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COMPUTER PROGRAMS MANUAL

ANALYTICAL STUDY OF CATALYTIC REACTORS FOR HYDRAZINE DECOMPOSITION

ONE-AND TWO-DIMENSIONAL STEADY-STATE PROGRAMS

- **by**

E.J. SMITH, D.B. SMITH and A.S. KESTEN

prepared for

NATIONAL AERONAUTICS AND SPACE ADMENISTRATION

AUGUST, 1968

CONTRACT NAS 7-45

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United Aircraft Research Laboratories

UNITED AIRCRAFT CORPORATION

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One- and Two-Dimensional Steady-State Models

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E. J. Smith, D. B. Smith and A. S. Kesten

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ABSTRACT

Two machine computational programs have been developed under MASA Contract NAS 7-456 to calculate the steady-state temperature and reac. It concentration distributions in typical catalyzed hydrazine decomposition reaction chambers. One program is based upon a one-dimensional model of the reactor system which describes the behavior of reactors having radially uniform injection profiles and catalyst bed configurations, while the other program is based upon a twodimensiona' model which permits consideration of nonuniform radial injection and of catalyst bed configurations exhibiting both radial and azial nonuniformities.

The one- and two-dimensional models and the computer programs developed from these models are described in detail in this computer manual. The manual contains operating instructions for these programs as well as descriptions of input and output formats, including all output massages. Also included is a discussion of pussible operational problems which might arise together with appropriate manual for solving these problems.

FOREWORD

This work was performed by United Aircraft Research Laboratories for the National Aeronautics and Space Administration under Contract NAS 7-458 initiated April 15, 1966.

Included among those who cooperated in performance of the work under NAS 7-458 were Dr. A. S. Kesten, Program Manager, Dr. W. G. Burwell, Chief, Kinetics and Thermal Sciences Section, Mr. D. B. Smith, Project Analyst, and Mrs. E. J. Smith, Applied Mathematician.

This work was conducted under program management of the NASA Chief, Liquid Propulsion Experimental Engineering Systems, NASA Headquarters, Washington, D. C., and the Technical Manager was Mr. T. W. Price, Jet Propulsion Laboratory, Pasadena, California. Report 0910461-30

Analytical Study of Catalytic Reactors

for Hydrazine Decomposition

Computer Programs Manual

One- and Two-Dimensional Steady-State Models

Contract NAS 7-458

SUMMARY

A description is contained herein of two machine computational programs developed under Contract NAS 7-458 with the National Aeronautics and Space Administration. These programs represent one- and two-dimensional steady-state models of catalyzed hydrazine decomposition reaction chambers. Both of these models consider both thermal and catalytic decomposition of reactants, along with simultaneous heat and mass transfer between the free-gas phase and the gas within the pores of the catalyst pellets. The one-dimensional model of the reactor system describes the behavior of reactors having radially uniform injection profiles and catalyst bed configurations, while the two-dimensional model permits consideration of nonuniform radial injection and of catalyst bed configurations exhibiting both radial and axial nonuniformities.

A general description of the one and two-dimensional models and a discussion of the machine programs developed from these models are contained in this manual. A description of input and output for both the one- and twodimensional steady-state programs are included in the discussion together with examples of typical data cases. Also included is a description of several operational problems which might be encountered while using the programs along with appropriate means for solving these problems. In addition, a short writeup of the subroutines contained in each deck is included along with general flow charts of the major routines.

INTRODUCTION

Under Contract NAS 7-458, the Research Laboratories of United Aircraft Corporation are performing analytical studies of the behavior of distributedfeed catalytic reactors for hydrazine decomposition. The specific objectives of this program are (a) to develop computer programs for predicting the temperature and concentration distributions in monopropellant hydrazine catalytic reactors in which hydrazine can be injected at arbitrary locations in the reaction chamber and (b) to perform calculations using these computer programs to demonstrate the effects of various system parameters on the performance of the reactor.

Progress previously reported in the first annual report (Ref. 1) included the development of a computer program which describes the steady-state behavior of a continuous flow type reactor system in which complete radial mixing in the free-gas (or liquid) phase was assumed. Progress previously reported in the second annual report (Ref. 2) included an extension of the steady-state program to include radial as well as axial variations in temperature and concentrations in order to permit an analysis of various injection schemes and catalyst bed configurations which exhibit radial nonuniformities. These programs had been used to calculate temperature and reactant concentration distributions as functions of feed temperature, chamber pressure, mass flow rate distribution, catalyst size distribution, and embedded injector locations. As part of the third year of contract effort attention has been directed toward preparing a manual describing to potential users the operation of these computer programs. The manual includes a general description of the one- and two-dimensional models as well as a detailed discussion of the machine programs representing these models.

DESCRIPTION OF ANALYSES

The analysis of a hydrazine engine reaction system carried out to date pertains to a reaction chamber of arbitrary cross section preceded with catalys particles into which liquid hydrazine is injected at arbitrarily selected locations. Catalyst particles are represented as "equivalent" spheres with a diameter taken as a function of the particle size and shape. Both thermal and catalytic vapor phase decomposition of hydrazine and ammonia are considered in developing equations describing the concentration distributions of these reactants. Diffusion of reactants from the free-gas phase to the outside surface of the catalyst pellets is taken into account. Since the catalyst material is impregnated on the interior and exterior surfaces of porous particles, the diffusion of reactants into the porous structure must also be considered. In addition, the conduction of heat within the porous particles must be taken into account since the decomposition reactions are accompanied by the evolution or absorption of heat.

One-Dimensional Steady-State Model

In developing the one-dimensional steady-state model, the temperature and reactant concentrations in the interstitial phase (i.e., the free-fluid phase as distinguished from the gas phase within the porous particles) are assumed to vary only with axial distance along the bed. In the entrance region of the reaction chamber, where the temperature is low enough to permit the existence of liquid hydrazine, vaporization of liquid is assumed to occur as a result of decomposition of vapor hydrazine within the pores of the catalyst particles. That is, catalytic reaction is assumed to be fast enough to keep liquid hydrazine from wetting the pores of the particles; the hydrazine concentration at the surface of the catalyst particles at any axial location in the entrance region is then computed from the vapor pressure of liquid hydrazine in the interstitial phase at the same axial location. Neglecting axial diffusion of heat or mass, the change in enthalpy of the interstitial phase in the region where liquid hydrazine is present (i.e., where $h_i \leq h_i^v$) is related to the concentration gradient at the surface of the porous catalyst particles by

$$G \frac{dh}{dz} + H^{N_2H_4}D_pA_p\left(\frac{dC_p^{N_2H_4}}{dx}\right)_s + F(h_i - h_F) = 0 \quad (1)$$

for $h_i \leq h_i^V$

The variation of mass flow rate, G, with axial distance is easily computed from the rate of feed of liquid hydrazine from the distributed injectors into the system. In the region where liquid hydrazine exists at temperatures below the vaporization temperature, the temperature may be obtained from

$$T_{i} = T_{F} + \frac{h_{i} - h_{F}}{C_{F}} \quad \text{for } h_{i} \leq h_{i}^{L} \quad (2)$$

In the two-phase region, where $T_i = T_{vap}$, the weight-fraction of vapor may be computed from

WEIGHT - FRACTION VAPOR =
$$\frac{h_i - h_i^L}{h_i^V - h_i^L}$$
 for $h_i^L \le h_i \le h_i^V$ (3)

At the axial position at which the enthalpy of the interstitial phase is just equal to the enthalpy of vapor hydrazine at the boiling point $(h_i = h_i^V)$, the

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fraction of hydrazine injected upstream of that point which has been decomposed is easily calculated from an overall heat balance. The associated amounts of ammonia, nitrogen, and hydrazine formed from decomposition of hydrazine can then be calculated taking the decomposition reaction as

$$2N_2H_4 - 2NH_3 + N_2 + H_2$$

should be noted that this is the overall reaction scheme determined experimentally for both homogeneous decomposition of hydrazine (Refs. 3, 4, 5) and low pressure heterogeneous decomposition of hydrazine on platinum surfaces (Ref. 6).*

In the remainder of the reaction c, where $h_i > h_i^V$, heat is being supplied to the system by homogeneous as well as heterogeneous decomposition of hydrazine. In addition, at sufficiently high temperature, heat is removed from the system by the endothermic decomposition of ammonia. For $h_i > h_i^V$ then, the change in enthalpy with axial distance is related to the reactant concentrations in the interstitial phase and at the surface of the porous catalyst particles by

$$\frac{dh_{i}}{dz} = -\frac{1}{G} \left\{ F(h_{i}-h_{F}) + A_{P}A_{C} \left[T_{i} - (T_{P})_{S} \right] + H^{N_{2}H_{4}} r_{hom}^{N_{2}H_{4}} \delta \right\}$$
(4)

The changes in reactant weight fractions in the interstitial phase with axial distance are related to the reactant concentrations in the interstitial phase and at the surface of the porous catalyst particles by

$$\frac{dW_i}{dZ} = \frac{i}{G} \left\{ F - r_{\text{hom}}^{N_2H_4} \delta - A_P \left(k_C c_i\right)^{N_2H_4} - F\left(\frac{c_i}{\rho_i}\right)^{N_2H_4} \right\}$$
(5)

^{*}It is more commonly assumed, without benefit of experimental evidence, that the decomposition reaction is $3 N_2H_4 - 4 NH_3 + N_2$, followed by dissociation of one of the four ammonia molecules to nitrogen and hydrogen. This two-step process leads to the same overall reaction cited above but assumes that a minimum of 25 percent of the ammonia produced by hydrazine decomposition also decomposes. The fractional ammonia dissociation, f, calculated assuming the validity of the two-step process is related by the fractional ammonia dissociation calculated in the present report by

$$\frac{\partial \mathbf{w}_{i}}{\partial z} = \frac{1}{G} \left\{ r_{hom}^{h_{2}H_{4}} \delta \frac{M^{hH_{3}}}{M^{h_{2}H_{4}}} + A_{p} \left(k_{C}C_{i} \right)^{h_{2}H_{4}} \frac{M^{hH_{3}}}{M^{h_{2}H_{4}}} - A_{p} \left(k_{C}C_{i} \right)^{h_{2}H_{4}} \frac{M^{hH_{3}}}{M^{h_{2}H_{4}}} \right\}$$

$$(6)$$

$$\frac{d_{W_{i}}^{N_{2}}}{dz} = \frac{1}{G} \left\{ \frac{1}{2} r_{NO^{N_{1}}}^{N_{2}H_{4}} \delta \frac{M^{N_{2}}}{M^{N_{2}H_{4}}} + \frac{A_{p}}{2} (k_{c}c_{i})^{N_{2}H_{4}} \frac{M^{N_{2}}}{M^{N_{2}H_{4}}} + \frac{A_{p}}{2} (k_{c}c_{i})^{N_{2}} \frac{M^{N_{2}}}{M^{N_{2}}} \frac{M^{N_{2}}}}{M^{N_{$$

$$\frac{dW_{i}^{H_{2}}}{dz} = \frac{1}{G} \left\{ \frac{1}{2} r_{hom}^{H_{2}H_{6}} \delta \frac{M^{H_{2}}}{M^{H_{2}H_{6}}} + \frac{A_{p}}{2} (k_{c}c_{i})^{H_{2}H_{6}} \frac{M^{H_{2}}}{M^{H_{2}H_{6}}} + \frac{3A_{p}}{2} (k_{c}[c_{i}-(c_{p})_{S}])^{H_{3}} \frac{M^{H_{2}}}{M^{H_{3}}} - F\left(\frac{c_{i}}{\rho_{i}}\right)^{H_{2}} \right\}$$

$$(8)$$

where the film coefficients, h_c and k_c , may be estimated from (Ref. 7)

$$A_{\rm C} = 0.74 \left(\frac{G}{A_{\rm P}\mu}\right)^{-0.44} (\overline{c}_{\rm F}G) \tag{9}$$

and

$$k_{c}^{J} = \left(\frac{C \ 61 \ 6}{\rho_{1}}\right) \left(\frac{\mu}{\rho_{1} \ D_{1}^{J}}\right)^{-0.667} \left(\frac{G}{A_{P}\mu}\right)^{-0.41}$$
(10)

The changes in reactant concentrations with axial Matanae are then given by

$$\frac{\partial c_i}{\partial z} = \rho_i \frac{\partial w}{\partial z} \qquad (11)$$

.

where

$$\frac{d\rho_{\rm i}}{dz} = \rho_{\rm i} \quad \left[\frac{1}{\dot{M}} \frac{d\dot{M}}{dz} - \frac{1}{\dot{T}_{\rm i}} \frac{dT_{\rm i}}{dz} + \frac{1}{P} \frac{d\rho}{dz}\right] \tag{12}$$

and

$$\frac{1}{\overline{M}} \frac{d\overline{M}}{dz} = -\frac{1}{\sum_{j=1}^{j} \frac{W_{i}}{M^{j}}} \sum_{j=1}^{j} \frac{1}{M^{j}} \frac{d_{W_{i}}}{dz}$$
(13)

and

$$\frac{dP}{dz} = -\left(\frac{1-\delta}{\delta^3}\right)\left(175 + \frac{150(1-\delta)}{2\alpha G/\mu}\right)\left(\frac{G^2}{2\alpha \rho_i g_c}\right)$$
(14)

The temperature of the interstitial phase in this region is related to the enthalpy by

$$h_{i} - h_{i}^{V} = \int_{T_{vop}}^{T_{i}} C_{F} dT_{i}$$
 (15)

It should be noted that the hydrazine concentration at the surface of a catalyst particle in the vapor region, $(c_p)_s^{N_2H_4}$, is taken as zero. This reflects the fact that the catalytic reaction is so fast that the rate of decomposition is controlled by the rate of diffusion of hydrazine from the bulk vapor, through a stagnant gas film surrounding the catalyst particles, to the outside surface of the particles. In the case of ammonia, film diffusion is rapid relative to the rate of dissociation of ammonia within the particles. The concentration of ammonia at the surface of the catalyst par-ticles, $(c_p)_s^{NH3}$, is therefore fairly close to the ammonia concentrations in the bulk vapor phase, z_1^{NH3} . The surface concentration can be calculated, along with the concentration profile in the porous particles, at any axial location by solving simultaneously the equations representing film and pore diffusion of heat and mass. In describing the diffusion of mass within a porous pellet, it is assumed that changes in the mass density of fluid within the particle are negligible relative to changes in concentration of the reacting species. In addition, pressure changes within the particle resulting from nonequimolar diffusion are neglected, as is heat transported by pore diffusion of mass. Assuming constant diffusion coefficients, D_n, and thermal conductivities, Kp, the equations describing heat and mass transfer within a catalyst particle may be written as

$$D_{p}^{NH_{3}} \nabla^{2} C_{p}^{NH_{3}} - r_{het}^{NH_{3}} = 0$$
 (16)

$$K_{p}\nabla^{2}T_{p} - H^{NH_{3}}r_{hei}^{NH_{3}} = 0 \qquad (17)$$

The boundary conditions which consider diffusion of heat and mass through a film surrounding a spherical particle are

$$D_{P}^{NH_{3}}\left(\frac{dc_{P}}{dx}\right)_{S}^{NH_{3}} = k_{C}^{NH_{3}}\left[c_{i}^{NH_{3}} - (c_{P})_{S}^{NH_{3}}\right]$$
(18)

and

$$\left(H h_{C} C_{i}\right)^{N_{2}H_{4}} + H^{NH_{3}} D_{p}^{NH_{3}} \left(\frac{\partial C_{p}}{\partial x}\right)_{S}^{NH_{3}} = h_{C} \left[T_{i} - (T_{p})_{S}\right]$$
 (12)

Using Eqs. (16) and (17), Prater (Ref. 8) has pointed out that temperature and concentration are related quite simply by

$$T_{p} - (T_{p})_{s} = \frac{HD_{p}}{K_{p}} [(c_{p})_{s} - c_{p}]$$
 (20)

The use of this relationship enables the reaction rate, r_{het}^{NH3} , to be written as a function of concentration alone instead of concentration and temperature. In this case, however, the reaction rate is a function of two parameters, $(T_p)_s$ and $(c_p)_s^{NH3}$, which are yet to be determined. Equation 16 can be solved for the concentration at any point in the porous particle in terms of the reaction rate, r_{het}^{NH3} , and the interstitial concentration, c_1^{NH3} . The solution is derived in Refs. 2 and 9 as an implicit integral equation given by

$$c_{p}(x)^{NH_{3}} = c_{i}^{NH_{3}} - \left[\frac{i}{x} - \frac{ak_{c}^{NH_{3}} - D_{p}^{NH_{3}}}{a^{2}k_{c}^{NH_{3}}}\right] \int_{0}^{x} \xi^{2} \frac{r_{het}^{NH_{3}}(C_{p})}{D_{p}^{NH_{3}}} d\xi \qquad (21)$$
$$- \int_{x}^{a} \left[\frac{i}{\xi} - \frac{ak_{c}^{NH_{3}} - D_{p}}{a^{2}k_{c}^{NH_{3}}}\right] \xi^{2} \frac{r_{het}^{NH_{2}}(C_{p})}{D_{p}^{NH_{3}}} d\xi$$

In order to determine the particle annonia concentration profile directly in terms of the interstitial temperature and reactint concentrations it is necessary to solve Eqs. 18, 19 and 21 similtaneously.

In the special case of negligible film resistance to heat and mass transfer (i.e. $(T_p)_s = T_i$ and $(c_p)_s = c_i$), Eq. (21) can be written, for any reacting species, as

$$c_{p}(x) = c_{i} - \left[\frac{i}{x} - \frac{i}{a}\right] \int_{0}^{x} \xi^{2} \frac{r_{het}(c_{p})}{D_{p}} d\xi$$

$$- \int_{x}^{a} \left[\frac{1}{\xi} - \frac{i}{a}\right] \xi^{2} \frac{r_{het}(c_{p})}{D_{p}} d\xi$$
(22)

It is Eq. (22) which is used to describe the hydrazine concentration profiles within the catalyst particles located in the liquid region of the reaction chamler. In this liquid region it is assumed that liquid hydrazine wets the cutside surface of "he catalyst particles so that $(c_p)_s^{N_2H_4} = c_i^{N_2H_4}$, where $c_1^{N_2H_4}$ is the vapor concentration in equilibrium with liquid hydrazine at temperature T_i . In the liquid-vapor region the situation is somewhat more complicated since it is difficult to predict whether liquid or a combination of liquid and vapor wets the outside surface of the catalyst particles. Both of these options are presently in the computer program representing the steadystate model. In the case in which both the liquid and vapor are taken to wet the particle surface, it is assumed that, at a given axial location, the fraction of the surface covered by vapor is equal to the weight-fraction of vapor present. Decomposition rates, computed essuming pure liquid surface coverage and then pure vapor coverage, are weighted accordingly. Fortuitously, for the system considered here, the liquid-vapor region is so narrow that the choice of either of these options has negligible effect on the resulting temperature distributions (Ref. 1).

Finite difference methods have been used to program for digital computation the ordinary differential equations describing the changes in enthalpy and reactant concentrations in the interstitial phase. No iteration is necessary to solve these equations numerically when the incremental axial distances are sufficiently small. The size of a succeeding increment is calculated at each axis! position as a function of the rates of change of temperature and fractional ammonia dissociation with axial distance. However, Eqs. (21) and (22), which must be solved simultaneously with the differential equations, are implicit integral equations which require iterative procedures for solution. Hand calculations have indicated that convergence to solutions for $c_p(x)$ are difficult to achieve unless the initial estimates of the concentration distributions are fairly accurate. Methods have been developed for generating these estimates and ite. tive procedures have been devised which effect rapid conver-

gence over a fairly wide range of conditions. These procedures are presently used as subroutines in the main program representing the steady-state model.

Two-Dimensional Steady-State Model

In aeveloping the two-dimensional steady-state model of a hydrazine reactor system the temperature and reactant concentrations in the bulk fluid phase are permitted to vary with radial and axial position in the reaction chamber. In the entrance region of the reactor, where the temperature is low enough to permit the existence of liquid hydrazine, radial mixing between adjacent layers of liquid is neglected. The equations representing the change in liquid enthalpy and temperature with axial distance at any radial position are the same as those developed for the one-dimensional model described previously. As in the one-dimensional model, catalytic reaction is assumed to be fast enough to keep liquid hydrazine from wetting the pores of the particles; the hydrazine concentration at the surface of the catalyst particles at any location in the entrance region is then computed from the vapor pressure of liquid hydrazine in the interstitial phase at the same location.

In the vapor regions of the reaction chamber, turbulent diffusion of heat and mass is considered as a mecha. In for radial mixing. Radial heat and mass fluxes are computed as functions of temperature and reactant concentration gradients. Heat is being supplied to the system by homogeneous as well as heterogeneous decomposition of hydrazine, and is being removed from the system by the catalytic decomposition of examonia. The change in enthalpy with exial distance at any radial location is related to the reactant concentrations in the interstitial phase and at the surface of the porous catalyst particles by

$$\frac{\partial h_i}{\partial z} = -\frac{1}{G} \left\{ F(h_i - h_F) + A_P h_C \left[T_1 - (T_P)_S \right] + H^{N_2 H_a} r_{hom}^{N_2 H_a} \delta \right. \\ \left. + \frac{\partial q_r}{\partial r} \delta + \frac{q_r}{r} \delta + \frac{\partial T_1}{\partial r} \delta \sum_{j} N_r^{J} C_F^{J} \right\}$$
(23)*

The changes in reactant weight fractions in the interstitial phase with axial distance at any radial location are related to the reactant concentrations in the interstitial phase and at the surface of the porous catalyst particles by

^{*}Equations of this type are presented in somewhat different form in Ref. 7. The last term on the right-hand side of the equation reflects the heat transferred by the radial diffusion of mass.

$$\frac{\partial W_{i}}{\partial z} = \frac{1}{G} \left\{ F - r_{hom}^{N_{2}H_{4}} \delta - A_{p} \left(k_{C} c_{i} \right)^{N_{2}H_{4}} - \frac{\partial N_{r}^{N_{2}H_{4}}}{\partial r} \delta - \frac{N_{r}^{N_{2}H_{4}}}{r} \delta - F \left(\frac{Ci}{\rho_{i}} \right)^{N_{2}H_{4}} \right\}$$

$$(24)$$

$$\frac{\partial W_{i}^{NH_{3}}}{\partial z} = \frac{1}{G} \left\{ r_{hom}^{N_{2}H_{4}} \delta \frac{M^{NH_{3}}}{M^{N_{2}H_{4}}} + A_{p} (k_{c} C_{i})^{N_{2}H_{4}} \frac{M^{NH_{3}}}{M^{N_{2}H_{4}}} \right\}$$
(25)
$$- A_{p} \left(k_{c} \left[C_{i} - (C_{p})_{s} \right] \right)^{NH_{3}} - \frac{\partial N_{r}^{NH_{3}}}{\partial r} \delta - \frac{N_{r}^{NH_{3}}}{r} \delta - F \left(\frac{C_{i}}{\rho_{i}} \right)^{NH_{3}} \right\}$$

$$\frac{\partial w_{i}}{\partial z}^{H_{2}} = \frac{i}{G} \left\{ \frac{1}{2} \frac{N_{2}H_{4}}{r_{horn}} \delta \frac{M^{N_{2}}}{M^{N_{2}H_{4}}} + \frac{\Delta_{p}}{2} \left(k_{c}C_{i} \right)^{N_{2}H_{4}} \frac{M^{N_{2}}}{M^{N_{2}H_{4}}} \right.$$

$$\left. + \frac{\Delta_{p}}{2} \left(k_{c} \left[C_{i} - \left(C_{p} \right)_{S} \right] \right)^{NH_{3}} \frac{M^{N_{2}}}{M^{NH_{3}}} - \frac{\partial N_{r}^{N_{2}}}{\partial r} \delta - \frac{N_{r}^{N_{2}}}{r} \delta - F \left(\frac{C_{i}}{\rho_{i}} \right)^{N_{2}} \right\}$$

$$(26)$$

$$\frac{\partial w_i^{H_2}}{\partial z} = \frac{1}{G} \left\{ \frac{1}{2} r_{hom}^{N_2H_4} \delta \frac{M^{H_2}}{M^{N_2H_4}} + \frac{A_p}{2} (k_c c_i)^{N_2H_4} \frac{M^{H_2}}{M^{N_2H_4}} + \frac{3A_p}{2} (k_c (c_i)^{N_2H_4} \frac{M^{H_2}}{M^{N_2H_4}}) \right\}$$

$$+ \frac{3A_p}{2} \left(k_c [c_i - (c_p)_s] \right)^{N_H_3} \frac{M^{H_2}}{M^{N_H_3}} - \frac{\partial N_r^{H_2}}{\partial r} \delta - \frac{N_r^{H_2}}{r} \delta - F \left(\frac{c_i}{\rho_i}\right)^{H_2} \right\}$$
(27)

where

$$q_r = -\lambda \left(\frac{\partial T_i}{\partial r} \right) \tag{28}$$

$$N_r^J = -\epsilon \left(\frac{\partial c_i^J}{\partial r} \right)_r \tag{29}$$

$$\mathcal{N}_{c} = 0.74 \left[\frac{G}{A_{P} \mu} \right]^{-0.41} \left[\overline{C}_{F} G \right]$$
(30)

$$k_{c}^{J} = \left[\frac{0.61G}{\rho_{i}}\right] \left[\frac{\mu}{A D_{i}^{J}}\right]^{-0.657} \left[\frac{G}{A_{p}\mu}\right]^{-0.41}$$
(31)

The eddy conductivity and diffucivity may be estimated from (Ref. 11)

$$\lambda = \frac{a \,\overline{C_F} \,G}{5 \,\delta} \qquad \text{and} \qquad \varepsilon = \frac{a \,G}{5 \,\rho_i} \qquad (32)$$

The changes in reactant concentrations with axial distance are then given by

$$\frac{\partial c_i^{J}}{\partial z} = \rho_i \frac{\partial w_i^{J}}{\partial z} + \frac{c_i^{J}}{\rho_i} \frac{\partial \rho_i}{\partial z}$$
(33)

where

$$\frac{\partial \rho_i}{\partial z} = \rho_i \left[\frac{1}{M} \frac{\partial M}{\partial z} - \frac{1}{T_i} \frac{\partial T_i}{\partial z} + \frac{1}{P} \frac{\partial P}{\partial z} \right]^2$$
(34)

$$\frac{1}{\overline{M}} \frac{\partial \overline{M}}{\partial z} = -\frac{1}{\sum_{J} (w_{i}J/M^{J})} \sum_{J} \frac{1}{M^{J}} \frac{\partial w_{i}^{J}}{\partial z}$$
(35)

and the pressure drop may be estimated from the Ergun equation (Ref. 7) as

$$\frac{d\rho}{dz} = -\left(\frac{1-\delta}{\delta^3}\right) \left(1.75 + \frac{150(1-\delta)}{2 \,\mathrm{aG}/\mu}\right) \left(\frac{G^2}{2 \,\mathrm{a}\rho_\mathrm{i} \mathrm{g}_\mathrm{c}}\right) \tag{36}$$

The mass flow rate, G, is computed as a function of the rate of feed of liquid hydrazine from the distributed injectors into the system. Bulk radial flow, caused by particle-fluid viscous interaction, is neglected. It is assumed, therefore, that downstream of the injectors the mass flow rate profile remains unchanged.

DISCUSSION OF ONE- AND TWO-DIMENSIONAL STEADY-STATE COMPUTER PROGRAMS

The equations representing the one- and two-dimensional steady-state models have been programmed for the UNIVAC 1108 digital computer. These comruter programs are discussed below. Included in this discussion are input and output descriptions and descriptions of common operational problems associated with the programs.

One-Dimensional Steady-State Model

Input Description

The following is a listing of the necessary input for the one-dimensional steady-state computer program. The input format is given in Table I. The coding of a sample data case is shown in Fig. 1 and a listing of the input data punch cards corresponding to this sample data case is shown in Fig. 2. The card numbers in the text below correspond to the card numbers (first column) of Table I. For each run there will be only one card number one. Cards 2 through 16 should be repeated for each data case to be run.

- 1. The first card contains the number NCASE. This number indicates the number of data cases with each run. $1 \leq NCASE \leq 999$.
- 2. The second card is the title card used for individual data case identification. The title may be any alpha numeric information desired.
- 4. The fourth card contains the eight constants ZO, GO, FC, ALPHA3, HF, R, WM4, and WM3.
 - Z0 is the axial distance to the end of a buried injector in ft. (Ref. 1).

GO	is t	the	inlet	mass	flow	rate	in	lb/ft ² -sec.	It mus	t be
	gree	ater	than	zero	•					

- FC is the rate of feed of hydrazine from buried injectors (Ref. 1) into the system in lb/ft³-sec.
- ALPHA3 is the preexponential factor in the rate equation for the thermal decomposition of hydrazine (See Ref. 1). It equals $2.14 \times 10^{10} \text{ sec}^{-1}$.
- HF is the enthalpy of liquid hydrazine entering the bed in Btu/lb.
- R is a gas constant. It equals 10.73 (psia-ft³)/(lb mole-deg R).
- WM4 is the molecular weight of hydrazine. It equals 32.048 lb/ lr mole.
- WM? is the molecular weight of ammonia. It equals 17.032 lb/lb mole.
- 5. The fifth card contains the eight constants WM2, WML, ALPHA1, ALPHA2, AGM, BGM, KP, and CGM.
 - WM2 is the molecular weight of nitrogen. It equals 28.016 lb/lb mole.
 - WM1 is the molecular weight of hydrogen. It equals 2.016 lb/lb mole.
 - ALPHAL is the preexponential factor in the rate equation for the catalytic decomposition of hydrazine (See Ref. 1). For the Shell 405 catalyst it equals $10^{10} \mathrm{sec^{-1}}$.
 - ALPHA2 is the preexponential factor in the rate equation for the catalytic decomposition of annonia (See Ref. 1). For the Shell 405 catalyst it equals $10^{11}(1b/ft^3)^{1.6}(sec)^{-1}$.
 - AGM is the activation energy for the catalytic decomposition of hydrazine, divided by the gas constant. For the Shell h05 catalyst it equals 2500 deg R.
 - BGM is the activation energy for the catalytic decomposition of ammonia, divided by the gas constant. For the Shell 405 catalyst it equals 50,000 deg R.

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ΚP	is the thermal conductivity of the porous catalyst par- ticle. For the Shell 405 catalyst it equals 0.4x10 ⁻⁴ Btu/ft-sec-deg R.
CGM	is the activation energy for the thermal decomposition of hydrazine, divided by the gas constant. It equals 33,000 deg R.
The sixth ENMX3, DI	card contains the seven constants TF, OFL, ENMX1, ENMX2, F3, DIF4, and the inlet value of PRES.
TF	's the temperature of liquid hydrazine entering the bed in aeg R.
CFL	is the specific heat of liquid hydrazine. It equals 0.7332 Btu/lb-deg R.
ENMX1.	is the constant used to determine the size of axial station increments in the liquid region. It equals 200. Increas- ing this number would result in a decrease in size of axial station increments (and an increase in computer run time).
ENMX2	is the constant used to determine the size of axial station increments in the liquid-vapor region. It equals 40. In- creasing this number would result in a decrease in size of axial station increments (and an increase in computer run time).

- ENMX3 is the constant used to determine the size of axial station increments in the vapor region. It equals 80. Increasing this number would result in a decrease in size of axial station increments (and an increase in computer run time).
- DIF3 is the diffusion coefficient of ammonia in the gas phase at SIP. It equals $0.17 \times 10^{-3} \text{ft}^2/\text{sec}$.
- DIF4 is the diffusion coefficient of hydrazine in the gas phase at STP. It equals $0.95 \times 10^{-4} \text{ft}^2/\text{sec}$.

PRES is the inlet chamber pressure in psia.

7. The seventh card contains the four constants ZEND, EN1, EN2, and EN3.

n #*

ZEND is the catalytic bed length in ft.

- EN1 is the order of hydrazine catalytic decomposition reaction with respect to hydrazine. For the Shell 405 catalyst it equals 1.0.
- EN2 is the order of ammonia catalytic decomposition reaction with respect to ammonia. For the Shell 405 catalyst it equals 1.0.
- EN3 is the order of ammonia catalytic decomposition reaction with respect to hydrogen. For the Shell 405 catalyst it equals -1.6.
- 8. Cards 8 through 10 contain ZTBLA(I), the interpolation table used to obtain the catalyst particle radius at any point along the reactor bed. Subroutine UNBAR, an interpolation routine developed at the United Aircraft Research Laboratories, is used to obtain an appropriate particle radius, A, for a given axial station, Z(I), along the bed. For this table there should be a total of (NØFZ) Z's and (NØFZ) A's. The table is set up as follows.

CARD NO.

- 8 This card contains the four table descriptors used by UNBAR. The first descriptor signifies the table number. For this program it equals 0.0. The second descriptor tells at what location in the array the table starts; the tables in this program are read in such that this number equals 1.0. The third descriptor is the number of independent variables in the table (in this case, the number of Z's). This number equals NØFZ. The fourth descriptor for a univariate table such as this one should equal 0.0.
- 9 These cards contain the monatonically increasing Z values. Enough cards should be used to contain NØFZ values of Z at the rate of ten per card. For example, if NØFZ = 12, 12 values of Z should be input using two cards with ten values on the first card and the 2 remaining values on the second card.
- 10 These cards contain the A's which correspond to the Z's listed on cards 9. Enough cards should be used to contain NØFZ values of A at the rate of ten per card.
- 9. Cards 11 through 13 contain ZTBLAP(I), the interpolation table used to obtain the total external catalyst particle surface area per unit volume of bed (AP). These AP values are obtained from UNBAR as func-

tic s of exial distance (Z) as in the ZTF(A table discussed above. For this table there should be a total of (NØFZ) Z's and (NØFZ) AP's. The table is set up as follows:

CARD NO.

- 11 This card is exactly the same as card 8.
- 12 These cards are exactly the same as cards 9,
- 13 These cards contain the AP values which correspond to the Z's listed on cards 12. Lnough cards should be used to contain NØFZ values of AP at the rate of ten per card.
- 10. Cards 14 through 16 contain ZTBLD(I), the interpolation table used to obtain the interparticle void fraction (DELA). These DELA values are obtained from UNBAR as functions of axial distance (Z) as in the ZTBLA table discussed above. For this table there should be a total of (NØFZ) Z's and (NØFZ) DELA's. The table is set up as follows:

CARD NO.

- 14 This card is exactly the same as card 8.
- 15 These cards are exactly the same as cards 9.

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16 These cards contain the DELA values which correspond to the Z's listed on cards 15. Enough cards should be used to contain NØFZ values of DELA at the rate of ten per card.

	Program	
	Computer	
I FIANT	Steady-State	Input Format
	One-Dimensional	

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FORTRAN Z FORMAT	13* 1	14A6	212, 13 *	BEI0.5		8Elo.5	8E10.5
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*All I format numbers should be right adjusted

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NOMENCLA URE	Bed length Order of decomposition reaction Order of decomposition reaction Order of decomposition reaction	Table descriptor Table descriptor Table descriptor Table descriptor	Axial station	Catalyst Farticle Radius	Table descriptor Table descriptor Table descriptor Table descriptor
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FORTRAN X FORMAT	8rio. 5	4. F.8. 5	1.1 DE8.5	. LOE3. 5	μ Ε8.5
NUMBER OF CARDS	1	r-1	*	*	
CARD NUMBER		ω	*	10**	

*Enough cards should be used to contain NOFZ values of z at the rate of ten per card. **Enough wards should be used to contain NOFZ values of A at the rate of ten nur card.

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FORTRAN IZ FORMAT	10E8.5	10E8.5	4E8.5	10E8.5	10E8.5
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CARD	12*	13**	14	15*	

*Fnough cards should be used to contain NOFY values of z at the rate of ten per card.

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LISTING OF 'NFUT DATA FUNCE CARDS: SAMPLE CASE One-Dimensional Steady-State Model FIG. 2

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Output Description

Output from the one-dimensional st ady-state program is entirely in printout form. Standard output, which is printed out when input option PRINT = C, includes all printing normally done during execution of any representative data case, three messages which pertain to calculations which do not follow the normal pattern in a typical run, and one error message which is followed by program termination. Non-standard output is printed in addition to the standard output when PRINT = 1. This non-standard output includes additional calculated values and comments which pertain to intermediate calculations. The print statements associated with each routine in which output is generated are described below.

Standard Output

MAIN program

- 1. A complete listing of all program input including FØRTRAN variable titles for all input variables.
- 2. Axial position, (Z), temperature, (TEMP), enthalpy, (H), and rate of change of enthalpy with axial distance, (DHDZ), for each axial position in the liquid region.

Subroutine LQVP or LQV2

1. Axial position, (Z), temperature, (TEMP), enthalpy, (H), and weight fraction of vapor, (WFV), for each axial position in the liquid-vapor region.

Subroutine VAPØR

- Axial position, (Z), temperature, (TEMP), pressure (PRES), enthalpy, (H), and concentrations of hydrogen, (C1), nitrogen, (C2), ammonia, (C3), and hydrazine, (C4), at each axial position in the vapor region.
- 2. Mole fractions of hydrogen, (MFRAC1), nitrogen, (MFRAC2), ammonia, (MFRAC3), and hydrazine, (MFRAC4), and the fractional dissociation of ammonia, (FRAC3D), at each exial position in the vapor region.
- 3. All axial positions, (Z values), in the vapor region listed consecutively and MBAR and G values at the end of the reactor for use in preparing input to the transient model computer program.

4. "KOUNT = XX --- THIS INTERVAL HAS BEEN REDIVIDED XXXX TIMES"

For all cases involving a non-zero embedded injector feed rate, a check is made on the Z step size after each calculation. If the increment proves too large to yield satisfactory results, it is halved and rechecked. The procedure continues until a satisfactory interval size is found, and the above message is then printed.

- 5. "THERE IS A PUDDLE OF COLD HYDRAZINE AT THE LIQUID-VAPOR/VAPOR INTERFACE --- TRY USING A LARGER VALUE FOR GO"
 - When using a buried injector scheme it is possible to "flood" the region surrounding the injector tip with cold, liquid hydrazine. A sudden drop in axial temperatures at the liquid-vapor/vapor interface indicates that this has occurred, and in such cases the above message is printed and no further calculations are made.

Subroutine SGRAD

1. "WE HAVE CALCULATED A NEGATIVE XO DURING ITERATION NO. XX. SET XO = 0, CALCULATE TPS = .XXXXX + XX, AND CONTINUE"

XO represents an approximation of the radial distance to which hydrazine penetrates the catalyst particle before being dissipated. It is determined through an iterative procedure, and in some instances initial guesses do not yield satisfactory results. In this case, corrective measures to yield a better approximation to XO are instituted and the procedure repeated. This message indicates only that corrective calculations to improve on the accuracy of XO are being initiated.

2. "UNABLE TØ CØNVERGE ØN CPS IN 50 TRIES --- CP(X/A) = .XXXXX + XX"

If subroutine SGRAD cannot calculate a "converged" value for CPS after 50 iterations, the final value for CP at the particle surface is used to approximate CPS. This is a good approximation to CPS, however, and program calculations continue with the above message being printed.

3. "UNABLE TØ FIND SUITABLE XO AFTER FØUR TRIES ØF 25 ITERATIØNS EACH ----PRØGRAM STØP FØLLØWS"

If after four corrective attempts to approximate XO the procedure still does not yield satisfactory results, this message along with all unacceptable values for XO is printed and further calculations are stopped. An octal dump of core accompanies the program stop.

Non-Standard Output

Subroutine SLØPE

1. "INITIAL CHØICE THRØUGH ØRIGIN IS TØØ LARGE"

When iterating to find a satisfactory approximation to the radial depth of penetration of hydrazine in a catalyst particle (XO calculation), an initial guess is the particle radius itself. If this proves to be an unsatisfactory choice, the above message is printed and a different initial guess is used.

2. "SATISFACTØRY STARTING CURVE FØUND AFTER XX TRAILS. THE VALUE ØF B (XO) IS .XXXXXX + XX"

This message indicates that a satisfactory approximation to the radial depth of penetration of hydrazine in a catalyst particle has been found, and appears frequently in calculations involving the liquid region of the reactor.

3. "INITIAL CHØICE THRU ØRIGIN SEEMINGLY ØK, BUT RESULTS RØTTEN AFTER 99 ITERATIONS --- SET XO = .000001* A AND USE MØRE REFINED TECHNIQUE"

When calculating a concentration vs radial position profile within the catalyst particle, an initial guess at the profile is used assuming a linear profile from the center of the particle to the surface. It can happen that this appears to be a satisfactory first guess, but ultimately yields unsatisfactory results for the final "converged" values of CPA. In such instances the above message is printed and the iteration procedure is repeated using a new initial guess.

4. "ITERATIÓN = XX

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X/A	CPA	X/A	CPA	X/A	CPA	``X/A	CPA
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When a converged value for the slope of the concentration profile curve at the catalyst particle surface has been calculated, the above "concentration profile" will be printed. The word "ITERATIØN" refers to the

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iteration count at the time of convergence. X/A is the normalized distance from the center of the catalyst particle of radius A to the surface. CPA is the concentration of hydrazine within the particle at the corresponding normalized radial distance. The final message indicates the final converged value of the slope. This block will be printed for each axial station of the liquid region.

5. "THE SLOPE CONVERGES TO .XXXXXX + XX"

This measure indicates that the iterative procedure has achieved convergence on a value of the hydrazine concentration gradient at the catalyst particle surface, and appears frequently in calculations involving the liquid region of the reactor.

Subroutine SGRAD

- 1. A listing of converged reactant concentration (CP(X/A)) versus normalized radial distance within the catalyst particle (X/A) at each axial position in the vapor region.
- 2. (a) "CONCENTRATION GRADIENT MOUND AFTER XXX TRIES"
 - (b) "CP(X) AT PARTICLE SURFACE = .XXXXX + XX"
 - (c) "KC3* (CI3-CPS) = .XXXXX + XX"
 - (d) "HC* (T-TPS) = .XXXXX + XX"

Print message (a) indicates the number of iterations that were needed a to find a converged value for the concentration gradient.

Print message (b) gives the converged value for the concentration at the particle surface $(c_p)_g$.

Print messages (c) and (d) give calculated values where KC3 is the mass transfer coefficient for ammonia, C13 is the interstitial concentration of ammonia at the catalyst surface, HC is the heat transfer coefficient, T is the interstitial temperature, and TPS is the temperature at the surface of the catalyst.

Print messages (a), (b), (c), and (d) appear at each axial position in the vapor region.

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3. "SATISFACTORY XO FOUND AFTER XXX TRIES, XO = .XXXXX ± XX"

When calculating an ammonia concentration radial profile within a catalyst particle it is necessary to determine the radial depth of penetration of ammonia. The approximate radial position of "zero" concentration is referred to as XO in subroutine SGRAD, and wher "the iterative procedure employed has successfully determined a value of XD, the above message, with iteration count, is printed.

A sample listing of the output for a typical one-dimensional steady-state data case is shown in Figs. 3a through 3f.

LISTING OF OUTPUT FOR SAMPLE DATA CASE ONE-DIMENSIONAL STEADY-STATE

FIG. 3 a

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	.21262 3 -03	•715978+03	\$3000+03	TVAP TVAP 528000-03	CONSTANTS CFL 733200-00	PRESSURE • 10000+03	,400000-04	000000	61 • 300001+n1	11
R 107300+02	ALPMAS 214000411	.33000+05	DIF3	0154 •95000-04	320480+02	WM3 4170320+02	* WM2 * 280160+02	WM1 •201600+01	ZEND 250600-00	
·250000+04	86# 503003405	ALPHA1 . 100000+11	ALPHA2 .100000412	•100000+01	. 10000+01-	•160000+01	ENMX1 2000U0403	ENMX2 .400000+02	ENMX3 .800000+02	~
• 000000						•				
.000000 .111900+00	,550000-02 ,125500-00	•111000-01 •139100-01	<u>•000000</u> •167000-01 •152700-00	2 \ •100006+01 •166900-01 •166300-00	/5 A 748LE ▲210000+02 •*39000+01 •179900-01	.006000 .57500-01 .193500-00	711000-01 207100-00	.847000-01 .220790-00	.983000-01 .234300-00	
.100006-02	.100000-02 .640000-02	. 100000-52 .640005-02	.100000-02 .640000-02	•640000-02 •640000-02	•640000-02 •640000-02	.640000-02	.640000-02 .640000-02	.640000-02 ,640000-02	.640000-02 .640000-02	
•000000 •111900+00 •111900+00	•550090=02 •125580=02	•111000-01 •139138-00	.000000 .1570000	2 V5 2 V5 2 V5 2 V5 2 V5 2 V5 2 V5 2 V5	5 AP TABLE 210000402 439000-01	•00000 •5750000 •193500-01	0-001012, 201100-01	.847090-01 .220770-91	,9830A0-01 ,23430A0-01	
210000+04 .330000+03 .330000+03	, 210000+03 , 330000+03	+210000+04 •330000+03	*210200+04 •330000+03	• 330000+03 • 330000+03	• 33000+03 • 330000+03	•330000+03 •330000+03	.330000+03 .330000+03	•330000+03 •330000+03	.330000+03 .330000+03	
\$00000 \$111900+00	.550000-02 .125580-02	.111000-01 .139100-00	• 000000 • 167000-01 • 152700-00	Z VS C •100000+01 •168000-01	DELTA TABLE .210000402 .439000-01 .179900-00	.000000 .575000-01	711000-001 ,711000-01 ,****	.847090-01 .220710-01	.983nnn-r1 .234,50-r1	
.240000-00 .340000-00 .340000-00	.340000-00 .340000-00	- 340000-00 - 340000-00	.340000-00 .340000-00	.340766-00 .340766-00	00-000072* 00-000072*	. 340000~00 . 340000-00		.348099-99 .3480999-98	.340nnn+n0 .340nnn+n0	

FIG. 36

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20H0	.750974+07	ZOHO.	.935122+07	ZCHO	.117621+08	ZQHQ	.151922+08	20HO	.167059+08	DHUZ	.225211+08	ZOHO	.269846+08	20140	80++06245.	Zaha	. 58323408
Ĩ	141740403		.151152+03	T	.160563+03	Í	.169972+03	I	.179380+03	T	.108786403	Ĩ	.196190+03	H	.207593403	T	• 212628+03
TENP	.723316+03	TEMP	-736154+03	TEMP	* 748968+03	TEMP	.761822+0:	1EMP	りつ ナカビ ウナドト・	16EP	.787462+03	TEMP	.00030C+05	LEND	504551518.	TENP	• 820000403
N	.732365-03	2	.733618-03	N	,734627-03	N.	735427-03	2	736046-03	2		N	736964-03	2	00-075606	2	,737459-03

FIG. 3c
5610 ¹ ***	- 2 - 10日 - 10日 - 2 - 10日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 11日 - 110 -			00+74002*	00-692A2"	00-0049**	20100000 ·	.65430-00	00-24272		04-22426	.100004.01
"IQUID-WAPOR RI	I	00+00AG2.	50+05000 °	ウローウビウジワー	\$04+3900t	00+09454	00+19461	20+19115	58865+03	60+39696"	\$6+542+9%	"71548+U3
ENTERING I	TEMP	3 B2000403	6200028	.82000+03	.82000+03	.62000+03	.8200C+02	.82000+03	.62000+03	A2000+03	82000+03	
· · · · · · · · · · · · · · · · · · ·	 2	20-04464	. 73893-03	74016-03	74138-03	74261-05	74384-03	74506-05	74629=03	74761-03	74874-03	. 75082-03

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FIG. 3d

	-					2.	
2,75082274-05	7EMP • 82000400+03	. 100000+03	.7154779840S	c1 31579918-02	C2 +5885062-01	C3 •53560837-01	,16743158-00
	NFRAC1 •13782692-00	MFRAC2 .13782692-00	HFRAC3 .27563384-00	NFRAC4 . 44869231-00			
2 90740574-03	TEMP * 86645369+03	PNES 99981377+02	, 73897909+03	. S2506140-02	.43334969-01	C3 •50454650-01	,14735426-00
~	NFRAC1 .15041867-00	MFRAC2 .14429730-00	NFRAC3 27635187-00	NFRAC4 .42695217-00	FRAC3D .21670507-01		
2 10665796-02	76MP •9158767+03	\$99960 8 99402	,76246590+03	() C1 .33173817-02	- 52 42790974-01	C3 - C3 - 16003847=01	54 •13356108-00
	MFRAC1 .16197901-00	NFRAC2 .15034778-00	NFRAC3 27743711-00	. +1023511-00	- FRAC3N .40233626-01		
2 2 32278735-02	TEMP .95559712+03	PRES ,99938571+02	, 78594348+03	C1 .33603019-02	62 •42236626=61	C3 45931103-01	r4 •12162284+n0
	NFRAC1 •17243814-00	MFRAC2 .15595528-00		" Мрядси •39260677-00	FRAC3D \$5749761=01		
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FIG. 3e

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,17155202-0(тем ^р 0 .195072434	· 78	PRES 1863929+02	H 14092872+04	c1 • 39661221-02	52 ,31522408-0		13 98352-02	#U 0000	0000
	124.42 1946-1969	1C1 555-00	MFRAC2 • 30754914-00	#FRACS .15470531-00	. 900000	5380651				
1 8-66666 67;	TEMP	-04 • 71	PRES 683713+02	,13780029+64	61 61 • 380%60%0-02	C2 .29667359=0	, 777, 10	.3 5879-02	40 60 60 7 8	0000
		123 8- 00	##XCZ .31099591-00	HF7ACS .13403679-00	NFRAC4 .00000000	543C1	56-00 56-00			
							- 1			
			-						2	
7508227-03 2459069-02 4085/468-02 5797482-02 5797482-02	.9074057-03 .2656209-02 .5157416-02 .1043560-01	1066580+(2858234+(5493988+(1225689-0	22.1227674-01 22.30686899-01 22.5656422-01 11.14655076-01 11.2208696-01	Z'S FROM VAL 2 .1392110-02 2 .3269989-02 5 .6249363-02 1 .408569-01	207 RE610M • 1559678-02 • 3516443-02 • 1487130-01 • 1487130-01 • 1487130-01	1730142-02 3755323-02 7151910-02 1467891-01	1905576-02 4005576-02 7680163-02 1230174-02	2 .2054611 2 .2054619999 6 8276725 6 .1552457 1 .1323280	NNNH0 000000	2269192-02 4547596-02 8971330-02 1659306-01 1519400-00
	3 5 5 7 7 7 7					-				
-			STEAUT SIA	TE VALUES FOK M 1 .12115402	34K AWD & AT E 6 II 3060	ND 0F 840 0+01				
4			140 0000	ERATIONS COMPLET						

FIG. 3f

Common Operational Problems

Many different data cases have been run with the one-dimensional steadystate computer program. During these runs, most of the problems which have developed have been eliminated through program modification. However, two problems which may still occur are noted below, together with appropriate techniques for solving them.

1. "UNABLE TØ FIND SUITABLE XD AFTER FØUR TRIES ØF 25 ITERATIØNS EACH ... PRØGRAM STØP FØLLØWS"

If a satisfactory value for XO cannot be found after four attempts, this message is printed and program execution is terminated. An appropriate solution to this problem would be to try different values for f_i [Eq. (I-11) in discussion of SGRAD, Appendix I]. These values could be greater than 0.95. To make this change, subroutine SGRAD would have to be recomplied using the new values of f_i .

2. "THERE IS A PUDDLE OF COLD HYDRAZINE AT THE LIQUID-VAROR/VAROR INTERFACE --- TRY USING A LARGER VALUE FOR GO"

When using a buried injector scheme it is possible to "flood" the region surrounding the injector tip with cold, liquid hydrazine. A sudden drop in axial temperatures at the liquid-vapor/vapor interface indicates that this has occurred, and in such cases the above message in printed and no further calculations are made. A: appropriate solution to this problem would be to try a larger input value for GO and rerun the program with the revised input.

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Two-Dimensional Steady-State Model

Input Description

The following is a description of the necessary input for the two-dimensional steady-state computer program. The input format is given in Table II. The coding of the sample data case for this program is shown in Figs. 4a and 4b, and a listing of the input data punch cards corresponding to this sample data case is shown in Figs. 5a and 5b. The statement numbers in the text below refer to the card numbers (first column) of Table II. For each run there will be only one card number one. Cards two through twenty-one should be included for each data case to be run.

- 1. The first card contains the number NCASE. This number indicates the number of data cases with each run. $1 \le NCASE \le 999$.
- 2. The second card is the title card used for individual data case idenatification. The title may be any alpha numeric information desired.
- 3. The third card contains the indicators NRINGS and NØFZ. NRINGS indicates the number of evenly spaced radial stations at which calculations are to be made where radial station number one is that one nearest the center of the reactor and radial station number (NRINGS) is that station nearest the reactor wall. For typical runs, NRINGS = 10 was found adequate to insure. good results. Increasing this number would allow more detailed radial analysis, but it would also increase computer run time. NØFZ is the number of axial stations (Z's) to be used in the three tables input on cards 10 through 21.
- 4. Cards four contain the values of F(I), (the races of feed of hydrazine from buried injectors (Ref. 1) into the system in $1b/ft^3$ -sec). One value of F for each radial station (total number of radial stations = NRINGS) should be input. Ten numbers are allowed to a card. For the suggested NRINGS of 10, there would be one card with ten values of F.
- 5. Cards five contain the values of GO(I), (the inlet mass flow rates in lb/ft^2 -sec) for each radial station. Ten numbers are allowed to a card. For the suggested NRINGS of 10, there would be one card with ten values of GO. All values of GO must be greater than zero.
- 6. Cards six contain the values of ZO(I), (the axial distance to the end of a builed injector in ft) for each radial station. Ten numbers are allowed to a card. For the suggested NRINGS of 10, there would be one card with ten values of ZO.
- 7. The seventh card contains the eight constants ALFHA3, HF, R, MN2N4, MNH3, MN2, MH2, and ALFHA1.

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	ALPHA3	is the preexponential factor in the rate equation for the thermal decomposition of hydrazine. It equals 2.14x10 ¹⁰ sec ⁻¹ .
	HF	is the enthalpy of liquid hydrazine entering the bed in deg R.
	R	is the gas constant. It equals 10.73 $(psla-ft^3)/(lb-mole-deg R)$.
	MN2H4	is the molecular weight of nydrazine. It equals 32.048 lb/lb mole.
	MNH3	is the molecular weight of ammonia. It equals 17.032 10/16 mole.
	MN2	is the molecular weight of nitrogen. It equals 28.016 lb/lb mole.
	MH2	is the molecular weight of hydrogen. It equals 2.016 lb/lb mole.
	ALPHA	is the preexponential factor in the rate equation for the catalytic decomposition of hydrazine. For the Shell 405 catalyst it equals 10^{10} sec ⁻¹ .
8.	The eight CF, NMAXL	h card contains the eight constants ALPHA2, AGM, BGM, KP, TF, , and NMAX2.
	Alpha2	is the preexponential factor in the rate equation for the catalytic decomposition of ammonia. For the Shell 405 cata- lyst it equals 10 ¹¹ sec ⁻¹ .
	AGM	is the activation energy for the catalytic decomposition of hydrazine, divided by the gas constant. For the Shell 405 catalyst it equals 2,500 deg R.
	BGM	is the activation energy for the catalytic decomposition of ammonia, divided by the gas constant. For the Shell 405 catalyst it equals 50,000 deg R.

KP is the effective thermal conductivity of the porous catalyst particle. For the Shell 405 catalyst it equals 0.4x10⁻⁴ Btu/ft-sec-deg R.

TF is the temperature of liquid hydrazine entering the bed in deg R

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- CF is the specific heat of liquid hydrazine. It equals 0.7332 Btu/lb-deg R.
- NMAX1 is the constant used to determine the size of axial station increments in the liquid region. It equals 200. Increasing this number would result in a decrease in size of axial station increments (and an increase in computer run time).
- NMAX2 is the constant used to determine the size of axial station increments in the liquid-vapor region. It equals 40. Increasing this number would result in a decrease in size of axial station increments (and an increase in computer run time).
- 9. The ninth card contains the inlet value of P and five constants ZEND, DON2H4, DONH3, CGM, and RADIUS.
 - P is the inlet chamber pressure in psia.
 - ZEND is the catalyst bed length in feet.
 - DON2H⁴ is the diffusion coefficient of hydrazine in the gas phase at STP. It equals 0.95x10⁻⁴ft²/sec.³
 - DONH3 is the diffusion coefficient of ammonia in the gas phase at STP. It equals $0.17 \times 10^{-3} \text{ft}^2/\text{sec.}$
 - CGM is the activation energy for the thermal decomposition of hydrazine, divided by the gas constant. It equals 33,000 deg R.

RADIUS is the radius of the catalyst bed in feet.

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10. Cards ten through thirteen contain AVSZ(I), the bivariate interpolation table used to obtain the catalyst particle radius, $A(z,r)^*$. These A values are obtained from subroutine UNBAR, an interpolation routine developed at the United Aircraft Research Laboratories, as functions of axial distance, Z, and radial distance, RAD. For this table there should be a total of (NØFZ) Z's, (NRINGS) RAD's and (NØFZ x NRINGS) A's. The table is set up as follows:

*This variable is not subscripted in the program. This notation is used to show that the variable is a function of both axial distance and radial distance and to clarify the way the table is set up.

CARD NO.

- 10 This card contains the four table descriptors used by UNBAR. The first descriptor signifies the table number. For this program it equals 0.0. The second descriptor signifies the location in the array at which the table starts; the tables in this program are read in such that this number equals 1.0. The third descriptor for a bivariate table such as this one is the number of elements in the first set of independent variables in the table (in this case, the number of Z's). This number equals NØFZ. The fourth descriptor is the number of elements in the second set of independent variables in the table (in this case, the number of RAD's). This number equals NRINGS.
- 11 These cards contain the monatonically increasing Z values. Enough cards should be used to contain NØFZ values of Z at the rate of ten per card. For example, if NØFZ = 12, 12 values of Z should be input using 2 cards with ten values on the first card and the 2 remaining values on the second card.
- 12 These cards contain the monatonically increasing RAD's. Enough cards should be used to contain NRINGS values of RAD at the rate of ten per card.
- 13 These cards contain the values for A(z, r). The A values are input at each Z value for all KAD's (i.e., (NRINGS) values of A for each Z) at the rate of ten per card.

Example 1: if NØFZ = 10 and NRINGS = 5, the first card would contain five A values corresponding to the five RAD's on card 12 for Z(1); the second card would contain the five A values corresponding to the five RAD's for Z(2); ... etc. ...; the 10th card would contain the five A values corresponding to the five RAD's for Z(10).

Example 2: if NØFZ = 10 and NRINGS = 12, the first card would contain 10 A values corresponding to the first ten RAD's (on card 12a) for Z(1); the second card would contain the two remaining A's corresponding to the last two RAD's (on card 12b) for Z(1); the third card would contain the 10 A's corresponding to the first ten RAD's for Z(2); the fourth card would contain the 2 remaining A's for Z(2); ... etc...; the 19th card would contain the ten A's corresponding to the first ten RAD's at Z(10); the 20th card would contain the two A's corresponding to the last two RAD's at Z(10).

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11. Cards 14 through 17 contain AFVSZ(I), the bivariate interpolation table used to obtain the catalyst particle surface area, AP(z,r)*. These AP values are obtained from UNBAR as functions of axial distance, Z, and radial distance, RAD, as in the AVSZ table discussed above. For this table there should be a total of (NØFZ) Z's, (NRINGS) RAD's, and (NØFZ x NRINGS) AP's. The table is set up as follows:

CARD NO.

- 14 This card is exactly the same as card 10.
- 15 These cards are exactly the same as cards 11.
- 16 These cards are exactly the same as cards 12.
- 17 These cards contain the values for AP(z,r). These values are input at each Z value for all RAD's at the rate of ten values per card. (See examples in the discussion of the AVSZ table as the table setup is the same.)
- 12. Gards 18 through 21 contain DELVSZ(I), the bivariate interpolation table used to obtain the interparticle void fraction, DELTA (z,r)*. These DELTA values are obtained from UNBAR as functions of axial distance, Z, and radial distance, RAD, as in the AVSZ table discussed above. For this table there should be a total of (NØFZ) Z's, (NRINGS) RAD's, and (NØFZ x NRINGS) DELTA's. The table is set up as follows:

CARD NO.

- 18 This card is exactly the same as card 10.
- 19 These cards are exactly the same as cards 11.
- 20 These cards are exactly the same as cards 12.
- 21 These cards contain the values for DELTA (z,r). These values are input at each Z value for all RAD's at the rate of ten values per card. (See examples in the discussion of the AVSZ tablé as the table setup is the same).
- NOTE: The values for the orders of the decomposition reactions (called EN1, EN2, and EN3 in the one-dimensional model) are included in the equations in the two-dimensional model and therefore are not input.

*This variable is not subscripted in the program. This notation is used to show that the variable is a function of both axial distance and radial distance and to clarify the way the table is set up.

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Two-Dimensional Computer Program: Input Format

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	FORMAT FORMAT 13* 14ā6 213*	Courses USED 1-3 1-60 1-6	STANDL OR DESCRIPTION NCASE Title Title NELNGS NGFZ	STREADL USED STREADL USED IN EQUATIONS	Number of data cases Number of radial stations Number of radial stations Number of z's in input tables
	10E8.4	1-8 9-16 13-80	F(I)	Γ×ι.	Distributed Feed Rate
L	10E8.4	1-8 9-16 73-80	GO(I)		Inlet mass flow rate
	10E8.4	1-8 9-16 73-80	Zo(I)	oz	Axial distance to injector end

*All I format numbers should be right adjusted. **Enough cards should be used to contain (NRINGS) values of F(I), GO(I) or ZO(I) at the rate of ten per card.

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CARD	NUMBER OF CARDS	FORTRAN X	COLUMNS	SYMBOL OR DESCRIPTION	CORRESPONDING SYMBOL USED IN EQUATIONS	NOMENCLATURE
		8E10.5	1-10 11-20 21-30 31-40 41-50 41-50 61-70 61-70 71-80	Alffrag He R MN2H4 MNH3 MN2 MN2 MH2 MH2 MH2 MH2 MH2 MH2	α hoia hF NN2E4 MNH3 MH2 MH2 MH2 MH2 MH2 MH2	Constant in rate equation Enthalpy of feed Gas constant Molecular weight of N ₂ H ₄ Molecular weight of NH ₃ Molec lar weight of N ₂ Molec lar weight of H ₂ Preexponential factor
α α α α α α α α α α α α α α	н 1	8E10.5	1-10 11-20 21-30 31-40 41-50 61-70 61-70 71-80	ALPHA2 AGM BGM KP TF TF TF TF TMAX2 NMAX2	ann an	Preexponential factor Activation energy, deg R Activation energy, deg R Thermal conductivity Feed temperature Specific heat of liquid N ₂ H ₄ Determ. axial step size(liq.vap.reg.)
σ		8ELO.5	1-10 11-20 21-30 81-40 41-50 51-60	P ZEND DON2H4 DON7H3 CGM RADIUS	P Do N2H4 Do NH3 Qhom N2H4/R	Inlet chamber pressure Bed length Diffusion coefficient of N2H ₄ Diffusion coefficient of NH ₃ Activation energy, deg R Bed radius
10	94 - A 194 - A	4.28 . 4	1-8 9-16 17-24 25-32	0. 1. NGFZ. NRINGS.		Table descriptor Table descriptor Table descriptor Table descriptor
E T		10E8.4	1-8 9-16 73-80	Z(I)	N	Axial station
*Enou	sh cards shou	', uld be used to	contain (NØF	72) values of z a	t'the rate of to.	ין געל אטן.

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TABLE II (Cont.)

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*Enough cards should be used to contain (NØFZ) values of z at the rate of ten per sard. **Enough cards should be used to contain (NRINGS) values of RAD at the sate of ter provent. ***Enough cards should be used to contain (NRINGS) values of A and AP for each z at the sate of ten pur sard (see detailed exumple in text).

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NOMFNCLATURE	Table descriptor Table descriptor Table descriptor Table descriptor	Axial station	Radial station	Interparticle void fraction	per card. ten per card. the rate of ten per "rrd.
CORRESPONDING SYMBOL USED IN EQUATIONS		8	Бı	40	the rate of ton D at the rate of IMA for each 2 at
SYMBOL CR DESCRIPTION	0, 1. Norz. Nrlngs.	Z(I)	RAD(I)	DELTA (z,r)	Z) values of z at NGS) values of RA NGS) values of DE
COLUMNS	1-8 9-16 17-24 25-32	18 9-16 73-80	1-8 9-16 73-80	1-8 9-16 13-80	contain (NØF) contain (NRI) contain (NRI)
FORTRAN I	4E8.4	1.09%, 4	10E8.4	10E8.4	ld be used to ld be used to ld be used to
NUMBER OF CARDS		*	*	*	l cards shou cards shou cards shou
CARD	18	6	50	1.0	*#Enough ##Enough ** Fnough

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FIG. 4a

(CONT.)

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FIG. 46

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Card No.

FIG. 5a

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FIG. 5b

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Output Description

Output from the two-dimensional steady-state program is entirely in printout form. There is no print option as in the one-dimensional program; therefore, all printing described below is "standard" and could possibly occur with each data case run. The print statements generated from each routine are described below; they include all printing normally done during execution of any representative data case, error messages, and certain comments pertaining to calculations which do not follow the normal pattern in a typical run.

Standard Output

MAIN Program

- 1. A complete listing of the punch card input with appropriate headings and FØRTRAN variable titles for all input variables.
- 2. Axial positions, (Z), and temperatures, (T), in each annular region for both liquid and liquid-vapor regions.
- 3. Axial position, radial position and temperature at the liquid/liquidvapor interface for each annular region.
- 4. Axial position, radial position and temperature at the liquid-vapor/ vapor interface for each annular region.

Subroutine VAR

- 1. Concentrations of hydrazine, (C4), ammonia, (C3), nitrogen, (C2), and hydrogen, 'C1), and mole fractions of hydrazine, (MFRAC4), ammonia, (MFRAC3), 1, ..., igen, (MFRAC2), and hydrogen, (MFRAC1), at the liquidvapor/vapor interfaces (these values will be indentical for each ring).
- 2. Axial position, (Z), temperature, (TEMP), and concentrations of hydrazine, (N2H4), ammonia, (NH3), nitrogen, (N2), and hydrogen, (H2), for each annular region at every axial increment along the reactor.
- 3. Assumed uniform pressure (calculated by averaging the pressure drop calculated for each ring over the reactor cross-section) in the reactor at each axial increment.

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- 4. Mole fractions of hydrazine, (MFRAC4), empouse, (MFRAC3), nitrogen, (MFRAC2), and hydrogen, (MFRAC1), and the equivalent fractional ammonia dissociation, (EQUIVALENT FRAC3D), for each annular ring at every axial increment.
- 5. "THERE IS A PUDDLE OF COLD HYDRAZINE AT THE LIQUID-VAPOR/VAPOR INTER-FACE ---- TRY USING A LARGER VALUE FOR GO"

When using a buried injector scheme it is possible to "flood" the region surrounding the injector tip with cold, liquid hydrazine. A sudden drop in axial temperatures at the liquid-vapor/vapor interface in any annular ring indicates that this has occurred, and in such cases the above message is printed and no further calculations are made.

"THE PROGRAM HAS CALCUALITED A NEGATIVE PRESSURE --- RETURN AND TERMINATE"

If a negative pressure is calculated at some axial station, further calculations for the current data case are stopped and this message is printed out.

7. "THE PROGRAM HAS CALCULATED A NEGATIVE TEMPERATURE IN RING XX ---- RETURN AND TERMINATE"

If a negative temperature is calculated in any annular region at any axial station, further calculations are stopped and this message, including the current annular ring, is printed.

Subroutine SGRAD

1. "WE HAVE CALCULATED A NEGATIVE XO DURING ITERATION NO. XX. SET XO = 0, CALCULATE TPS = .XXXXXX + XX, AND CONTINUE"

XO represents an approximation of the radial distance to which hydrazine penetrates the catalyst particle before being dissipated. It is determined through an iterative procedure, and in some instances initial guesses do not yield satisfactory results. In this case, corrective measures to yield a better approximation to XO are instituted and the procedure repeated. This message indicates only that corrective calculations to improve on the accuracy of XO are being initiated.

2. "UNABLE TO FIND SUITABLE XO AFTER FOUR TRIES OF 25 ITERATIONS EACH ----PROGRAM STOP FOLLOWS"

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If after four corrective attempts to approximate XO the procedure still does not yield satisfactory results, this message along with all unacceple values for XO is printed and further calculations are stopped. An occul dump of core accompanies the program stop.

3. "UNABLE TØ CØNVERGE ØN CPS IN 50 TRIES --- CP(X/A) = .XXXXX + XX"

If subroutine SGRAD cannot calculate a "converged" value for CPS after 50 iterations, the final value for CP at the particle surface is used to approximate CPS. This is a good approximation to CPS, however, and program calculations continue with the above message being printed.

A listing of typical output for the two-dimensional sample data case is shown in Figs. 6a through 61.

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FIG. 6d

51-	-3()																										FIG	6. 6	•
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THATIONS AT 1 14 NH. 3-00 5336	.13783-00	TEMP	00000	00000	.00000 .00000	.83487+03 .83487+03 .83487+03 .83487+03	PRESSURI	4FRAC2	00000 00000 00000 00000 00000 00000 0000	•14009-00 •14009-00	TEMP 000000	00000	00000	.0+959+03 .84959+03 .84959+03	
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	MERACU	00000	00000	.00000	00000°	00000	.43544-00	,43544-00 ,43544-00	****	EHN	00000	00000.			00000.	00000	.50520-01	.50520-01		+02		MFKAC4	• 00000	.00060	00000	.00000	.00000	.00000	42907-00	.42907-00	*******				
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Al				•704988-02 •70381-02 •70381-02 •69988-02 •69042-02 •6345-02 •6345-02 •44166-02 •44166-02	02 NERAC4 *40785-04 *27992-04 *239345-04 *29392-04 *38196-04	.33072-64 .00000 .16161-04 .00000
* • •		•••		M2H4 M2H4 .33006-05 .33006-05 .31895-05 .31895-05 .31288-05 .16765-05 .16765-05 .00000 .14423-05 .00000	. = .55026+ MERAC3 .16392-00 .16251-00 .15988-00 .15988-00 .15422-00	.12734-00 .10398+Ju .93237-Jl .98814-U1
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	THU		20-00169.	.69062-02		.67723-02	.65750-02	.62114-02	.56117-02	47590-02	20-12154	41570-02		+02		VFRAC4		.36780-04	20075-01	. 35665-04	+D=26522.	-0-040/2*	13915-04		*****		1E *****				
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		LEMP	+0+++66 T.	,19939+04		.19867+04	19748+34	19515+04	10100101	19501404	10-10-01 ·	18097+04		PRESSUR		HFRAC2	.30614-00	.30620-00		.30775-00	-9460E.	.31222-00	.31766-00		********		**** OPERA				
		2	.25000-00	.25000-00	25000-00	25000-00	25000-00	00-00056	95000-00		00-000C2*	.25000-00				MFKACL	.53073-00	.53102-00	00-\$67cc*	53880-00	-24734-00	\$56115-00	C0-16683.	69297-01	*******		*				
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Common Operational Problems

The two-dimensional steady-state computer program has been run with a large variety of data cases. During these runs, most of the problems which developed were eliminated by modifying the program. However, a few problems may still remain; these problems are outlined below together with appropriate techniques for solving them.

1. "THE PROGRAM HAS CALCULATED A NEGATIVE PRESSURE --- RETURN AND TERMINATE"

If a negative pressure is calculated at some axial station in the vapor region, further calculations for the current data case are stopped and this message is printed out. This diagnostic statement indicates that a physical limitation of the reactor system has been exceeded. Therefore, this particular case cannot be run. A lower mass flow rate or a higher feed pressure should work.

2. "THE PROGRAM HAS CALCULATED A NEGATIVE TEMPERATURE IN RING XX----RETURN AND TERMINATE"

If a negative temperature is calcualted in any annular region at any axial station in the vapor region, further calculations are stopped and this message, including the current annular ring, is printed. An appropriate solution to this problem would be to increase the number of radial regions into which the reactor is divided.

3. "UNABLE TØ FIND SUITABLE XO AFTER FØUR TRIES ØF 25 ITERATIØNS EACH ---PRØGRAM STØP FØLLØWS"

If a satisfactory value for XO cannot be found after four attempts, this message is printed and program execution is terminated. An appropriate solution to this problem would be to try different values for f_i [Eq. (I-11) in discussion of SGRAD, Appendix I]. These values could be greater than 0.95. To make this change, subroutine SGRAD would have to be recompiled using the new values of f_i .

4. "THERE IS A PUDDLE OF COLD HYDRAZINE AT THE LIQUID-VAPOR/VAPOR INTER-FACE --- TRY USING A LARGER VALUE FOR GO"

When using a buried injector scheme it is possible to "flood" the region surrounding the injector tip with cold, liquid hydrazine. A sudden drop in axial temperatures at the liquid-vapor/vapor interface in any annular ring indicates that this has occurred, and in such cases the above message is printed and no further calculations are made. An appropriate solution to this problem would be to try a larger input value for GO, and rerun the program with the revised input.

REFERENCES

- Kesten, A. S.: Analytical Study of Catalytic Reactors for Hydrazine Decomposition. United Aircraft Research Laboratories Report F910461-12, First Annual Progress Report, Contract NAS 7-458, May 1967.
- Kesten, A. S.: Analytical Study of Catalytic Reactors for Hydrazine Decomposition. United Aircraft Research Laboratories Report G910461-24, Second Annual Progress Report, Contract NAS 7-458, May 1968.
- 3. Eberstein, I. J., and I. Glassman: The Gas-Phase Decomposition of Hydrazine and Its Methyl Derivations. Tenth Symposium (International) on Combustion, Pittsburgh, The Combustion Institute, 1965, pp. 365-374.
- 4. McHale, E. T., B. E. Knox, and H. B. Palmer: Determination of the Decomposition Kinetics of Hydrazine Using a Single-Pulse Shock Tube. Tenth Symposium (International) on Combustion, The Combustion Institute, Pittsburgh, 1965, pp. 341-351.
- 5. Michel, K. W., and H. GG. Wagner: The Pyrolysis and Oxidation of Hydrazine Behind Shock Waves. Tenth Symposium (International) on Combustion, The Combustion Institute, Pittsburgh, 1965, pp. 353-364.
- Askey, P. J.: The Thermal Decomposition of Hydrazine. J. Am. Chem. Soc., Vol. 52, 1930, pp. 970-974.
- 7. Bird, R. B., W. E. Stewart, and E. N. Lightfoot: Transport Phenomena. John Wiley & Sons, Inc., New York, 1960.
- 8. Prater, D. C.: The Temperature Produced by Heat of Reaction in the Interior of Porous Particles. Chemical Engineering Science, Vol. 8, 1958, pp. 284-286.
- 9. Kesten, A. S.: Analytical Study of Catalytic Reactors for Hydrazine Decomposition - Part I: Steady-State Behavior of Hydrazine Reactors. Proceedings of the Hydrazine Monopropellant Technology Symposium, The Johns Hopkins University Applied Physics Laboratory, Silver Spring, Maryland, November 1967.
- Argo, W. B., and J. M. Smith: Heat Transfer in Packed Beds, Chemical Engineering Progress, 49, 1953, pp. 443-451.

LIST OF SYMBOLS

a	Radius of spherical particle, ft
Ap	Total external surface of catalyst particle per unit volume of bed, ft-1
ci	Reactant concentration in interstitial fluid, lb/ft ³
сЪ	Reactant concentration in gas phase within the porous particle, lb/ft^3
CF	Specific heat of fluid in the interstitial phase, Btu/lb - deg R
C _F	Average specific heat of fluid in the interstitial phase, Btu/lb - deg R
Di	Diffusion coefficient of reactant gas in the interstitial fluid, ft ² /sec
D _o	Diffusion coefficient of reactant gas in the interstitial fluid at STP, ft ² /sec
D_p	Diffusion coefficient of reactant gas in the porous particle, ft ² /sec
fi	Weighting factor in Eq. (I-11)
F	Rate of feed of hydrazine from buried injectors into the system (Ref. 1), 1b/ft ³ -sec
gC	Conversion factor, $(lb_m/lb_f) ft/sec^2$
G	Mass flow rate, lb/ft ² -sec
h	Enthalpy, Btu/1b
h _c	Heat transfer coefficient, Btu/ft ² -sec-deg R
н	Heat of reaction (negative for exothermic reaction), Btu/lb
k _c	Mass transfer coefficient, ft/sec
k _o	Reaction rate constant, equals $\alpha e^{-\gamma}$
κ _p	Thermal conductivity of the porous catalyst particle, Btu/ft-sec-deg R

M	Molecular weight, lb/lb mole
M	Average molecular weight, lo/lb mole
n	Order of decomposition reaction
Nr	Radial mass flux, lb/ft ² -sec
Р	Chamber pressure, psia
q _r	Radial heat flux, Btu/ft ² -sec
Q het	Activation energy for (heterogeneous) chemical reaction on the catalyst surfaces, Btu/lb mole
Q _{hom}	Activation energy for (homogeneous) chemical reaction in the inter- stitial phase, Btu/1b mole
r	Radial distance from the center of the cylindrical reaction chamber, ft
rhet	Rate of (heterogeneous) chemical reaction on the catalyst surfaces, lb/ft ³ -sec
r _{hom}	Rate of (homogeneous) chemical reaction in the interstitial phase, lb/ft^3 -sec
R	Gas constant, equals 10.73 psis - ft ³ /1b mole - deg R, or, Radius of reactor
Т	Temperature, deg R
Tvap	Vaporization temperature, deg R
w _i	Weight fraction of reactant in interstitial phase
x	Radial distance from the center of the spherical catalyst particle, ft
х _о	Defined in Appendix I (Discussion of Subroutine SGRAD)
Z	Axial distance, ft
z _o	Axial distance to the end of buried injectors, ft
a	Preexponential factor in rate equation

- β Equals $\left[-(C_{p})_{s} HD_{p}\right] / \left[K_{p} (T_{p})_{s}\right]$
- γ Equals $Q_{\rm net}/R (T_p)_s$
- δ Interparticle void fraction
- ϵ Eddy diffusivity, ft²/sec
- λ Eddy conductivity, Btu/ft-sec-deg R
- μ Viscosity of interstitial fluid, lb/ft sec
- ρ_{i} Density of interstitial fluid, lb/ft³

Subscripts

F	Refers	to	feed					
i	Refers	to	interstitial phase					
р	Refers	to	gas within the porous catalyst particle					
S	Refers	to	surface of catalyst particle					
Superscripts								
J	Refers	to	chemical species					
L	Refers	to	liquid at vaporization temperature					

V Refers to vapor at vaporization temperature

APPENDIX I

Description of Subroutines

The following is a list and brief description of the subroutines which comprise the UNIVAC 1108 computer programs describing the one- and twodimensional steady-state models of a hydrazine catalytic reactor. Subroutine SGRAD, since it is the key subroutine in each program is described in detail. The flow charts for the main programs and major subroutines are included immediately after this list in Figs. I.1 through I-8. The number outside of and next to any block on the flow charts indicates the approximate statement number in that routine at which that particular operation occurs.

One-Dimensional Model

MAIN (Fig. I-1)	Controls input and calculates concentrations and tem- peratures in the liquid region of the reactor.
SLØPE (Fig. I-1)	Calculates concentration and temperature profiles within the catalyst particles for the liquid and liquid vapor regions of the reactor. This subroutine is similar to SGRAD which is described in detail later in this section.
LQVP (Fig. I-2)	Calculates enthalpy during the liquid vapor region of the reactor (concentration of N_2H_4 and temperature remain constant).
LQV2 (Fig. I-2)	Calculates hydrazine concentration, enthalpy and tem- peratures during the liquid-liquid vapor region of the reactor (concentration of hydrazine varies).
VAPØR (Figs. I-3 & I-4)	Calculates concentrations, temperatures and pressures in the vapor region of the reactor.
PARAM (Fig. 1-5)	Calculates parameters needed for calculations done in subroutine SLOPE.
CØNC (Fig. 1-5)	Calculates reactant concentrations at the liquid vapor- vapor interface of the reactor.
UNBAR	Interpolation routine used to obtain values from a table.
BLØCK DATA TABLES	Tables of:
	 temperature vs. viscosity temperature vs. vapor pressure

(2)	+		header	<u>_</u>	
131	temperature	vs.	nears	OI	reaction

- (4) temperature vs. specific heat
- (5) vapor pressure vs. temperature
- (6) enthalpy vs. temperature
- SGRAD (Fig. 1-5) This routine is the same as it is in the two-dimensional model. For a detailed description, see the section describing two-dimensional subroutines.

Two-Dimensional Model

MAIN (Fig. 1-6) Controls input and calculates concentrations and temperatures in the liquid region of the reactor for all annular regions.

- SLØPE (Fig. I-6) Calculates concentration and temperature profiles within the catalyst particles for the liquid and liquid vapor regions of the reactor for all annular regions. This subroutine is similar to SGRAD which is described in detail later in this section.
- LQVP (Fig. 1.6) Calculates enthalpy during the liquid vapor region of the reactor for all annular regions (concentration of N₂H_h and temperature remain constant).
- VAPOR (Fig. 1-7) Calculates concentrations, temperatures and pressures in the vapor region of the reactor for all annualr regions.

DELTAZ (Fig. I-8) Calculates axial increments for the vapor region.

ØRDER (Fig. 1-8) Arranges an array of numbers in ascending order

UNBAR Interpolation routine used to obtain values from a table.

BLOCK DATA TABLES Tables of:

- (1) temperature vs. viscosity
- (2) temperature vs. vapor pressure
- (3) temperature vs. heats of reaction
- (4) temperature vs. specific heat
- (5) vapor pressure vs. temperature
- (6) enthalpy vs. temperature

SGRAD (Fig. 1-8) Detailed description follows:
SGRAD (Fig. 1-8)

The purpose of subroutine SGRAD is to solve the implicit integral equations describing reactant concentration and temperature profiles in the porous catalyst particles and to calculate the slope of the reactant concentration gradient at the surface of the catalyst particles. This routine is used for calculations in the vapor region of the reactor only. In the hydrazine catalytic reactor system, ammonia concentration profiles are calculated but the subroutine is very general and can be used for many other reactants. The key equation to be solved is an implicit integral equation of the form (Refs. 2 and 9):

$$c_{P}^{NH_{3}}(x/a) = c_{i}^{NH_{3}} - a^{2} \left[\frac{1}{x/a} - \frac{ak_{c}^{NH_{3}} D_{P}^{NH_{3}}}{ak_{c}^{NH_{3}}} \right] \int_{x_{0}/a}^{x/a} \xi^{2} \frac{r_{het}^{NH_{3}} [c_{P}^{NH_{3}}(x/a)]}{D_{P}^{NH_{3}}} d\xi$$

$$- a^{2} \int_{x/a}^{1} \left[\frac{1}{\xi} - \frac{ak_{c}^{NH_{3}} - D_{P}^{NH_{3}}}{ak_{c}^{NH_{3}}} \right] \xi^{2} \frac{r_{het}^{NH_{3}} [c_{P}^{NH_{3}}(x/a)]}{D_{P}^{NH_{3}}} d\xi$$
(I-1)

where $c_p^{NH_3}(x)$ is the reactant (ammonia) concentration as a function of x (the radial position within the catalyst particle), $c_1^{NH_3}$ is the interstitial reactant concentration and **G** is the radius of the spherical catalyst particle. To solve this equation, a two-phase iterative scheme is used. First, an initial estimate for $c_p^{NH_3}(x)$ is found through an iterative method of calculating successively better approximations. Second, using the good initial estimate found in the first phase, a similar iterative method is used to arrive at converged values of the actual $c_p^{NH_3}(x)$ distribution.

Phase I

It was found through hand calculation that solutions of Eq. (I-1) were very likely to diverge if the initial estimate was not a very good estimate. Therefore, in the first phase of this subroutine the iterative scheme is used to find this good first estimate. A linear function of the type shown in Fig. I-9 was found to be a fairly close approximation to the actual concentration distribution. The point at which the reactant concentration profile changes slope is referred to as X_0 .



Fig. (I-9)

The final solution to Phase I is a distribution of this type.

Iterative Procedure: Phase I

- 1. First a guess is made at a value for the reactant concentration at the surface of the catalyst particle: $(c_p)_s^{NE3} = c_1^{NH3}/2$.
- 2. Using this value, a value is found for the slope of the concentration profile at the surface, $\left[dc_p^{NH3}/dx\right]_{x=a}$.

$$\left[dc_{P}^{NH_{3}} / dx \right]_{x=a} = \frac{k_{c}^{NH_{3}}}{D_{P}^{NH_{3}}} \left[c_{i} - (c_{P})_{S} \right]^{NH_{3}}$$
(I-2)

where k_c^{NH3} is calculated from an equation given in Ref. 1 and D_p^{NH3} is calculated from Eq. (I-3).

$$D_{P}^{NH_{3}} = D_{0}^{NH_{3}} \left\{ \left(\frac{(T_{P})_{s}}{492} \right)^{1.823} \cdot \left(\frac{14.7}{P} \right) \cdot \left[1 - e^{-0.0672 (P/14.7)(492/(T_{P})_{s})} \right] \right\}$$
(I-3)

3. The temperature at the particle surface, $(T_p)_s$, is calculated from

$$(T_P)_S = T_i - \frac{1}{A_C} \left[(H \cdot k_C \cdot C_i)^{N_2 H_4} + (H \cdot D_P \cdot \left[dC_P / dx \right]_{X=0} \right]^{NH_3}$$
 (I-4)

where T_i and $c_i^{N_2H_4}$ are input to the subroutine, $H^{N_2H_4}$ and H^{NH3} are taken from tables in the computer program, and Λ_c and $k_c^{N_2H_4}$ are calculated according to the equations in Ref. 1.

- 4. Using the point $\begin{bmatrix} a, (c_p)_s^{NH_3} \end{bmatrix}$ and the slope $\begin{bmatrix} dc_p^{NH_3}/dx \end{bmatrix}_{x=a}$, a line is established and extrapolated to the $c_p^{NH_3} = 0$ axis line, intersecting the axis line at X_0 (as in Fig. I-9).
- 5. The value for X_0 is calculated from

$$x_0 = a - \left\{ (c_P)_S / [dc_P / dx]_{X=a} \right\}^{NH_S}$$
 (I-5)

Since the region of primary interest is the particle surface, it is at this point that convergence on a value for $c_p^{NH3}(x)$ is tested. To test for convergence, a new $(c_p)_s^{NH3}$ is calculated and compared to the previous $(c_p)_s^{NH3}$. The new value for $(c_p)_s^{NH3}$ can be calculated from Eq.(I-1) by noting that, at the catalyst particle surface, where x=a, the second integral term in Eq. (I-1) drops out leaving

$$(c_{P})_{S}^{NH_{3}} = c_{i}^{NH_{3}} \left[\frac{1}{x} - \frac{ak_{c} - D_{P}^{NH_{3}}}{a^{2}k_{c}^{NH_{3}}} \right] \int_{0}^{a} \xi^{2} \frac{r_{het} \left[c_{P}^{NH_{3}}(x) \right]}{D_{P}^{NH_{3}}} d\xi$$
 (I-6)

As can be seen in Fig.(I-9) in distributions of this type all values of $c_p^{NH3}(x)$ between 0 and X_0 are zero. Therefore, in evaluating the integrals, all points between 0 and X_0 can be ignored. If this is done and if x is normalized by dividing by a, Eq. (I-6) reduces to

$$(c_{P})_{S}^{I:H_{R}} = c_{I}^{NH_{3}} - a^{2} \left[I - \frac{ak_{c}^{NH_{3}} - D_{P}^{NH_{3}}}{ak_{c}^{NH_{3}}} \right] \int_{x_{0}/a}^{I} \xi^{2} \frac{r_{het} \left[c_{P}^{NH_{3}}(x) \right]}{D_{P}^{NH_{3}}} d\xi (I-7)$$

where all tarms have been previously determined except \mathbf{r}_{het} which is calculated from

$$r_{het}^{NH_{3}} = k_{0} (c_{i}^{NH_{3}})^{i-n} \cdot [c_{P}^{NH_{3}}(x)]^{n} \exp \left\{ \gamma \beta (i - c_{P}^{NH_{3}}(x)/c_{i}^{NH_{3}}) / [i + \beta (i - c_{P}^{NH_{3}}(x)/c_{i}^{NH_{3}})] \right\}$$
(I-8)

where n, k_0 , γ , and β are defined in the List of Symbols.

- 6. A new value for $(c_p)_s^{NH3}$ is calculated using Eq. (I-7) where the integral is evaluated numerically using the trapezoidal method.
- 7. A new value for $\begin{bmatrix} dc_p NH3/dx \\ c_p NH3 \end{bmatrix}$ is calculated from Eq. (I-3) using the newly calculated $(c_p)_s^{NH3}$.
- 8. New values are calculated for $(T_p)_s$, D_p^{NH3} , γ , β , k_o .
- 9. The following convergence tests are made:

$$\frac{\left[T_{i} - (T_{P})_{S}\right]_{OLD} - \left[T_{i} - (T_{P})_{S}\right]_{NEW}}{\left[T_{i} - (T_{P})_{S}\right]_{NEW}} \stackrel{?}{\leq} 0.05 \qquad (I-9)$$

and

$$\frac{\left[c_{i} - (c_{P})_{S}\right]_{OLD}^{NH_{3}} - \left[c_{i} - (c_{P})_{S}\right]_{NEW}^{NH_{3}}}{\left[c_{i} - (c_{P})_{S}\right]_{NEW}^{NH_{3}}} \stackrel{?}{\leq} 0.05 \quad (I-10)$$

If these tests are both satisfied, the value of X_0 calculated in Eq. (I-5) is saved and the program moves on to Phase II.

If both tests are not satisfied, an averaged value of $(c_p)_s^{NH3}$ is calculated using as many as three averaging techniques to insure rapid convergence.

Using this new value of $(c_p)_s^{NH3}$, steps 2 through 9 are repeated up to a maximum of twenty-five times. If no convergence is reached after twenty-five iterations, a "weighted" estimate of X_o is tried:

$$X_{o} = f_{i} \cdot (X_{o}) \text{ previously} + (1-f_{i}) \cdot (X_{o}) \text{ last}$$
(I-11)
calculated calculated

Steps 1 through 9 are repeated up to twenty-five times. Succeeding values $f_i = 0.80, 0.85, 0.90$, and 0.95 are tried until convergence is reached. If convergence still is not reached and therefore a satisfactory X_0 is not found, a program termination with an appropriate error message follows.

Phase II

Using as an initial approximation the straight line determined by the convergent X_0 and $\left[dc_p^{NH3}/dx\right]_{x=0}$ found in Phase I, an iterative scheme similar to that in Phase I is now employed to find convergent values for the entire $c_p^{NH3}(x)$ distribution within the catalyst particle. It was found through hand calculations that the convergent values of $c_p^{NH3}(x)$ near the surface were not changed by more than 5 percent when the values of $c_p^{NH3}(x)$ between 0 and X_0 were not considered in the iterative procedure. Therefore, the points in this range are ignored.

Iterative Procedure: Phase II

The values of $c_p^{NH3}(x)$, $(T_p)_s$, k_o^{NH3} , β^{NH3} , γ^{NH3} , etc. found in the last iteration in Phase I are the initial input to the following iteration.

1. A new
$$c_p^{NH_3}(x)$$
 profile is calculated from Eq. (I-12).
 $c_P^{NH_3}(x/a) = c_i^{NH_3} - a^2 \left[\frac{1}{X/a} - \frac{ak_c^{NH_3} - D_p^{NH_3}}{ak_c^{NH_3}} \right] \int_{x_0/a}^{x/a} \xi^2 \frac{r_{het}^{NH_3} \left[c_P^{NH_3}(x/a) \right]}{D_p^{NH_3}} d\xi$

$$(I-12)$$

$$- a^2 \int_{x/a}^{1} \left[\frac{1}{\xi} - \frac{ak_c^{NH_3} - D_p^{NH_3}}{ak_c^{NH_3}} \right] \xi^2 \frac{r_{het}^{NH_3} \left[c_P^{NH_3}(x/a) \right]}{D_P^{NH_3}} d\xi$$

As before, the limits of the integral have been normalized by dividing by **a**. The integrals are evaluated numerically using the finite sum approximation described below.

To evaluate the integral terms in Eq. (I-12) the following procedure, using a finite sum approximation, is used:

- (a) the interval $X_0/a \le x/a \le 1$ is divided into 24 equally spaced subdivisions, and an average value for r_{het} $\begin{bmatrix} c_p^{NH3}(x/a) \end{bmatrix}$ is calculated for each of these divisions.
- (b) treating r_{het} $\left[c_p^{NH3}(x/a)\right]$ as constant over each of these subdivisions, Eq. (I-12) can be approximated by

$$C_{P}^{NH_{3}}(x/d) = C_{i}^{NH_{3}} - \frac{d}{D_{P}^{NH_{3}}} \left[\frac{1}{x/d} - \frac{dk_{C}^{NH_{3}} - D_{P}^{NH_{3}}}{dk_{C}^{NH_{3}}} \right] \left\{ r_{het}^{i} \int_{x_{0}/a}^{x_{0}/a + \Delta x/a} \xi d\xi + r_{het}^{2} \int_{x_{0}/a + \Delta x/a}^{x_{0}/a + 2\Delta x/a} \xi d\xi + \dots + r_{het}^{24} \int_{x_{0}/a + (k-1)\Delta x/a}^{x_{0}/a + k\Delta x/a} \xi d\xi \right\} - \frac{d^{2}}{D_{P}^{NH_{3}}} \left\{ r_{het}^{i} \int_{x_{0}/a + (k+1)\Delta x/a}^{x_{0}/a + (k+1)\Delta x/a} \left[\frac{1}{\xi} - \frac{dk_{C}^{NH_{3}} - D_{P}^{NH_{3}}}{dk_{C}^{NH_{3}}} \right] \xi^{2} d\xi \right\}$$

$$+ r_{het}^{2} \int_{x_{0}/a + (k+2)\Delta x/a}^{x_{0}/a + (k+2)\Delta x/a} \left[\frac{1}{\xi} - \frac{dk_{C}^{NH_{3}} - D_{P}^{NH_{3}}}{dk_{C}^{NH_{3}}} \right] \xi^{2} d\xi + \dots$$

$$(I-13)$$

+
$$r_{het}^{24} \int_{x_0/a}^{x_0/a+24} \Delta x/a} \left[\frac{1}{\xi} - \frac{ak_c^{NH_3} - D_P^{NH_3}}{ak_c^{NH_3}} \right] \xi^2 d\xi$$

where k = 1, 2, ..., 24

(c) the integrals in Eq. (I-13) can now be evaluated directly

viz
$$\int_{a}^{b} \xi d\xi = \frac{\xi^{2}}{2} \bigg|_{a}^{b} = \frac{b^{2}}{2} - \frac{a^{2}}{2}$$

 $\int_{a}^{b} \text{constant} \quad \xi^{2} d\xi = \text{constant} \quad \frac{\xi^{3}}{3} \bigg|_{a}^{b} = \text{constant} \quad \left(\frac{b^{3}}{3} - \frac{a^{3}}{3}\right)$

(d) rearranging and integrating term by term in Eq. (I-13) yields the finite sum approximation for $c_p^{NH}3(x/a)$ at each subdivision of the interval from X_0/a to 1:

$$C_{P}^{NH_{3}}(x/\alpha)_{k+1} = C_{i}^{NH_{3}} - \frac{\alpha^{2}}{D_{P}^{NH_{3}}} \left\{ \left(\frac{1}{X_{k}/\alpha} - \frac{\alpha v + 1}{\alpha v} \right) \right\}$$

$$\sum_{j=1}^{k} \frac{r_{het}^{j}}{3} \left[\left(\frac{x_{j}}{\alpha} \right)^{3} - \left(\frac{x_{j-1}}{\alpha} \right)^{3} \right] + \sum_{j=k}^{24} \frac{r_{het}^{j+1}}{2} \left[\left(\frac{x_{j+1}}{\alpha} \right)^{2} - \left(\frac{x_{j}}{\alpha} \right)^{2} \right] \quad (I-1^{\frac{1}{4}})$$

$$- \left(\frac{\alpha v + 1}{\alpha v} \right) + \sum_{j=k}^{24} \frac{r_{het}^{j+1}}{3} \left[\left(\frac{x_{j+1}}{\alpha} \right)^{3} - \left(\frac{x_{j}}{\alpha} \right)^{3} \right] \right\}$$

where
$$V = (ak_c - D_p)^{NH_3} / ak_c^{NH_3}$$
 and $K = 1, 2, ..., 24$

. . . .

- (e) the values for $c_p^{NH3}(x/a) \Big|_{x=X_0}$ and $c_p^{NH3}(x/a) \Big|_{x=a}$ are special cases where one or the other of the integral terms in Eq. (I-12) vanishes. Evaluation follows from a simple reduction of Eq. (I-14).
- 2. A new value for $\left[dc_p^{NH3}/dx \right]_{x=0}$ is calculated from Eq. (I-3) using the newly calculated $(c_p)_s^{NH3}$.
- 3. A new value for $(T_p)_s$ is calculated from Eq. (I-4).
- 4. Convergence tests are made (as they were in Phase I) using Eqs. (I-9) and (I-10).
 - (a) If the convergence tests are both satisfied, the quantities GRAD and TGRAD are calculated according to Eqs. (I-15) and (I-16), and the program returns to the point from which the subroutine was called.

$$GRAD = \left[dc_{P}^{NH_{s}} / dx \right]_{x=0} D_{P}^{NH_{s}}$$
(I-15)

$$TGRAD = \mathcal{A}_{c} \left[T_{i} - (T_{P})_{s} \right]$$
 (1-16)

(b) If the tests are not both satisfied, a new $c_p^{NH3}(x)$ distribution is calculated using one of various averaging techniques. Corresponding $\left[dc_p^{NH3}/dx\right]_{x=0}$, $(T_p)_s$, k_o , γ , β , etc. are also calculated. Then steps 1 through 4 are repeated up to a maximum of 50 times. If convergence criteria are not met after 50 iterations, approximations to acceptable values of GRAD and TGRAD are made using the results of the Phase I iterative procedure, an appropriate message is printed, and the program returns to the point from which the subroutine was called.

Distributions of the type shown in Fig. (I-10) are typical of those found in this iterative procedure.

- (1) converged linear approximation from Phase I
- (2) curve calculated from curve (1) using Eq. (I-11) (Phase II, step 1)
- (3) averaged curve calculated from curves (1) and (2) (Phase II, step 4b)



Fig. (I-10)

FIG. I-1

ONE-DIMENSIONAL STEADY-STATE COMPUTER PROGRAM MAIN PROGRAM and SUBRØUTINE SLØPE: Flow Diagrams



ONE-DIMENSIONAL STEADY-STATE COMPUTER PROGRAM FIG. I-2 SUERØUTINES LQVP and LQV2 : Flow Diagrams



G910461-30 ONE-DIMENSIONAL STEADY-STATE COMPUTER PROGRAM SUBRØUTINE VAPØR : Flow Diagram



FIG. T-3



^{G910461-30}ONE-DIMENSIONAL STEADY-STATE COMPUTER PROGRAM SUBROUTINE VAPOR (cont.)

FIG. I-4

G910461-30 ONE-DIMENSIONAL STEADY-STATE COMPUTER PROGRAM SUBRØUTINES PARAM, CØNC, and SGRAD: Flow Diagrams





FIG.I-5

TWO-DIMENSIONAL STEADY-STATE COMPUTER PROGRAM MAIN PROGRAM FLOW DIAGRAM





FIG. 1-7

G910461-30

FIG. I-8

TWO-DIMENSIONAL STEADY-STATE COMPUTER PROGRAM

SUBROUTINES DELTAZ, SGRAD, and ØRDER

Flow Diagrams







APPENDIX II

LISTING OF COMPUTER PROGRAMS

ONE-DIMENSIONAL STEADY-STATE MODEL

	1 1 1 1 011						
							FORMA
САКЫ	1	CUL'S	1-3	CONTAIN	NCASE	(ONLY ONE CARD L PER RUN)	(13)
						SHOULD BE REPEATED For Each data case)	
 Сляр	2	CUL*5	1-00	TITLE CA	RD	ANY ALPHANUMERIC INFORMATION DESIRED	(146)
CARJ	3	0115	1-2	CUNTAI	OPTION		(12)
		CUL'S	3-4	CONTAIN	PRINT		(12)
		CULIS	5-7	CONTAIN	LIOF 2		(13)
Сакы	4	CULIS	1-10	CONTAIN	20		(11)
 -			-11-20-	CONTAIN	60		(E10
			21-30	CUNTAIN	FC		(210)
			31-40	CONTAIN	ALPHA3		(=10.
			41-50	CONTAIN	HF		(i.10.
			51-60	CONTAIN	R		(E10
			01-70	LIATICO	WM4		(£10,
 		· · · · · · · · · · · · · · · · · · ·	-71-50-	CONTAIN	WH3		(E10.
CARO	5	LULIS	1-10	CONTAIN	Wil2		(c1).
			11-20	CONTAIN	v:M1		(E10.
			21-50	CONTAIN	ALPHAL		((1),
			31-40	CONTAIN	ALPHA2		(£10.
			41-50	CONTAIN	AGM		(に10。
 			-5t-00-	CONTAIN	HGM	· • • • • • • • • • • • • • • • • • • •	(E11),
			61-70	CONTAIN	KP ••••	• • • • • • • • • • • • • • • • • • • •	(1.10.
^		/	/1-80	CONTAIN	LGM	• • • • • • • • • • • • • • • • • • • •	(E10.
UNKU	0	COL'S	1-10	CUNTATIN	11	•••••••	(110.
			11-20	CONTAIN	576	•••••••	(110.
			(1=50 (1=50	CONTAIL			(110.
				CONTAIN	LINMAZ A	•••••••	TCIU.
			51-50	CONTAIN	LINMAJ (NTER	••••••	- (E10. - (E16
			61+70	CONTAIN	DIFL	• • • • • • • • • • • • • • • • • • • •	- (E10) - (E10
			71-80	CONTATIN	PRES -	· · · · · · · · · · · · · · · · · · ·	- (E10) - (E10)
Саки	7	COLIS	1-1/0	CONTAIN	ZEND	· · · · · · · · · · · · · · · · · · ·	(E10.
 			-11-20-	CONTAIN			-(E10-
			21-30	CONTAIN	EN2		(£10.
			31-40	CUNTAIN	EN3		(E10.
		(THE T	ABLË FU	R CATALYS	T PARTI	ICLE RADIUS VS	
 		AXIAL	DISTAN	CE ALUNG	REACTO	HED FOLLOWS)	···· -
Сакы	8	COLIS	1- н	CONTAIN	THE NU-	18ER 0.0	(E8-
2	-	CULIS	9-10	CONTAIL	THE NU-	18ER 1.0	(E8.
		CUL'S	17-24	CONTAIN	NOFZ (P	LUATING POINT)	(E8-

C 2(1)+2(2)+...+2(NOFZ) С € Ç CARUS 10A, 108, ... CONTAIN THE CATALYST PARTICLE RADII ÷ A(1),A(2),...A(NOFZ) С 10 PER CARD, COL'S 1-80 (10E8.4) C С C (THE TABLE FOR CATALYST PARTICLE SURFACE AREA С VS AXIAL DISTANCE ALONG REACTOR BED FOLLOWS) ÷ С **CAKD 11** THIS CARD IS IDENTICAL TO CARD 8 C Ç CARDS 12A, 12B, ... THESE CARDS (OR SINGLE CARD) ARE IDENTICAL £ TO CARDS 9A,98, ... С £ CONTAIN THE CATALYST PARTICLE SURFACE AREAS CARDS 13A+130+ ... С AP(1) + AP(2) + . . . + AP(NOFZ) £ С С С (THE TABLE FOR INTERPARTICLE VOID FRACTION VS. -C AXIAL DISTANCE ALUNG REACTOR BED FOLLOWS) С ε THIS CARD IS IDENTICAL TO CARD 8 CARD 14 С E CARDS 15A+15B+... THESE CARDS (OR SINGLE CARD) ARE IDENTICAL С TO CARDS 9A,9B,... £ С CARDS 16A, 168.... CONTAIN THE INTERPARTICLE VOID FRACTIONS e DELA(1); UELA(2); ..., DELA(NOFZ) C 10 PER CARD, COL'S 1-80 (10E8.4) £ С REAL KP+K n INTEGER OPTION PRINT 10 COMMON /FTZ/TBLVP(70),TBLH4(42),TBLH3(42),SHTBL1(34),SHTBL2(34), 20 30 COMMON /CO/HL, HV, FC, TF, CFL, CGM, ENMX1, AGM, DIF3, DIF4, KP, PRES, GO, 40 -WM4+WM3+WM2+#M1+ALPHA3+R+TVAP+ZEND+BGM+HF+DZ+ALPHA1+ALPHA2 50 2 JENMX2JENMX3JEH1, EN2JEN3, HJRAT, MI 60 -- COMMON- /VAR/DERIV(250), DHDZ(250), Z(250) 70 COMMON /TOLL/ALIM, OPTION, C1, C2, C3, C4, CAV, G, TEMP, AP, WMAV, Z0, 80 -COMMON /MUVST/VISVST(30) 90 COMMON /FLAGS/MFLAG, KFLAG, PRINT 100 COMMON /IFCEQ0/IFC/GAT20 110 COMMON /LIZTBL/DHVST(18),DHLVST(18) 120 CUMMON /DAVTBL/VPYBL(44) 130 DIMENSION TITLE(14) 140 150 700 FORMAT (13) 160 KOUNT=1 170 705 READ (5+608) TITLE 180 190 -608 -FORMAT-(1446) WRITE (6,609) TITLE 200 -609 FORMAT-(1H1+1446//) 210 IFC=1 220 READ (5,809) OPTION, PRINT, NOF2 230 809 FORMAT (212,13) 240

0910461-30

G91 0461-30	

	X AUMID X FN1+FI	GM+KP+CGM N2+EN3+	TFICFLIENMX1	ENMX2+ENMX3	DIF3,DIF4,	PRES / ZEND /
าก (FORMAT (8E1)	0.5)				
	1210L = 2+14	0F2+4				
	$10FZ4 \approx 10F$	2+4				
	10E25 = 10E					
	CALL UNBAR	(VP IOL(1))	+1+PRES+U++1VA			
	CALL UNDAR		1111VAP10.10EL	. FIV#KK# TLUL_KZY		
	HE TINNET					
	- HV=HL+DELEV					
	GATZ0=GU+FC	*20				
	1F(FC.31.0.	00 TO 03	7			
	1FC=n					
37	WRITE (0,60)	0)				
n n -	FURMAT (52X	TOH INPU	1-CONSTANTS/7)	(102H HF		HV
	∧ 1F	ŤVA	P CFL	PRESSURE	KP	F
	X (00)	4 <u>)</u> <u>)</u>			6 0	
0.1	WRITE (D+00) COMPANY (3V)	.↓↓ .718 #i16# ★063★4 . ニノイ	11V#1F#1VAM#CFL \		60	
1.T	RURPER (3A)	2)	1			
<u></u> جە	+UN in F-17#=	< / ¶113+1 →≹~~~~			···· f〕 †₣`.4 ····	f)]F4
	A 15M4	5N W	WM2	WM1	ZEN()	041 7
	WRITE (0,00	1) RIALPH	43,CGM,DIF3,DI	F4+WM4+WM3+W	1M2 . WH1 . ZEN)
	WRITE (6,60	3)				
n 3	FURMAT (AX .	113H AUM	BGM	ALPHA1	ALPHA2	N1
	X 12	`43	ENMX1	Chillyo	ENMX 3	۱.
	M M T T C / - A O			CINITAZ	LINNAU	,
	1) T T (1) A6M≠dG	HVALPHALVALPHA	ENMAZ EVENIVENZVEN	13VENMX1VEN	AX2 JENMX3
1 7	aRITE (0.61	1) AGM+30 7) ZU	MYALPHALVALPHA	ENMAZ EVENIVENZVEN	IJVENMXIVEN'	AX2 FENMX3
17	ARITE (0.61 FURMAT (77)	1) AGM+36 7) ZU 3K+1201 Z	Мильриатиасния Злистана Стана	ENITRE EVENITENETEN	INAC IVEN	, 1X2 ,≝№X3
יד נ ז ד ז	ARITE (0+61 HURMAT (// READ (0+20) HURMAT (468	1) - A6M+d6 7) Z0 8K+'Z0' Z (ZTSLA(I +4)	Мульрнатульрни ЗлуЕ11.6)),1=1,4)	ENITRE EVENITENETE	INTRO IJVENMXIVEN	/ /X2,EMMX3
17 ก	ARITE (0,61 FURMAT (77 READ (0,20) FURMAT (428 READ (5,21)	1) AGM+20 7) 20 3×+'20' / (2T5LA(I +4) (213LA(1	3×+E11.6))+(=1,4))+(=5+NOFZ4)	ENITRE EVENITENET	IJVENMXIVEN	/X2,EMMX3
ז יַ ה 1	ARITE (0,61 FURMAT (77 READ (0,21) FURMAT (468 READ (5,21) FURMAT (19E	1) AGM+20 7) 20 3K+'20' / (2TBLA(I •4) (213LA(1 2+4)	3x,E11.6)),(=1,4)),1=5,NOFZ4)		137ENMX17EN	/ 1821514483
<u>1</u> 7 ก 1	ARITE (0,00 PORMAT (7/ READ (0,20) PORMAT (428 READ (5,21) FORMAT (30E) READ (5,21)	1) AGM+20 7) 20 3K+'20' / (2TBLA(1 •4) (213LA(1 3+4) (213LA(1	3A,E11.6)),I=1,4)),I=5,NOFZ4)),I=NOFZ5,NZTE		137ENMX17EN	/ 1X21ENMX3
17 n 1	ARITE (0,00 HURMAT (7/ REAU (0,20) HURMAT (428 REAU (5,20) FURMAT (302 REAU (5,21) REAU (5,20)	1) AGM+30 7) 20 8x+201 / (2TBLA(1 •4) (2TBLA(1 8+4) (2TBLA(1 (2TBLA(1	3A,E11.6) 3A,E11.6)),I=1,4)),I=5,NOFZ4)),I=NOFZ5,NZTE 1),I=1,4)		137ENMX17EN	/ 18215NMx3
17 n 1	RITE (0,00 HURMAT (// READ (0,20) HURMAT (428 READ (5,21) FURMAT (3,20) READ (5,21) READ (5,21)	1) AGM+30 7) 20 84+207 / (2TBLA(1 •4) (2TBLA(1 (2TBLA(1 (2TBLA)((2TBLA))	3A,E11.6) 3A,E11.6)),I=1,4)),I=5,NOFZ4)),I=NOFZ5,NZTE 1),I=1,4) I),I=5,NOFZ4)		137ENMX17EN	/ 1821 ENMX3
97 a	ARITE (0,61 FURMAT (7/ READ (0,20) FURMAT (428 READ (5,21) FURMAT (1428 READ (5,21) READ (5,21) READ (5,21) READ (5,21)	1) AGM+30 7) 20 8x+207 / (2T8L4(1 4) (2T8LA(1 (2T8LAP((2T8LAP((2T8LAP((2T8LAP(<pre>M+ALPHA1+ALPHA 3A+E11+6))+1=1+4))+1=5+NOFZ4))+1=5+NOFZ4))+1=1+4) 1)+1=5+NOFZ4) 1)+1=NOFZ5+NZ1</pre>		137ENMX17EN	/ ****
<u>1</u> 7 ก 1	RITE (0,00 RURMAT (7/ READ (0,20) FURMAT (428 READ (5,21) FURMAT (1920) READ (5,21) READ (5,21) READ (5,21) READ (5,20)	1) AGM+30 7) 20 84,1201 / (2TBLA(1 4) (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP(M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4) 1, 1=1,4)	ENITEN2 FEN REFENSER BL)	137ENMX17EN	/ ****
37 n 1	RITE (0,00 RUKMAT (7/ READ (0,20) FURMAT (428 READ (5,21) FURMAT (428 READ (5,21) READ (5,21) READ (5,21) READ (5,21) READ (5,21) READ (5,21)	1) AGM+30 7) 20 84,1201 / (2TBL4(1 (2TBL4(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP(<pre>MyALPHA1yALPHA 3A,E11.6)),1=1,4)),1=5,NOFZ4)),1=5,NOFZ4)),1=1,4) 1),1=1,4) 1),1=5,NOFZ4) 1),1=NOFZ5,NZT),1=1,4)),1=5,NOFZ4)),1=1,4)</pre>		137ENMX17EN	/ ★¥₽,₽₩₩x3
17 n 1	RITE (0,00 READ (0,01) FURMAT (// READ (0,20) FURMAT (468 READ (5,21) READ (5,21) READ (5,21) READ (5,21) READ (5,21) READ (5,21)	1) AGM+30 7) 20 84,207 / (2TBLA(1 .4) (2TBLA(1 (2TBLA)(1 (2TBLA)(1 (2TBLA)(1 (2TBLA)(1 (2TBLA)(1 (2TBL)(1 (2TBL)(1 (2TBL)(1 (2TBL)(1	<pre>M#ALPHA1#ALPHA 3A#E11.6)) #1=1,4)) #1=5,NOFZ4)) #1=5,NOFZ4)) #1=5,NOFZ4) 1) #1=1,4) 1) #1=5,NOFZ4) 1) #1=1,4)) #1=5,NOFZ4)) #1=1,4)) #1=5,NOFZ4)) #1=NOFZ5,NZTE</pre>			/ ★¥₽,₽₩₩X3
9 7 n 1	ARITE (0,01 HURMAT (7/ READ (0,20) HURMAT (428 READ (5,20) FURMAT (428 READ (5,21) READ (1) AGM+30 7) 20 84,207 / (2TBLA(1 (2TBLA(1 (2TBLA) (2T	M, ALPHAlyALPHA 3A, E11.6)), I=1,4)), I=5, NOFZ4)), I=5, NOFZ4)), I=5, NOFZ4) 1), I=5, NOFZ4) 1), I=1,4)), I=1,4)), I=1,4)), I=NOFZ5, NZTE V5 A TABLE			/ ★¥₽,₽₩₩X3
17 n 1	ARITE (0,00 ARITE (0,00 FURMAT (// REAU (0,20) FURMAT (428 REAU (0,20) FURMAT (428 REAU (0,20) REAU (0,20) REAU (0,20) REAU (0,20) REAU (0,20) REAU (0,20) REAU (0,20) REAU (0,20) REAU (0,20) REAU (0,20)	1) AGM+30 7) 20 3x+'20' / (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLAP) (2TBLAP) (2TBLAP) (2TBLAP) (2TBLAP) (2TBLAP) (2TBLO(1 4) 55x+13H 2) (2TBLAC)	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=5, NOFZ4) 1), 1=5, NOFZ4) 1), 1=5, NOFZ4) 1), 1=1,4)), 1=NOFZ5, NZTE V5 A TABLE) 1), 1=1,4)		137€NMX17EN	/ ₩x3
17 1 1 1 1 1	aRITE (0,61 FURMAT (// READ (0,20) FURMAT (428 READ (5,20) FURMAT (428 READ (5,21) READ (5,22)	1) AGM+30 7) 20 84,1201 / (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLD(1 (2TBLD(1 4) 55X,130) 2) (2TBLA(,4E13.5)	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=5, NOFZ4) 1), 1=5, NOFZ4) 1), 1=5, NOFZ4) 1), 1=1,4) , 1=NOFZ5, NZTE VS A TABLE) 1), 1=1,4)			/ ₩x3
1 1 1 2	WRITE (0,61) FURMAT (// READ (0,20) FURMAT (428 READ (0,20) FURMAT (428 READ (0,20) FURMAT (1920) READ (0,20)	1) AGM+30 7) 20 84,1201 / (2TBLA(1 4) (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBL)(1 (2TBL)(1 4) 55x,13H 2) (2TBLA(,4E13,5)) (2TBLA(M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4)), 1=5, NOFZ4)), 1=1,4)), 1=5, NOFZ4) 1), 1=1,4) 1), 1=1,4) 1), 1=1,4)			/ ★¥2, ENMX3
7	ARITE (0,64) ARITE (0,64) FURMAT (7/1) READ (5,21) FURMAT (448) READ (5,21) READ (5,22) READ (5,22) <t< td=""><td>1) AGM+30 7) 20 34, 20 (2T5L4(1 (2T5L4(1 (2T5LA(1 (2T5LAP((2T5LAP((2T5LAP((2T5LAP((2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LA))) (2T5LA((2T5LA(1 (2T5LA)))) (2T5LA((2T5LA)))</td><td>M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4) , 1=1,4) , 1=5, NOFZ4)), 1=NOFZ5, NZTE VS A TABLE) 1), 1=1,4) 1), 1=1,4) 1), 1=5, NOFZ4)-</td><td></td><td></td><td>/ ★¥₽,₽₽₩₩X3</td></t<>	1) AGM+30 7) 20 34, 20 (2T5L4(1 (2T5L4(1 (2T5LA(1 (2T5LAP((2T5LAP((2T5LAP((2T5LAP((2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LD(1 (2T5LA))) (2T5LA((2T5LA(1 (2T5LA)))) (2T5LA((2T5LA)))	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4) , 1=1,4) , 1=5, NOFZ4)), 1=NOFZ5, NZTE VS A TABLE) 1), 1=1,4) 1), 1=1,4) 1), 1=5, NOFZ4)-			/ ★¥₽,₽₽₩₩X3
14 2 2 3	WRITE (0,00 WRITE (0,01 PURMAT (7/1 READ (0,20) PURMAT (400 READ (0,20) PURMAT (400 READ (0,20) FURMAT (1,20) READ (0,20)	1) AGM+30 7) 20 84,1201 / (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLA)((2TBLD(1 (2TBLD(1 (2TBLD(1 (2TBLA))) (2TBLA(+4E13.5))) (2TBLA(+4E13.5)/)	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4)), 1=5, NOFZ4)), 1=NOFZ5, NZTE VS A TABLE) 1), 1=1,4) 1), 1=5, NOFZ4)-			/ 1X2 , ENMX3
17 1 1 2 3	ARITE (0,00 ARITE (0,01 FURMAT (7/1 READ (0,20) FURMAT (408 READ (0,20) FURMAT (408 READ (0,20) FURMAT (10,20) READ (0,20) READ (0,20) <tr< td=""><td>1) AGM+30 7) 20 3A+1201 Z (2TBLA(1 4) (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLA)) (2TBLA)) (2TBLA(1 4) 55X+13H Z) (2TBLA(+4E13.5)) (2TBLA(10E13.5) Z</td><td>M, ALPHA1, ALPHA 3A, E11.6)), I=1,4)), I=5, NOFZ4)), I=5, NOFZ4) 1), I=5, NOFZ4) 1), I=5, NOFZ4) 1), I=1,4)), I=1,4)), I=1,4)), I=NOFZ5, NZTE VS A TABLE) 1), I=1,4) I), I=1,4) I), I=5, NOFZ4)</td><td></td><td></td><td>/ ★¥₽,Ĕ₩₩x3</td></tr<>	1) AGM+30 7) 20 3A+1201 Z (2TBLA(1 4) (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLA)) (2TBLA)) (2TBLA(1 4) 55X+13H Z) (2TBLA(+4E13.5)) (2TBLA(10E13.5) Z	M, ALPHA1, ALPHA 3A, E11.6)), I=1,4)), I=5, NOFZ4)), I=5, NOFZ4) 1), I=5, NOFZ4) 1), I=5, NOFZ4) 1), I=1,4)), I=1,4)), I=1,4)), I=NOFZ5, NZTE VS A TABLE) 1), I=1,4) I), I=1,4) I), I=5, NOFZ4)			/ ★¥₽,Ĕ₩₩x3
7) , ,	aRITE (0,00 aRITE (0,01 FURMAT (// READ (0,20) FURMAT (420 READ (0,20) FURMAT (420 READ (0,20) FURMAT (10,20) READ (0,20)	1) - AGM+JG 7) ZU 3A, 1ZO1 / (ZTBLACI	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=5, NOFZ4) 1), 1=5, NOFZ4) 1), 1=5, NOFZ4)), 1=1,4)), 1=5, NOFZ4)), 1=NOFZ5, NZTE V5 A TABLE) 1), 1=1,4) I), 1=5, NOFZ4)- I), 1=NOFZ5, NZTE			/ +¥≈,EMMx3
17 n 1 	aRITE (0,61 FURMAT (// READ (0,20) FURMAT (428 READ (0,20) FURMAT (428 READ (0,20) FURMAT (428 READ (0,20) FURMAT (428 READ (0,20)	1) AGM+30 7) 20 3x+20' 2 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLA(1))) 55x+13H 2) (2TBLA(+4E13.5) 2)) (2TBLA()	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=5, NOFZ4) 1), 1=5, NOFZ4) 1), 1=5, NOFZ4)), 1=1,4)), 1=5, NOFZ4)), 1=NOFZ5, NZTE V5 A TABLE) 1), 1=1,4) 1), 1=5, NOFZ4) 1), 1=NOFZ5, NZTE (), 1=NOFZ5, NZTE			/ +¥≈, EMMx3
37 1 1 014 2 3 5 5	aRITE (0,61 FURMAT (// READ (0,20) FURMAT (420 READ (0,20) FURMAT (420 READ (0,20) FURMAT (420 READ (0,20)	1) AGM+30 7) 20 3A+220 / / (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLA	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=5, NOFZ4) 1), 1=1,4)), 1=NOFZ5, NZTE V5 A TABLE) 1), 1=1,4) 1), 1=5, NOFZ4) 1), 1=NOFZ5, NZTE (), 1=NOFZ5,			/ /**2,EMMx3
97 n 1 04 2 3 5 4 06	WRITE (0,61 FURMAT (// READ (0,20) FURMAT (420 READ (0,20) FURMAT (420 READ (0,20) FURMAT (420 READ (0,20)	1) AGM+30 7) 20 3x, 20 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA(1 (2TBLA))))))))))))))))))))))))))))))))))))	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=5, NOFZ4) 1), 1=NOFZ5, NZTE VS A TABLE) 1), 1=1,4) 1), 1=1,4) 1), 1=5, NOFZ4) (), 1=NOFZ5, NZTE (), 1=NOFZ5,	5L) 5L)		/ /**2,EMMx3
97 n 1 04 2 3 5 4 06	WRITE (0,61 FURMAT (// READ (5,20) FURMAT (428 READ (5,21) FURMAT (192 READ (5,21) READ (5,22) READ (5,22) READ (5,22) READ (5,22) READ (5,23) READ (5,24) WRITE (0,23) WRITE (0,24) WRITE (0,60) FURMAT (0,40) FURMAT (0,40)	$\begin{array}{c} 1) & AGM + 3G\\ 7) & Z0\\ SA + ZO + & \\ (ZTSLA(1)\\ (2TSLA(1)\\ (2TSLA(1)\\ (2TSLA(1)\\ (2TSLAP)\\ (2TSLAP$	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=5, NOFZ4) 1), 1=1,4) , 1=5, NOFZ4)), 1=NOFZ5, NZTE VS A TABLE) 1), 1=NOFZ5, NZTE US A TABLE) 1), 1=NOFZ5, NZTE (), 1=NOFZ5, NZTE), 1=NOFZ5, NZTE	5L) (bL) (bL)		/ /**2,EMMx3
27 n 1 04 2 3 5 4 06	WRITE (0,61 PURMAT (// READ (5,20) PURMAT (428 READ (5,20) PURMAT (428 READ (5,21) READ (5,22) READ (5,22) READ (5,23) READ (5,24) FORMAT (12,40) WRITE (0,23) WRITE (0,24) FORMAT (54) WRITE (0,24) WRITE (0,24)	$\begin{array}{c} 1) & AGM+JG\\ 7) & Z0\\ SA+ ZO & Z\\ (ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI(ZTSLACI) (ZTSLACI) (ZTSLACI$	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4)), 1=5, NOFZ4)), 1=1,4)), 1=5, NOFZ4) 1), 1=1,4) 1), 1=1,4) 1), 1=1,4) (1), 1=1,4) (1), 1=5, NOFZ4)			/ /**2,EMMx3
27 n 1 	ARITE (0,61 FURMAT (// READ (0,20) FURMAT (428 READ (5,21) FURMAT (199 READ (5,21) READ (5,22) READ (5,22) READ (5,23) READ (5,24) FORMAT (12, 0,23) WRITE (0,24) FORMAT (54) WRITE (0,23) WRITE (0,23) WRITE (0,23)	1) AGM+30 7) 20 3A+ 20 7 (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP))) (2TBLAP)) (2TBLAP)) (2TBLAP)) (2TBLAP)	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4) 1,1=5, NOFZ4)), 1=NOFZ5, NZTE VS A TABLE) 1), 1=1,4) 1), 1=5, NOFZ4) S AP TABLE) (1), 1=1,4) (1), 1=5, NOFZ4)			/ /**2,EMMx3
14 2 3 14 2 5 3 6	WRITE (0,00 WRITE (0,01 PURMAT (// READ (0,20) PURMAT (446 READ (0,20) PURMAT (446 READ (0,20) PURMAT (40,000 READ (5,21)	1) AGM+30 7) 20 3A+ 20 7 (2TBLA(1 (2TBLA(1 (2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLAP((2TBLA)) (2TBLA(4) 55x+13H 2) (2TBLA(10E13.5) 7)) (2TBLA() (2TBLA(10E13.5) 7)) (2TBLA() (2TBLAP((2TBLAP((2TBLAP((2TBLAP))) (2TBLAP))) (2TBLAP))) (2TBLAP))) (2TBLAP))) (2TBLAP))	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4) 1, 1=5, NOFZ4)), 1=NOFZ5, NZTE V5 A TABLE) 1), 1=1,4) 1), 1=1,4) 1), 1=1,4) 1), 1=NOFZ5, NZTE (1), 1=1,4) (1), 1=5, NOFZ4) (1), 1=5, NOFZ4)			/ /**2,EMMx3
7	WRITE (0,00 WRITE (0,01 PURMAT (// READ (0,20) PURMAT (448 READ (0,20) PURMAT (428 READ (0,20) PURMAT (428 READ (5,21) WRITE (0,22 FORMAT (12, WRITE (0,23 FORMAT (12, WRITE (0,23 WRITE (0,23 WRITE (0,24 FORMAT (54 WRITE (0,25 WRITE (0,25 WRITE (0,25 WRITE (0,25 WRITE (0,25 WRITE (0,25 <td>$\begin{array}{c} 1) - AGM+JG\\ 7) - Z0\\ SA+ 20^{2} \\ (2TSLACI(2TSLACI(2TSLACI(2TSLACI(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC)(2TSLACC$</td> <td>M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4)), 1=1,4)), 1=1,4)), 1=NOFZ5, NZTE V5 A TABLE) 1), 1=1,4) 1), 1=NOFZ5, NZTE U5 A TABLE) 1), 1=1,4) 1), 1=NOFZ5, NZTE (1), 1=1,4) (1), 1=5, NOFZ4) (1), 1=5, NOFZ4) (1), 1=5, NOFZ4)</td> <td></td> <td></td> <td>/ /*** , EMMX3</td>	$\begin{array}{c} 1) - AGM+JG\\ 7) - Z0\\ SA+ 20^{2} \\ (2TSLACI(2TSLACI(2TSLACI(2TSLACI(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC(2TSLACC)(2TSLACC$	M, ALPHA1, ALPHA 3A, E11.6)), 1=1,4)), 1=5, NOFZ4)), 1=5, NOFZ4)), 1=1,4) 1), 1=5, NOFZ4) 1), 1=1,4)), 1=1,4)), 1=1,4)), 1=NOFZ5, NZTE V5 A TABLE) 1), 1=1,4) 1), 1=NOFZ5, NZTE U5 A TABLE) 1), 1=1,4) 1), 1=NOFZ5, NZTE (1), 1=1,4) (1), 1=5, NOFZ4) (1), 1=5, NOFZ4) (1), 1=5, NOFZ4)			/ /*** , EMMX3

G 91046	1-30
	WR11L (6+607)
607	FORSAT (52X,1711 2 VS DELTA TABLE)
	WRITE $(0, 2)$ (21840(1), 1=1, 4)
	WRITE (0+23) (213LD(1)+1=5+NOF24)
	W(11) = (0,25) W(11) = (0,25) W(11) = (0,25) W(11) = (0,25)
613	
	(1) = (1)
	sir ⊨Av=0
450	$\frac{1}{1} = \frac{1}{1}$
0.00	モンスエノームンエスニエノテレム 「1」の二丁ピナ(1)=AF)ノビビト
	· CALI-HININAN -FILL VP (+)
	CALL UNBAR (1) $+1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1$
	CALL UNDAP $(2TDLAP(1), 1, 2(11), 0, AP, KK)$
	CALL UNBAR (275LA(1),1,2(11),0.,A,KK)
	CALL PARAM(TEMP+Z(II), 1, CM2(14, H4, 1), G, GMMA, K, DPA, BEIA)
	CALL SCOPE (CWAHAVGMMARK, HE FARENINDERIVIII), DPARA, UIFA)
	1F(11-HL)777+77n+7/7
770	IF (B1.3T.20) OFKIV(II)=DERIV(II-1)
777	$OHU2(1_{1})=+(H+*UPA*AP*ULRIV(II)+FC*(H-HF))/G$
	$DZ = -H4/(E^{h}MX1 + DHDZ(11))$
	W(LIL (n) 820)
0211	
460	WALLAND (VARAL) (CAL) (CAL) (CAL)
000	FORMAT (700A)4C10+07 (F(1)=-(1)470,1020,870
874	HEM40407074750207074
	1P(D=HC)875.1020.1000
	60 TU 350
	HACKSTEP TO L-L-V-HOUNDARY
1000	02=(HL-H)/0H02(II)+02
	HEIL
	I1=11+1
	<u>- 60 î 0 850</u>
1020	IF (UPILUM, EU. 2) CALL LQV2(H, Z(II), DERIV(II), II, DHDZ(II), TEMP, CN2H4)
-	1F (OFTION.E.d.2) GO TO 1021
	CALL LGVP(1)/2(11)/DLRIV(II)/II/DHD2(II)/TEMP)
	DIART WARVE REDIDIN
TOST	UZ==F197(E191X)*UHDZ(II)) -CA VANODATEMO - AATA - TT. GUNDATEA, GENEVA-YA - IN
	CALL VAR ON CILINE VZ CILINE IZIJANOZCILINE UCKIVCILINENT
	TRUNHT-NUMTTE TRUKAHAT, FRUMSEDAN, TA 705
	weite (As102)
102	FORMAT (////41X+3oH ***** OPERATIONS COMPLETE *****)
	Stop
	<u>ÉND</u>

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SUBROUTINE LOVP	(H+ZLV+Q+JJ+Q1+TEMP)	0
		10
INTEGER PRINT		20

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-10101-	04 AMMAN: 75777771. VO17613781 HATASISTAL HATASIS 64701 17341 CU	TO1 0/341.
1	SHT3L3(34) + SHTBL4(34) + 7TBLD(46) + 7TBLAP(46) + 7TBL	$\Delta(46)$
ີເ	OMMON /CO/HL, HV, FC, TF, CFL, CGM, ENMX1, AGM, DIF3, DIF4, KP, P	RESPGOP
1	WM4 . WM3 . WM2 . WM1 . ALPHA3 . R . TVAP . ZEND . BGM . HF . UZ . ALI	PHA1, ALPHAZ
	,ENMX2JENMX3JEN1,ENZJENSJHJRATJMI	
C	OMMON /VAR/DERIV(250),DHDZ(250),Z(250)	
	UMMON /TULL/ALIM/UPIIUN, CI/CZ/C3/C4/CAV/G/TEMP/AP/WMAV	/20,
	CIMMON /MOVST/VISVST(30/	
<u>م</u>	RETE (5+100)	
- <u>100 +</u>	0KMAT{109H1	ENTERING L
11	QUID-VAPOR REGION *********************	//)
ΰ	ERIV(JJ)=Q	
J	HUZ(JJ)=01	
A THE O	RITE(6+1750)	
1750 -	UKNAT(//JUX, JH 2 , 11X, 5H FEMP 11X, JH H 12X, JHWFV)	
2		
1800 C	GNT TNOF	
1520 ປ	ERIV(JJ) = DERIV(JJ-1)	
2	(JJ) = 2(JJ-1) + 0Z	
1	EMP=TVAP	
t	ALL UNUAR (TUCH4(1) +1+1EMP+0.+H4+KK)	<u> </u>
C	ALL JIBAK (ZTOLAP(1)+1+Z(JJ)+0++AP+KK)	
C C	ALL PARAM(TEMP)Z(JJ)) $110.010.010.000$ G(MMA)K)DPA)BETA)	
U .1	1112(JJ)==(1447UPA#AP#0ERIV(JJ)+FU#(119HF))/6 2-==67/1566499#05677111)	
1	E	
- 1 2	=+++++++++++++++++++++++++++++++++++++	
I	F(H-HV) 1350,135H,2000	
1350 w	FV=(++-++L)/(++V-++L)	
14	KITE (U,1900) 2(JJ), TEMP, HOWEV	
1900 f	UnmAT(22X+E14.5+1X+E14.5+1X+E14.5+1X+E14.5)	
1 11 1 1	F (1=1/) 100+1900+80	
- 6 6-		
2000 0	2=(HV-H)/()H()7(J()+()/	
J	1+0-01	
0	N TO 1020	
- 1950 -	ETURN	
t_	- i u	

SUBROUTINE LUVE (172LVYOrJJY01YTEMPPENEH	0
INFEGER PRINT	10
COMMON /FTZ/TELVP(70),TELH4(42),TELH3(42),SHTEL1(34),SHTEL2(34),	50
1 SHTUL3(34), SHTUL4(34), ZTULD(46), ZTULAP(46), ZTULA(46)	30
COMMONI /CO/HL+HV+FC+TF+CFL+CGM+ENMX1+AGM+DIF3+DIF4+KP+PRES+GO+	40
1 WM4, WM3, WM2, WM1, ALPHA3, RATVAP, ZEND, BGM, HF, DZ, ALPHA1, ALPHA2	50
	· 60 ·
COMMON //AR/DERIV(250),DHDZ(250),Z(250)	7 G
COMMON /TOLL/ALIM+UPTION,C1+C2+C3+C4+CAV+G+TEMP+AP+WMAV+Z0+	80
COMMON ZMUVSTZVISVST(30)	ġΟ
COMMON /FLAGS/MFLAG+KFLAG+PRINT	100
wk1TE(6,100)	110
	120 -
LIQUID-VAPOR REGION ************************************	130

G 910461	-30	
	DERIV(JJ)=Q	14
	UHU2 (JJ) =Q1	1
	Z(JJ)=ZLV	16
	CALL UHBAN (TBLH411), 1, TEMP, 0, H4, KK)	1.
	C4-CH2H4*((H4-HF+1)L)/(H4+HF-HL))	1
		1
1101		<u>د</u>
1820	Z()=/()=1)+02	2
	TEMPETVAP	2
	CALL UNBAR (TOLNA +) , 1, TEMP, 0., H4, KK)	2
	CALL UNDAR (2TBLAP(1),1,2(JJ),0.,AP,KK)	2
	CALL UNDAR (ZTULA(1)+1+Z(JJ)+0++A+KK)	2
	CALL PARAM (ILMP, Z(JJ), 1, 1, 1, 1, 0, 0, 0, 0, G, GMMA, K, DPA, BETA)	2
	IF (MFLAG.EQ.1)00 10 7	2
	CALL SLUPE (C4) GM-MAJKAGLTAJEHIJDEKIV(JU)JDPAJAJDIF4)	21
7	100 10 H 116 mm 115 0 ± //15 mD / 403 1 ± ± 1 0331 ± 10 7 / 00555	וני. איצ
•	CALL UNBAR (VISVST(1), 1, TFMP, $0VIS.KK$)	3
	KHU=PRES*WM4/(R*TEMP)	3
	AKC=.61*0/RHU*((VI5/(RHO*D1FN))**667)*((G/(AP*VI5))**41)	3
	ULKIV(JJ)=AKC+C4/DPA	3
	HERIV(JJ)=+++++++++++++++++++++++++++++++++++	3
	UHUZ(JJ)=-(H4+UPA+AP+DERIV(JJ)+FC+(H-HF))/G	3
	DZ=-H4/(ENMX2*UHDZ(JJ))	3
15	IF (H=HV) 15,3050,15	3
.	H=H+UHUZ(JJ)*UZ 15/10-30/13050.3050.3600	4
	1P(1=4V)3030(300(0500)	4 11
0.000	xLv=(1)/	4
	C4=PRES*WM4/(R*TEMP)*((1.=XLV)/(1.+XLV))	4
3160	WRITE(6,3000)	4
~ 3000	FORMAT(//30X) 3H Z , 11X,5H TEMP 11X, 3H H (12X) 2 (FV)	4
	WRITE(6,3100)Z(JJ), TEMP, H, WFV	4
-3100	PUKMAT (22X)E14-5/1X/E14-5/1X/E14-5/1X/E14-5////)	
- 16	11 (1=11V) 10/0100/10	4 5
T (1	60 TO 3101	ំ ភ្
- 3500	02=(HV-H}/0HDZ(JJ)+02	5
	HEHV	5
		5
	GU TO 1620	5
3150	RETURN	5
		5
	· · · · · · · · · · · · · · · · · · ·	
	SUBROUTINE CONC (C1+C2+C3+C4+7C+H+T)	
2	THIS ROUTINE CALCULATES INITIAL N2H4, NH3, N2, H2 CONCENTRATIONS FOR	
:	VAPOR REGION OF THE REACTOR BED	
	INTEGER PRINT	
	-COMMON-/FTZ/T&LVP(70),TBLH4(42),TBLH3(42),SHTBL1(34),SHTBL2(34),	
	L SHTBL3(34), SHTUL4(34), ZTBLD(46), ZTBLAP(46), ZTBLA(46)	
	COMMON /CO/HL, HV, FC, TF, CFL, CGM, ENMX1, AGM, DIF3, DIF4, KP, PRES, GO,	
	L WM4+WM3+WM2+WM1+ALPHA3+R+TVAP+ZEND+BGM+HF+DZ+ALPHA1+ALPHA2	
	C ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・ ・	
	-COMMON-/YORT/DETTY/2007FDML/CY_COUTFL/2007 -COMMON-/TORT-/AFTM-OPTTON-CY_COUFFL/2007FL/20-TEMD-+D-UMAM-=A	
	COMMON ZMUVSTZVISVST(30)	

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-8f 9(;

0 910461-30	
COMMON /FLAGS/MFLAG, KFLAG, PRINT	100
CALL UNBAR (TBLH4(1),1,T,0,,H4,KK)	110
スソニー(Hートド)/H4	150
C4=((PRES#WM4)/(R*TVAP))#((1.+XV)/(1.+XV))	130
	140
C2=({PRE5*WM2)/(2.*R*TVAP))*(XV/(1.+XV))	150
C1=((PRES*WM1)/(2.*R*TVAP))*(XV/11.+XV))	160
RETURN	. 7!)
END	180

	SUBROUTINE PARAM (T+ZA+LOP+CC+HR+LVOP+G+GMMA+K+DPA+BETA)
	REAL KPIK
	INTEGER PRINT
	COMMON /FT2/TREVP(70),TBEH4(42),TBEH3(42),SHTBL1(34),SHTBL2(34);
	1 SHTBL3(34),SHTBL4(34),ZTBLD(46),ZTBLAP(46),ZTBLA(40)
	COMMON /CO/HL+HV+FC+TF+CFL+CGM+ENMX1+AGM+DIF3+DIF4+KP+PRES+GO+
	1 WP4+WM3+WH2+WM1+ALPHA3+R+TVAP+ZEND+BGM+HF+DZ+ALPHA1+ALPHA2
	2 ,EHMX2;ENMX3;EN1;EN2;EN3;H;RAT;MI
	COMMON /VAR/DEKIV(250),DHDZ(250),Z(250)
······	CUMMON /TOLL/ALIMIUPTIONICIICZICZICZICAVIGITEMPIAPIWMAVIZOF
	COMMON /MUVST/VISVST(30)
	CUMMUN /FLAGS/MFLAG+KFLAG+PRINT
	COMMON /IFCEUN/IFC,GATZO
	IF(ZA=z0)43+48+48
મડ	G=GU+FC*ZA
C	Z HAS EXCLEDED HYDRAZINE INJECTOR TUBE LENGTH - 6 CONSTANT FROM
C	HERE TO END OF HED
4.3	U=UATZ0
	FC=0.
52	IF (LVOP, EQ.1)GO TO 1004
<u> </u>	
L	CALCULATE KIUPA FUK 12114
	KGALMHA1*EAM(=0MMA) たいいいーロックのよう「スイルクタート・ホイム・クォク・ナイナル・ライロロロクトナイト・アメロクト・カイマクトノロロロクトルシンク・トイイー
100	I_UPL=U1F4+(1/492*)**I*832_*(14*//PRE5)*(1**EAP(=*U6/2*(PRE5*492*)/(
	114-7*177
- 1 ++++	
100	
, TH0	
Ç	CALCULATE NEURA FUX HES Manifoldsstructure fux hes
	N=ALF11A2#EAF1/000) ++4 030 +/10 7/00551+/1 _5V0/_ 06/10+/00554000 }//
	UPV=U1P 3×11/4940) ++10032 +1140//PRC3/+110=CAP1=00/2*(PKC3*4920)/(
	UFR-UFV 60 To 1002
100	V 1V 1000 7 DETUD
T00	
	CUD

SUBROUTINE VAPOR (TEMP, ZV, LL, Q1, Q, H)	0
KEAL KP+K	10
REAL MUSS	20
INTEGER PRINT	- 30
COMMON /FTZ/TBLVP(70),TBLH4(42),TBLH3(42),SHTBL1(34),SHTBL2(34),	40

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1 SHTBL3(34), SHTBL4(34), ZTBLD(46), ZTBLAP(46), ZTBLA(40)	
	14.2
	182
COMMON / VARY BERIVIEDD (2007) 212000 (CAMON PROVIDE (2007) (CAMON / TEMPANDA (CAMANA 7))	
COMMON / NEWST/WIGVST/36)	
COMMON ZELAGSZMELAG. KELAG. PRINT	
CUMMON ZIECEONZIEC.GATZN	
CUMMON /BBBB/UP3+A+KC3+KU+XOA+CPS+CI3+GAMMA+BFTA	
CUMMON -/CCC/H4THL(40) 7113TBL(40)	
COMMON /DDU/CFT3L4(34), CFT8L3(34), CFT8L2(34), CFT9L1(34)	
JZ=LŁ	
2(LL)=2v	
TEMPETVAP	
PFRC3D=0.	
Zhuundazen	
リトレイビュリー	
1000 T-0 1477	
wR1 (E (n. 100)	
.00 FURMAT(109H1 ************************************	STF
1RING VAPOR REGION ************************************	*16-
CALL CONC (C1,C2,C3,C4,Z(LL),H,TEMP)	
SUM=C1/WM1+U2/WM2+C3/WA5+C4/WM4	
FKAC1=C1/(//h]+5UM)	
FRAC2=C2/(JM2*SUM)	
FRAC3=C3/(wm3*SUM)	
FRAC4=C4/(JMG*SUM)	
FRAC3D=(FRAC1/FRAC2-1.)/(3FRAC1/FRAC2)	
WK1TE(n/4059)	
WRITE (074030) Z(EL) TEMP PRESTAVC1 C27C37C4	
WKLIL (DJJ/) WRITE (BUD/) CUACI CUACI CDACA CDACAD	
WRITE (DJJD) FRAUIFRAUZFRAUJFRAUJFRAUJFRAUJU NGO ČALE INNDAR (SUTRE141),1,1500,0,000,000	
CALL HALAR (CHTRES(1),1,1,TCHP.0,CP3.KK)	
CALL WHEAR (SHTELS(1), 1, TEMPAR, CP2, KK)	
CAv = (C4 + CP4 + C3 + CP3 + C2 + CP2 + C1 + CP1) / (C4 + C3 + C2 + C1)	
WMAV=(C1+C2+C3+C4)/(C1/WM1+C2/WM2+C3/WM3+C4/WM4)	
CALL UNBAR (TELH4(1),1,TEMP+0H4+KK)	
CALL UNBAR (ZTELD(1)+1+2(LL)+0.+DELA+KK)	
CALL UNBAK (ZTULAP(1),1,Z(LL),0.,AP+KK)	
CALL UNDAR (ZTDLA(1) /1/2(LL) /0. VAVKK)	
CALL PARAM(TEMP+Z(LL),1,C4+H4+0+G+GMMA+K,DPA+BETA)	
1 + (= 4 + 7 + 29 + 7	
DIFN=DIF4+((TEMP/492.)++1.623)+14.7/PRES	
CALL UNBAR (VISVST(1), 1, TEMP+0., VIS, KK)	
RHU=PRES**MAV/(R*TEMP)	
AKC=+6/RH0+((VIS/(RH0+DIFN))++-+667)+(6/(AP+VIS))++-+41)	
DERIV(LL)=AKC+C4/UPA	
マン・1 サロジョー (* * * * * * * * * * * * * * * * * * *	
L GALL UNDAR (IDLNOVI)/I/I/IMM/USPHO/KK/	
JE (C 3) 1 4, 30, 13	
11111111111111111111111111111111111111	

G 91046	1-30	
13	CALL SGHAD (GRAD, TGHAD)	650
	DERIV(LL)=GRAD/DPA	660
	T3=AP*DPA*DERIV(LL)	670
	GU TO 32	680
- 30-	13=0.	690
32	RHUM = ALPHA3+C4+EXP(-CGM/TEMP)	700
	T1=PRES+WMAV/(R+TEMP+G)	710
	T2=RHOM*DELA	720
	UHU2(LL)=-H4/G*(T2+T4)-H3/G*T3-FC/G*(H-HF)	730
	KELAG IS SLUPE INDICATOR	
Č	THE SLOPE MUVING TOWARDS FIRST PEAK	
C	THE SLOPE HAS REACHED FIRST PEAK	7.0
		740
	211147(E1908AJ#D102(LE)) />* 06=//26/00/27/11/1/	750
	464040241113471	760
		770
#00r		700
		7 20 8016
	W2=C2/RH0	500 810
	*3=C3/RHU	820
	W4=C4/RHQ	a30
	51=1./0	840
	55=FC/(6*kHJ)	650
	Uw4DZ=51*(FC-T2-T4)-C4*S5	860
	Dv3U2=51+(T2+vH3/3H4+T4+WM3/WM4+T3)-C3+S5	870
	Uw2UZ=51+(.5+T2+Wm2/WM4+.5+T4+WM2/WM4+.5+T3+WM2/WM3)-C2+55	880
	Dw1DZ=S1*(.5*T2*w 11/WM4+.5*T4*WM1/WM4+1.5*T3*WM1/WM3)-C1*S5	590
	SUMwM=w1/W-11+w2/W42+w3/WM3+W4/WM4	900
	SMDwDZ=UW1DZ/wM1+UW2DZ/wM2+DW3DZ/WM3+DW4DZ/WM4	910
	UMUZE-#MAV/SUMWM*ShiUHDZ	920
	DPUZ = (DELA-1.)/ULLA**3*(1.75+75.*VIS*(1DELA)/(A*G))*G**2/	9 3 0
		940
		950
	- <u>いれいとれーチーリャリンティャックスティーションティーレビンティーストラー</u> オトッククノビーング シスク	960
		470 C.00
	00402~11#\F0~12=1477-04413 36307-T1+(T0+00037.3M0+T0+00370M0_T3)_63+F	950
		10-0
	DUEDE=11+(10+12+102)HH++(0+12+WH2)WH++(0+10+HH2)WH0)=02+10 DUEDE=11+(15+12+WH1)/WH4+(5+14+WH1)/WH4+1(5+13+WH1)/WH3)=01+15	1010
		1020
С	JELAG IS DZ INDICATOR FOR NON-ZERO FEED RATE CASES	1
. C	=0 UZ INCREMENT O.K.	
С	=1 INCREMENT INITIALLY TOO SMALL	
	IF(JFLAG.EG.1)GO TO 93	1030
90	IF (KOUNT.EQ.4.OR.KOUNT.EQ.6.OR.KOUNT.EQ.8.OR.KOUNT.EQ.10.OR.KOUNT.	1040
·	* Eu;12.0R.KOUNF.E0.14)N=N=1	
	KOUNT=KOUNT+1	1060
	DZ=DELTAZ/(THREE**N)	1070
	IF(FC)98,98,93	1980
_9a	IF(IFC.EQ.0)60 TO 16	1090
C	IF FEED RATE IS NON-ZERO WE MUST MAKE ADDITIONAL CHECKS ON STEP	
- t		
293	IF (AUS(DTUZ)*DZ.GI01*TEMP)GO TO 19	1100
L.	CHECK IF WE HAVE REACHED THE END OF THE INJECTOR	
• • •	1F((1,+UZ/(2(LL)=4U)+,U1+2U/ABS(2(LL)=ZC)),GT.0,)GO TO 16	1110
19	しておうした。 このから、「「「「「「」」」」「「「」」」」「「」」」「「「」」」「「「」」」」「「」」」」	1120
	CALL REUIVU (ULIFUTULFNINTFUTLAGFIFLL)	1130
01	FORMAT 1//74 KOUNT 12 . 374 THIS INTEONAL HAS DESULDED THIS	
71	LANDAL AVAILE RAADI-IS IDID JUID INTERARE HAD DEEN KEDIAIDED141	1120

合素

16 HEINDAD2(LL)+02 117 17 IF (IN,LT,HY) GG TO 106 1194 4051 TEME+2E(MP+3D12+3Z 1197 9 PRES-POP2+87 1200 C3EC3+0C3D2402 1210 C3EC3+0C3D2402 1221 C3EC3+0C3D2402 1221 C3EC3+0C3D2402 1221 C3EC3+0C3D2402 1226 C4EC4+0C4D2402 1231 C1E1+0C1D2407 1244 400 SUMEC1/WM+C2/MM+C3/MM3 1260 FR(AC2EC2/LAM2+SUM2) 1260 FR(AC2EC2/LAM2+SUM3) 1200 FR(AC2EC2/LAM2+SUM3) 1300 FR(AC2EC2/LAM2+SUM3) 1301 FR(AC2EC1/FR(AC2EC))	1	KOH TIMES)				1160
1F (11, LT, LNY) G0 TO 106 1146 4Ph5 T Lemi+D124D2 1199 PRCS = PRESHDPD24D2 1201 C3=C3+0C3D2+02 1211 C3=C3+0C3D2+02 1235 C1=L1+0C1D2+02 1241 C3=C3+0C3D2+02 1235 C1=L1+0C1D2+02 1241 C3=C3+0C3D2+02 1255 C1=L1+0C1D2+02 1241 C1=L1+0C1D2+02 1247 FKAC1=C1/WM1+C2/MM3+C3/WM3 1267 FKAC1=C1/WM1+C2/MM3+C3/WM3 1307 FKAC1=C1/WM1+C2/MM3+C3/WM3 1307 FKAC1=C1/WM1+C2/MM3+C3/WM3 1307 FKAC1=C1/WM1+C2/MM3+C3/WM3+C3/WM3 1307 FKAC3=C3/WM1+C	16	H=H+DHD2(LL)*D2				1170
449:1 TLM*1=TEMP40TD2*DZ 1190 FMCS-004D2*02 1200 C3=C3+0C3D2*02 1210 C3=C3+0C3D2*02 1220 C3=C3+0C3D2*02 1220 C3=C3+0C3D2*02 1230 C1=L1+0C1D2*02 1240 400 SUM=C1*0M=SUM=C4*MM4 1+CCT=T.n.FSM=SUM=C4*MM4 1250 FTACLE1/KMM+C2/MM4+C3/MM3 1260 FFALSC2/KM2+SUM3 1260 FFALSC2/KM2+SUM3 1260 FFALSC2/KM2+SUM3 1260 FFALSC2/KM2+SUM3 1260 FFALSC2/KM2+SUM3 1300 FFALSC2/KM2+SUM3 1300 FFALSC3/KM3+SUM3 1300 FFALSC2/KM2+SUM3 1300 FFALSC3/KM3+SUM3 1300 FFALSC3/KM2+SUM3 1300 <		IF (H.LT.HV) GO T	υ 106			1180
PRCS - PRCSVDPD2PZ 1210 C3=C3+0C3D2#JZ 1221 C3=C3+0C3D2#JZ 1235 C1=L1+0C1D2#DZ 1246 C1=L1+0C1D2#DZ 1246 C1=L1+0C1D2#DZ 1246 C1=L1+0C1D2#DZ 1246 C1=L1+0C1D2#DZ 1246 C1=L1+0C1D2#DZ 1246 F1+0L5=C1/WM1+C2/MM4+C3/MM3 1267 F1+0L5=C1/WM1+C3/MM3+SUM3 1267 F1+0L5=C1/WM1+C3/MM3+SUM3 1267 F1+0L5=C1/WM1+C3/MM3+SUM3 1361 F1+0L5=C1/WM1+C3/MM3+SUM3 1361 F1+0L5=C1/WM1+C3/MM3+SUM3 1361 F1+0L5=C1/WM1+C3/MM3+SUM3 1361 F1+0L5=C1/WM1+C3/W1+SUM3 1361 F1+0L5=C1/W1+C3/W1+SUM3 1361 F1+0L5=C1/W1+C3/W1+SUM3+SUM3 1361 F1+0L5=C1/W1+SUM3+SUM3 1361 F1+0L5=C1/W1+SUM3+SUM3 1361 F1+0L5=C1/W1+SUM3+SUM3 1361 C2=C2/W1+SUM3+SUM3 1361 C3=C3=C3/W1+SUM3+SUM3 1361 C3=C3=C3/W1+SUM3+SUM3 1361 C3=C3=C3/W1+SUM3+SUM3 1	4051	TEMP=FEMP+DTDZ+DZ				1190
C43C44DC4D24D2 1221 C33C34C3D24D2 1227 C42C43C2D24D2 1227 C43C119C3D24D2 C3/MM3+C4/MM4 1255 If(c3,L1,9C3)SUM=SUM=C3/MM3 +C4/MM4 1256 If(c3,L1,9C3)SUM=SUM=C3/MM3 +C4/MM4 1267 FKAC12C1/KM1+SUM3 1227 FKAC12C1/KM1+SUM3 1227 FKAC2C2/KM2+SUM3 1227 FKAC42C3D+FKAC1/FKAC2+L1//13-FFAC1/FFAC2} 1327 C4SC4A-UC*D2+D2/L1.05160 T0 500 1340 TF(FRAC3D+FKAC1/FKAC2) 115 FKAC42C3D2/FKAC2D 1367 C4SC4A-UC*D2+D2 FKAC4A-UC*D2+D2 FKAC4A-UC*D2+D2 FKAC4A-UC*D2+D2 FKAC4A-UC*D2+D2 FKAC3D2+RAC3D 1497 FKAC3D3, FKAC4A-D3, FKAC3D3, FKAC4A-D3, FKAC3D3, FKAC4A-D3, FKAC3D3, FKAC4A-D4, FKAC3D3, FKAC3D3, FKAC4A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-D4, FKAC3A-FKAC3D 120 FKAC3A-FKAC3D 1		PRES = PRES+DPDZ	• 0 Z			1200
C35C340C302402 C25C240C202402 C11+0C302402 C11+0C302402 IF1C4+LT,0,15UM-SUM-C47M4 I25C IF1C4+LT,0,15UM-SUM-C47M4 I25C IF1C4+LT,0,15UM-SUM-C47M4 I25C IF1C4+LC4,0,10,15UM-SUM-C47M4 I25C IF1C4+LC4,0,10,15UM-SUM-C47M4 I25C IF1C4+LC4,0,10,15UM-SUM-C47M4 I25C IF1C4+LC4,0,10,15UM-SUM-C47M4 I25C IF1C4A,0,10,150 T0 500 I36C IF1C4A,0,10,150 T0 500 I37C IF1C4A,0,10,150 T0 500 I37C IF1C4A,0,10,17,171 I40C I15C IF1C4A,0,10,150 T0 500 I40C IF1C4A,0,10,150 T0 500 I10C I11C4372,737,73 I40C I11C4372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C I11C4C372,737,73 I40C		C4=C4+DC4DZ+DZ				1210
C22C2402022402 1233 C1211403102407 1244 400 SUMEC1/WM14C2/WM4 C3/WM3 + C4/WM4 1255 1F(c3,c1,0,1)SUM=SUM-C3/WM3 1277 FirkL2C1/(WM1+SUM3) 1287 FirkL3C2/(WM1+SUM3) 1287 FirkL3C2/(WM1+SUM3) 1287 FirkL3C2/(WM1+SUM3) 1300 FirkL3C2/(WM1+SUM3) 1300 FirkL3C2/(WM1+SUM3) 1301 FirkL3C3/(WM1+SUM2) 1301 G0 102402 1301 G0 102402 1301 G1 C202-C3D20-012 14						1220
C12L1PD:102#07 1244 1400 SUM=C17WN1+C27WN2+C37WM3 1265 1F(C*, C+, T, T, SUM=SUM-C47WM3 1277 FKAC1=C1/CWN1+SUM3 1287 FKAC1=C1/CWN2+C37WM3 1287 FKAC1=C1/CWN2+SUM3 1287 FKAC1=C2/CYAWA+SUM3 1297 FKAC1=C2/CYAWA+SUM3 1300 FKAC1=C1/FWAC1/FWAC2+1.1/(3-=FRAC1/FRAC2) 1310 FKAC3=C1/FWAC1/FWAC2+1.1/(3-=FRAC1/FRAC2) 1301 FKAC3D=FFKASD1.60 T0 500 1335 C FKAC3D=FFKASD1.1C05160 T0 500 1336 C FKAC4D=FFC3D1.1C05160 T0 500 1366 FKAC4D=FFC3D1.1C05160 T0 500 1356 1357 CAC4-9CPUZ+0Z 1367 1367 FKAC4D=FFC3D1.1C05160 T0 500 1357 1367 FKAC4D=FFC3D1.2C2 1357 1367 C3C4-9CPUZ+0Z 1367 1367 C3C4-9CPUZ+0Z 1367 1367 C4C4-9.2 1367 1367 C4C4-9.2 1367 1367 C4C4-9.3 1400 1426		C5=C5+DC5D2*D2				1230
400 SUM=C17/M11C2/WM21C3/WM31C47/M4 1200 1F(C3,L1,0,1)SUM=SUM=C3/WM31C47/M4 1201 1F(C3,L1,0,1)SUM=SUM=C3/WM3 1201 FKAL2C2(XM21SUM=SUM=C3/WM3 1201 FKAL2C2(XM21SUM=SUM=C3/WM31C47/MM3 1201 FKAL2C2(XM21SUM=SUM=C3/WM31C47/MM32 1201 FKAL2C2(XM21SUM=SUM=C3/WM31C47/M32 1301 FKAL3C2C2(XM21SUM=SUM=C3/WM31C47/MA22) 1301 FKAL4T2C2(XM41SUM) 1310 FKAL4T2C2(XM41SUM) 1311 FKAL4T2C2(XM41SUM) 1311 FKAL4T2C2(XM41SUM) 1321 FKAL4T2C2(XM41SUM1) 1322 IF(FRAL3D=FRAC3U)+LT.05160 T0 500 1341 FKAC4T20 1351 IF(FRAL3D=FRAC3U) 1341 PMC51=PMESD=PUL2WUZ 1357 C35-DUSUZU2 1357 C45-DUSU2WUZ 1357 C35-DUSU2WUZ 1357 C45-DUSU2WUZ 1351 C45-DUSU2WUZ 1357 C500 FMC3D=FRAC3U 1440 C1 C2 1457 71 IF(C3)72+77,73 1472 72 C30, 1492			1 03 h 147 . Cu 4. 1	A 1.		1240
1F(U3_L1)0,1SUM=SUM-C3/MM3 1201 1F(L3_L1)0,1SUM=SUM-C3/MM3 1201 FRAC12C2/(MM1*SUM) 1201 FRAC3C2(XM3*SUM) 1301 FRAC3C2(XM3*SUM) 1301 FRAC3C2(FMAC1/FMAC2-1,)/(3,=FRAC1/FRAC2) 1302 IF(FLAC,E0,1)60 TO 500 1333 C 1F RELATIVE DIFFERENCE OF SUCCESSIVE FRAC3D'S IS GREATER THAN 5 C PERCENT of RELACIONATE with SMALLER D2 INCREMENT 17 1F(FRAC3D=PFRC3D).L105)60 TO 500 17 HEIL-LOUZAU2 184 1361 17 HEIL-LOUZAU2 184 1361 197 HEIL-LOUZAU2 197 C2=C2-D2DZUZ 197 C2=C2-D2DZUZ 197 1400 197 1402 197 1402 197 1402 197 1402 197 1402 197 1402 197 1402 197 1402 197 1402 197 1402 197 1402 197 1402<	411()	SUM=C1/WM1+C2/WM2	+ C3/WM3+C4/W	14		1250
IF (C3:C1:00:F3:C3:C3:C3:C3:C4:C3:C4:C4:C3:C4:C4:C4:C4:C3:C3:C4:C4:C4:C4:C4:C4:C3:C3:C4:C4:C4:C4:C4:C4:C4:C4:C4:C4:C4:C4:C4:						1265
FRNC12C2(2/AW3*SUM) 1200 FRAC3C2/AW3*SUM) 1300 FRAC3C2/AW3*SUM) 1310 FRAC3C2/AW3*SUM) 1310 FRAC3C2/FRAC1/FRAC21.)/(3.=FRAC1/FRAC2) 1320 IF(RAC3C2) 1330 C 14 RELACU/AW4*SUM) SC 15 REATIVE UJFFERENCE OF SUCCESSIVE FRAC3D'S IS GREATEN THAN 5 C 15 RELACUCULATE AITH SMALLER D2 INCREMENT IF(IFRA.3C=PFR.5D).LT05)60 TO 500 1340 17 H=H=HD12(LL)+02 1350 18 F(IFRA.3C=PFR.5D).LT05)60 TO 500 1340 17 H=H=HD12(LL)+02 1351 18 F(IFRA.3C=PFR.5D).LL.05) 1340 19 F(IFRA.3C=PRES-UPL2#D2 1351 10 FEWP=FEMP-D102#D2 1356 11 GENESTER 1352 19 F(IFRA.3C=PR.5D) 1341 19 G2=C2=UC2D2U2 1371 19 G2=C2=UC2D2U2 1410 19 G2=C2=UC2D2U2 1490 19 G2=C30. 1490						1270
Find 3=02/ MM3+SUM 1300 Find 3=02/ MM3+SUM 1310 Find 4=02/ (MM3+SUM) 1320 IF (NFLAG, E0, 1) GO TO 500 1332 IF (NFLAG, E0, 1) GO TO 500 1336 IF (FRAG 50+FFRC 50), LT., 05) GO TO 500 1360 Phebolic (L1) +02 1360 Phebolic (L1) +02 1360 C 3=0, 632+02 1360 C 4=0, 1441 D2=02/02/02/02 1399 C 2=02, 02/02/02/02 1399 C 2=02, 02/02/02/02 1399 C 4=0, 1400 C 4=0, 1490 Find C=1, 1490 Find C=1, 1490 Find C=3, 73, 73, 73 1440 Find C=1, 1490 Find C=1, 1490 Find C=1, 1490 Find C=0, 111/1T=01NT=1 1490 C 4=0, 1490 Find C=1, 1500 Z C 3=0, 1		FRACIECT/ WHILE SOM	1 <i>4</i> • •			1200
FRAC43C47/WM4+S0M3 1310 FRAC43C47/WM4+S0M3 1320 IF (RAC43C47/WM4+S0M3) 1331 C IF (RAC43C47/WM4+S0M3) 1331 C IF (RELAC17EC JIF)7(3)-FRAC17PRAC2) 1331 C IF (RELAC17EC JIF)7(3)-FRAC17PRAC2) 1331 C IF (RELAC17EC JIF)7(3)-FRAC17PRAC2) 1331 C PERCENT WE RELACTOLATE ATTI SMALLER JIZ INCREMENT 1341 IF (FRAC3D-PFEC3D).LT05)GO TO 500 1341 17 H=H=D/102(LL)+02 1341 C C4:C2-UC2024U2 1341 C3:C3:C3:C3:C3:C2*U2 1341 C3:C3:C3:C3:C2*U2 1341 C3:C3:C3:C3:C2*U2 1341 C3:C3:C3:C3:C2*U2 1341 C3:C3:C3:C3:C2*U2 1341 C4:C1:C1:C1:C1:C1:C2*U2 1440 C1:C1:C1:C1:C1:C2*U2 1440 C1:C1:C1:C1:C1:C2*U2 1440 C2:C2:C2:C2:C2:C2:C2:C2 1440 C4:C1:C1:F1:C1:C1:C1:C1:C1:C1:C1:C1:C1:C1:C1:C1:C1		FRACE-CE/CHM2+300	• •			1300
FindEdDerivEnce / FindEd = 1, i/(3, = FRAC1/FRAC2) 132 IF (nFLAG_EQ_1) GO TO 500 1336 C IF RELATIVE DIFFERENCE OF SUCCESSIVE FRAC3D*S IS GREATER THAN 5 F PERCENT WE RELALCULATE #ITH SMALLER DZ INCREMENT 1346 IF (FRAC3D=FRFKC3D) LI, 05160 TO 500 1356 10 TEMP=FRC3D) FID2+02 1356 11 H=H=UND2(LL)*02 1356 12 GENES = DRES=DRD2+02 1357 CHEW=FERM=DO2+02 1356 CC=C2=0C3D2*02 1377 CC=C2=0C3D2*02 1366 CC=C2=0C3D2*02 1367 CC=C2=0C3D2*02 1367 CC=C2=0C3D2*02 1367 CC=C2=0C3D2*02 1367 CC=C2=0C3D2*02 14930 CC=C2=0C3D2*02 14930 CD=FRC3D3D=RAC30 14930 IF ((C)77,71,71 14950 CA=0, 14930 FRAC3=0, 14930 CA=0, 14930 FRAC3=0, 14930 CA=0, 14930 FRAC3=0, 14930 CA=0, 14940 FRAC3=0, 1494		FRAL4=C4Z(WM4+SUN	1)			1310
IFINFLAG.E0.1060T0 500 1336 C IF RELATIVE DIFFERENCE OF SUCCESSIVE FRAC3D'S IS GREATER THAN 5 C PERCENT WE RELACULATE ATTH SMALLER DZ INCREMENT IF (FRAC3D-FFRC3D).LT05)60 T0 500 1346 T THEMPTERM-DIU202 1356 10 TEMPTERM-DIU202 1366 PRCS = PRES-DUDU202 1377 CASCA-DC'DZ#UZ 1366 CSC2-UC2DZU22 1397 CASCA-DC'DZ#UZ 1406 CZ=CU-DCDZU2 1400 CZ=CU-DCDZU2 1440 CZ=CU-DCDZU2 1440 CG 10 16 1443 500 FRAC3DERAC3D 1446 FRAC4=0. 1446 FRAC4=0. 1446 FRAC4=0. 1450 FRAC4=0. 1466 FRAC4=0. 1446 FRAC4=0. 1466 FRAC4=0. 1466 FRAC4=0. 1500 FRAC4=0. 1500 ZILL=1 1510 ZILL=2(LL=1)+bZ 1526 FRAC4=0. 1507 FRAC4=0. 1506 FRAC		FRAC3D=(FRAC1/FRA	C2=1.)/(3==FF	AC1/FRAC2)		1320
C IF RELATIVE DIFFERENCE OF SUCCESSIVE FRAC3D'S IS GREATER THAN 5 PERCENT WE RELACCULATE #ITH SMALLER D2 INCREMENT IF (FRAC3D=FFRC3D)LT05160 TO 500 10 TEMP=FEMP=D12402 1366 PRCS = PRES=UPD2402 C4=C4=UC*D2402 C4=UC*D2402 C4		1F (NFLAG.EQ.1)60	TO 500			1330
C PERCENT WE RECALCULATE WITH SMALLER DZ INCREMENT IF ((FRAUSD-PFRC3D).LT05)60 TO 500 136(10 THPFHOHD-UTU202 136(20 THPFENN-UTU202 136(21 THPFENN-UTU202 137(21 CL-UCD2402 137(21 CL-UCD2402 139(22 C2-UCD2402 140(21 CL-UCD2402 140(C	IF RELATIVE DIFFE	RENCE OF SUC	CESSIVE FRAC3D+S IS	GREATER THAN 5	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	C	PERCENT WE RECALC	ULATE AITH SM	ALLER DZ INCREMENT	· · · · · · · · ·	
17 H=H=UID2(LL)*02 1361 10 TEMP=TEMP=0102*02 1361 11 TEMP=TEMP=0102*02 1371 11 C4=C4=DC*D2+02 1391 11 C4=C4=DC*D2+02 1391 11 C4=C4=DC*D2+02 1400 11 C2=C2=D2D2+02 1400 11 C4=C4 1492 12 C4=C4 1492 14 1492 1492 15 C4=C1 1492 16 C4=C4 1492 17 11 1450 1492 17 11 1450 1500 17 11 1450 1500 17 11 1450 1500 17 11 1450 1500 17 11 1471 1530 18 11 11 11 19 <td></td> <td>IF ((FRAC3D-PFRC3D</td> <td>).LT05)GO 1</td> <td>ro 500</td> <td></td> <td>1340</td>		IF ((FRAC3D-PFRC3D).LT05)GO 1	ro 500		1340
10 TEMP=TECM>-DFD2+02 1364 PRES = PRES=DPD2+02 1376 CM=CM+DC*D2+02 1386 CS=C3=DC3D2+02 1397 CC=C2=DC3D2+02 1400 CC=C2=DC3D2+02 1440 CC=C2=DC3D2+02 1440 CC=C2=DC3D2+02 1440 CC=C3=D2 1440 FRAC4=0. 1470 FRAC5=0. 1446 FRAC5=0. 1447 FRAC5=0. 1447 FRAC5=0. 1447 FRAC5=0. 1447 FRAC5=0. 1447 FRAC5=0. 1500 Z(LL)=Z(LL=1)+UZ 1520 IF (HIMF=C0:0)ULA6=0. 1550 Z(LL)=Z(LL=1)+UZ 1520 VETL=1. Z 1520 WhITE (0:4050) Z(LLL	17	H=H=0102(LL)+02	•			1350
PRcS = PRES=DPLZ*DZ 1377 C4:C4:DC'DZ*DZ 1361 C3:C3:DC'DZ*DZ 1361 C2:C2:DC2DZ*DZ 1410 D2:DZ*DZ 1410 D2:DZ*PR 1420 60 10 16 1436 D2:DZ*PR 1490 60 10 16 1490 D2:DZ*PR 1490 60 10 16 1490 FRC3D3:PRAC3D 1490 FRC4:D1:PRES:PRAC3D 1490 FRC4:D2:PRAC3D: 1490 FRC4:D2:PRAC3D: 1490 FRAC3D: 1490 FRAC4:D2:PRAC3D: 1500 Z(LL):Z(LL):Z(LL):PRES:PRES:PRES:PRES:PRES:PRES:PRES:PRES		TEMP=TEMP-DTuZ+D ž				1360
C4=C4=DC*DZ+DZ 1347 C3=C3=DC3DZ+DZ 1400 C2=C2=DZD2DZ 1410 C2=C2=DZDZDZ 1410 C4=C4 1427 G0 10 16 C4=C4 1430 FRAC3=D 1490 FRAC4=0, 1460 FRAC4=0, 1477 FRAC3=0, 1497 FRAC3=0, 1500 FRAC3=0, 1497 FRAC3=0, 1497 FRAC3=0, 1497 FRAC3=0, 1497 FRAC3=0, 1497 FRAC3=0, 1500 FRAC3=0, 1500 FRAC3=0,		PRES = PRES-DPUZA	ωz			1370
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		C4=C4=9C*0Z*0Z				1380
C2=C2=UC2D2+U/2 14U C1=C1=UC1D2+U/2 14U 60 10 16 142 60 10 16 142 1400 1500 15		C3=C3=DC3D2+D2				1390
C1=C1=C1:C1:Z2:D2 141 U2=C27/R 1420 60 10 16 1430 500 PFnC3D=FRAC3D 1440 1F(C4)77,71,71 1450 70 C4=0, 1460 Frac4=0, 1471 71 If(C3)72,73,73 1480 72 C3=0, 1490 FRaC3=0, 1490 73 LL=LL+1 1510 74 LF(L=24LL=1)+b2 1520 1F(JFLA6,E0,1)NINT=NINT=1 1530 F(JFLA6,E0,1)NINT=NINT=1 1530 VKITE (6,4059) 1550 wkITE (6,4059) 1550 wKITE (6,4059) 1550 4059 F0HMAT (4/21H) 2 TEMP WKITE (6,4059) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1590 wKITE (6,4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 wKITE (6,4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 wKITE (6,4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 wKITE (6,4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 wKITE (6,4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 wKITE (6,4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 w		C2=C2-UC2UZ#UZ				1400
02=077. 1470 60 TU 16 1433 500 PFRC3.D=FRAC30 1440 1F (C4)70,71;71 1495 70 C4=0. 1460 FRAC4=0. 1470 71 If (C3)72,73;73 1486 72 C3=0. 1496 73 L1=L+1 1510 73 L1=L+1 1510 74 C4=0. 1510 75 OFMAT (72,73;73 1500 76 C4=0. 1490 77 L1=L+1 1510 73 L1=L+1 1510 74 C4=0. 1500 75 OFMAT (74)21H Z 76 POHMAT (74)21H Z 77 K C4 1550 78 NHTE (0;4059) 2(LL);TEMP;PRES;H:C1;C2;C3;C4 9650 FOHMAT (1X;E15;0;1X						1410
60 10 16 1440 500 FFAC3.3=FRAC3.0 1440 1+(Cq)70,71,71 1450 70 C4=0. 1460 FRAC4=0. 1470 71 IF(C3)72,73,73 1480 72 C3=0. 1490 73 LL=LL+1 1510 73 LL=L+1 1510 74 IF(C3)72,73,73 1500 75 LL=LL+1 1510 76 C4E0. 1550 77 FRAC3=0. 1500 73 LL=LL+1 1520 74 (HHT,E0.0).JFLAGE0. 1550 75 WART (+/12.1H Z TEMP 76 WART (+/12.1H Z TEMP 77 WARTE (0,4059) 1550 78 WARTE (0,4059) 1550 79 WARTE (0,4059) 1550 77 FORMAT (+/12.1H Z TEMP 78 WARTE (0,4059) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 78 WARTE (0,4059) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 78 FORMAT (1/2.4E15.0,1X,E15.						1420
300 FRC3D=RRC3D 1450 11 1441 1450 70 C4=0. 1460 FRC4=70. 1471 11 11(13)72:73:73 1480 72 C3=0. 1490 73 L1=L1:1 1510 73 L1=L1:1 1510 74 If(10)FLAG_E0.1)MINT=NINT=1 1530 11 If(10)FLAG_E0.1)MINT=NINT=1 1530 12 If(11)FENINT=1 1530 14 KITE (0:4059) 1550 4059 FORMAT (#4050) 2(LL):TEMP:PRES:H:C1:C2:C3:C4 1590 4050 FORMAT (1X+E15:0:1X+E15	500					1430
-7θ C4=0, 14-50 -71 IF(C3)72,73,73 1446 72 C3=0, 1490 73 LL=LL+1 1500 73 LL=LL+1 1510 74 IF(FRAGE0,1)NINT=NINT=1 1530 74 IF(FLAG, E0,1)NINT=NINT=1 1530 74 IF(HIMT, E0, 0) JL LAGE0 1500 75 K IF 76 C4=0, 1550 77 K IF 78 C1 C2 78 K IF 79 VATE 1550 76 X H C1 77 X C4 1550 78 WK1TE IS 30/12/L), TEMP, PRES, H, C1, C2, C3, C4 1550 77 WK1TE IS 40/12/L), TEMP, PRES, H, C1, C2, C3, C4 1550 78 WK1TE IS 40/12/L), TEMP, PRES, H, C1, C2, C3, C4 1550 79 WRMAT IS 40/12/L), TEMP, PRES, H, C1, C2, C3, C4 1501 79 WRATE IS 40/12/L), TEMP, PRES, H, C1, C2, C3, C4 1502 70 WRTE	ວບບ	FFRC33=FRAC30				1450
70 C+11 1400 71 IF(C3)72,73,73 1480 72 C3=0. 1490 73 LL=LL+1 1500 73 LL=LL+1 1510 74 IF(C3)72,73,73 1480 74 IF(C3)72,73,73 1480 74 IF(C3)72,73,73 1480 75 C3=0. 1500 75 IEL=LL+1 1510 73 L=LL+1 1510 74 IF(G,G,E0,1)NINT=NINT=1 1530 75 IF(JF,G,G,1)NINT=NINT=1 1530 76 IF(HIAT,E0,0)JELAGER 1550 wk1TE G,4059 1550 76 Y H C1 C2 C3 1570 76 X C4 J 1560 1560 1570 1560 1570 1560 77 X C4 J C1 C2 C3 1570 1500 760RMAT IX+E15.01X+E15.0	- 70					1450
71 1f (C372;73,73 1480 72 C3=0. 1490 FRAC3=0. 1500 73 L=LL+1 1510 2(LL)=2(LL=1)+U2 1520 IF (JFLAG,EQ.1)NINT=NINT=1 1531 IF (JFLAG,EQ.1)NINT=NINT=1 1532 IF (JFLAG,EQ.1)NINT=NINT=1 1533 IF (JFLAG,EQ.1)NINT=NINT=1 1536 WA TE (6,4059) 1550 ************************************	<i>(</i> V	EraCu=0.				1470
72 C3=0. 1490 FRAC3=0. 1500 73 LL=LL+1 1510 2 7.1 L=LL+1 1510 2 7.1 L=LL+1 1510 2 1.5 1.520 1.520 1F(JFLAG.EQ.1)NINT=NINT=1 1530 1.500 wk1TE (0.4059) 1.550 -4059 FOHMAT 1.540 wk1TE (0.4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1.560 wk1TE (0.4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1.560 wk1TE (0.4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1.560 wk1TE (0.4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1.560 wk1TE (0.4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1.560 wk1TE (0.4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1.560 wk1TE (0.4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1.560 wk1TE (0.4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1.560 wk1TE (0.530) FRAC1, FRAC3, FRAC4, FRAC3D 1.620 37	71	1F (63) 72 73 73				1480
FRAC3=0. 1500 73 LL=LL+1 1510 2(LL)=2(tLL=1)+02 1520 IF(JFLAG,EQ,1)NINT=NINT=1 1530 IF(HINT:EQ:0)JLLAG=0 1540 whITE (6,4059) 1550 -4059 FORMAT (7/12)H Z TEMP PRES 1560 X H C1 C2 C3 1570 x H C1 C2 C3 1570 wkITE (6,4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 1580 wkITE (6,4050) 2(LL), TEMP, PRES, H, C1, C2, C3, C4 1590 1590 -4050 FORMAT (11/2, E15, 6, 11/2, E15, 6,	72	C3=0.				1490
73 LL=L+1 1510 2(LL)=2(LL-1)+U2 1520 IF (IJFLAG,EQ.1)NINT=NINT=1 1530 IF (IJFLAG,EQ.1)NINT=NINT=1 1530 WHATE (G.4059) ************************************		FRAC3=0.				1500
2(LL)=2(LL)=1)+02 1520 IF (JFLAG, EQ.1)NINT=NINT=1 1530 IF (JFLAG, EQ.1)NINT=NINT=1 1530 WK1TE (0,4059) 1550 -4059 F0RMAT (+//121H) Z TEMP PRES 1560 X H C1 C2 C3 1570 X H C1 C2 C3 1570 X C4) 1580 1580 wk1TE (0,4050) Z(LL), TEMP, PRES, H, C1, C2, C3, C4 1580 1580 -4050 F0RMAT (1X, E15, 8, 1X,	73	LL=LL+1				1510
IF (JFLAG,EQ.1)NINT=NINT=1 1530 IF (NINT=EQ.0) J LAGER 1540 WKITE (6,4059) 1550 4059 FORMAT (7/12)H Z TEMP PRES 1560 X H C1 C2 C3 1570 X H C1 C2 C3 1570 X H C1 C2 C3 1570 Wk1TE (6,4050) Z(LL), TEMP, PRES, H, C1, C2, C3, C4 1590 1580 -4050 FORMAT (12×E15, 8+12×E15, 8+12×E1		2(LL)=2(LL-1)+02				1520
IF (HIHT,EQ.0) JFLAGEN 1540 wkITE (0,4059) 1550 4059 F0RMAT (//121H) Z TEMP PRES 1560 X H C1 C2 C3 1570 wkITE (0,4050) 2(LL),TEMP,PRES,H,C1,C2,C3,C4 1580 1580 wkITE (0,4050) 2(LL),TEMP,PRES,H,C1,C2,C3,C4 1590 1580 -4050 F0RMAT (1X,E15.8,1X,E15.8		IF(JFLAG.EQ.1)NI	IT=NINT-1			1530
wkfTE (6,4059) 1550 -4059 F0kMAT (7/121H) Z TEMP PRES 1560 X H C1 C2 C3 1570 X C4) 1580 1580 wk1TE (6,4050) Z(LL),TEMP,PRES,H,C1,C2,C3,C4 1590 1590 -4050 F0KMAT (1%;E15,8;1x	·	-IF (HINT.EQ.0) JHLA	6=n			1540
-4059 FORMAT (//121H) 2 TEMP PRES 1560 X H C1 C2 C3 1570 X C4) 1580 1580 1580 4050 FURMAT (1X×E15×8×1×E15×8×1×E1		WRITE (6,4059)				1550
X H C1 C2 C3 1570 X C4) 1580 1580 WKITE (b;4050) 2(LL);TEMP;PRES;H;C1;C2;C3;C4 1590 4050 F0RMAT 11125;8;12;E15;E1;E15;E1;E15;E1;E15;E1;E15;E1;E15;E15	- 4059	FORMAT (7/121H	Z	TEMP	PRES	1560
X C4) 1580 WKITE (5,4050) Z(LL), TEMP, PRES, H, C1, C2, C3, C4 1590 4950 FURMAT (1X, E15,8, 1X, E15,8, 1620 1610 X15,8,1X, E15,3///) 1610 WRITE (6,37) 1620 37 FORMAT (98H MFRAC1 MFRAC2 1630 WRITE (6,38) FRAC1, FRAC2, FRAC3, FRAC4, FRAC3D 1640 1640 WRITE (6,38) FRAC1, FRAC2, FRAC3, FRAC4, FRAC3D 1650 1650 30 FORMAT (29X, E15, 8, 1X, E15, 8, 160 1650 30 FORMAT (29X, E15, 8, 1X, E15, 8, 160 1650 30 FORMAT (29X, E15, 8, 1X, E15, 8, 11X, E15, 10X, E14, 10F 1600 0 SUPE das TURNED DEGATIVE NEXT INCREMENTS ARE (1/3) **7, 1700 0 SUPE das TURNED NEGATIVE NEXT INCREMENTS ARE (1/3) **7, 17			C1	62	63	1570
-4050 FURMAT (1XvE15.8v1XvE15		A しみ ·) - 山口 TE (こ 川の町山) 20	III. TENO. DOF	- H.C C C.		1500
X15.8+1X+E15.3///) 1610 wRITE (6+37) 1620 37 FORMAT (98H MFRAC1 MFRAC2 1630 1 MFRAC3 MFRAC4 FRAC3D 1640 wRITE (6+38) FRAC1+FRAC2+FRAC3+FRAC4+FRAC3D 1640 wRITE (6+38) FRAC1+FRAC2+FRAC3+FRAC4+FRAC3D 1650 38 FORMAT (20X+E15+8+14+10+164 38 FORMAT (20X+E15+8+1X+E15+8+1X+E15+8+1X+E15+8+1X+E15+8+1X+E15+8+1X+E15+8+14+10+164 39 IF (2(LL)+6+1+2+10+2+10+2+10+2+12+10+10+10+10+10+10+10+10+10+10+10+10+10+		ENDIAT (AV. CAL 0	LLJ01CMP0FRE	5171161162163164 515	·	
wRITE (6,37) 1620 37 FORMAT (98H MFRAC1 MFRAC2 1630 - 1 MFRAC3- MFRAC4 FRAC3D 1640 wRITE (5,38) FRAC1,FRAC2,FRAC3,FRAC4,FRAC3D 1650 1650 38 FORMAT (20X,E15,8,1X,E15,8,1X,E15,8,1X,E15,8,1X,E15,8,1X,E15,8,7/7) 1660 38 FORMAT (20X,E15,8,1X,E15,8,1X,E15,8,1X,E15,8,7/7) 1660 38 FORMAT (20X,E15,8,1X,E15,8,1X,E15,8,1X,E15,8,7/7) 1660 38 FORMAT (20X,E15,8,1X,E15,8,1X,E15,8,1X,E15,8,7) 1650 39 FORMAT (20X,E15,8,1X,E15,8,1X,E15,8,1X,E15,8,7) 1660 19 If (2(LL), GT,2BOUND) GO TO 1 1670 19 IF (2(LL), GT,2BOUND) GO TO 1 1670 10 IF (2(LL), GT,2BOUND) JFLAG,E0,0) GO TO 1 1680 10 INJECT=0 1690 0 TO 3990 100 1700 10 GO TO 3990 1700 10 IS INCREMENTS 1N TOTAL 15 INCREMENTS 1N TOTAL		X15-8-12-616 AZZZ	TYLTO STAN	-134001 <u>-134001</u> -134001	T34011412901141	1610
37 FORMAT (98H MFRAC1 MFRAC2 1630 1 MFRAC3- MFRAC4 FRAC3D 1640 wR1TE (5,38) FKAC1,FRAC2,FRAC3,FRAC4,FRAC3D 1650 38 FORMAT-(20X,E15,8,1X,E15,1X,E1	• •	WRITE (6.37)	r			1620
- 1 MFRAC3- MFRAC4 FRAC3D 1640 wR1TE (b;38) FRAC1;FRAC2;FRAC3;FRAC4;FRAC3D 1650 - 30 FORMAT-(20X;E15:0;1X;E15:0;1X;E15:0;1X;E15:0;1X;E15;8;///) 1660 - 15 INDECT=0 1690 - 6 (1/3)**0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0	37	FORMAT (98H		MFRAC1	MFRAC2	1630
wR1TE (5,38) FRAC1+FRAC2+FRAC3+FRAC3+FRAC3D 1650 30 FORMAT-(20X+E15+8+1X+E15	- •	1 MFRAC3	MFRAC4	FRAC3D)		1640
30 FORMAT (20X,E15.8,1X,E15.8,1X,E15.8,1X,E15.8,1X,E15.8,1X,E15.8,1//) 1660 IF(2(LL).GT.2BOUND)GO TO 1 1670 IF(KOUNT.GT.15.AND.JFLAG.E0.0)GO TO 1 1680 INJECT=0 1690 GO TO 3990 1700 C SLOPE HAS TURNED HEGATIVE NEXT INCREMENTS ARE (1/3)**7, C 15 INCREMENTS 1N TOTAL		WRITE (0,38) FRAG	1.FRAC2.FRAC	3,FRAC4,FRAC3D		1650
IF (2(LL).GT.2BOUND)GO TO 1 1670 IF (KOUNT.GT.15.AND.JFLAG.EQ.0)GO TO 1 1680 INJECT=0 1690 GO TO 3990 1700 C SLOPE HAS TURNED (EGATIVE NEXT INCREMENTS ARE (1/3)**7, C 15 INCREMENTS 1N TOTAL		FORMAT (20X,E15.	3+1X+E15.8+1X	,E15.8,1X,E15.8,1X,	E15,8 ///)	1660
IF (KOUNT:GT.15:AND.JFLAG.E0.0)GO TO 1 1680 INJECT=0 1690 GO TO 3990 1700 C SLOPE HAS TURNED (EGATIVE NEXT INCREMENTS ARE (1/3)**7, C (1/3)**67,(1/3)**1 OF ZEND-Z(LL) C 15 INCREMENTS IN TOTAL		IF (2(LL) .GT.ZBOUM	10) GU TO 1			1670
INJECT=0 GU TO 3990 C SLUPE HAS TURNED REGATIVE NEXT INCREMENTS ARE (1/3)**7, -C (1/3)**67(1/3)**1 OF ZEND-Z(LL) C 15 INCREMENTS 1N TOTAL		IF (KOUNT .GT. 15. AN	D.JFLAG.EU.0)GO TO 1		1680
GU TO 3990 1700 C SLOPE HAS TURNED REGATIVE NEXT INCREMENTS ARE (1/3)**7, 1700 C (1/3)**0;,(1/3)**1 OF ZEND-Z(LL) 1700 C 15 INCREMENTS IN TOTAL 1000		INJECT=0				169 0
C SLOPE HAS TURNED REGATIVE NEXT INCREMENTS ARE (1/3)**7, 	_	60 TO 3990				1700
C 15 INCREMENTS IN TOTAL	C	SLOPE HAS TURNED	HEGATIVE	NEXT INCREMENTS AR	E (1/3)**7,	
C 15 INCREMENTS IN TOTAL	c		57**1 OF ZEND	- 2(LL)		
	C	15 INCREMENTS IN	IUTAL			

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4060	DELTAZ=ZEND-Z(LL)	1710
	ZHOUND=ZEND+DELTAZ/3.	1720
	KFLAG=1	1730
	KOUNT=KOUNT+1	1740
1		1750
<u>م</u>	THE SEARCH THE CASES WE ADD THE ADDITIONAL THE FOR WE THE	1760
č	FOR ZERV FLED RATE CASES WE AND IN D ADDITIONAL Z'S FOR USE IN TOALCTERT MODEL	
C	//////////////////////////////////////	1 770
	208F-214L7-214L-27 077-720078	170
		1780
		1740
		1000
	27.1-277.1.000 27.1-277.1.0022	1010
07	2/1/-2/1=1/+D22 2/1007 1.00 H	1850
<i>e</i> !		1830
~	LLELLTD 	1840
<u> </u>	TRIVING ANON RESIDIN Z ANEUES FOR USE IN TRANSIENT MODEL	
<i>22</i>		1820
02	TUREST LETTIDERICAT AND FRUM VAMUR REDIJNI Suptre 14. gra 17. ty 17. ty 17. ty	1000
- 4	MKL1に (ロチロの) (よく1/チュージビチ上に) だのしはいて (チン・チルビオス ア)	1870
0.0	- ビルバリハキー () ハナキリに 1 ひゃイナ - パット・ サービビネルウネルウネルドル ノナウキ かいわちょうひょうかりょうか ア・ハルト	1080
	"1000 - (LITL2TL3TL4)/(LI/WMITL2/WM2TL3/WM0TL4/WM4)	1698
u004	HALLE TOYOULT MIDDYU	1.466
ONUT	TURDAL VIZAZATOLEAUT STALE VALUES FUR MBAR AND G AT END OF HEDY/	1910
	A 4/A'MBAK EYEL2.3/3/1/6 EYEL2.5/	1920
104	UU 10 777 Suite 12 107)	1420
100	WELLE LOFLING - TO A DUDDER OF COLD ANDDERED AT THE LEADED	1440
107	FURMAT (////JOATTHERE IS A PUDDLE OF COLD HTDRAZINE AT THE LIQUID-	1950
005	AVAPUN/VAPUN IMTERIAL TO INT USING A LARGER VALUE FUR UUT 7-	
999		1975
c c	SUGROUTINE REDIVD (DZ1+UTDZ+NINT+JFLAG+1+LL) THIS ROUFINE REDIVIDES Z INCREMENTS TO COMPENSATE FOR RADICAL CHANGES IN TEMP+CONCENTRATION+AND OTHER PARAMETERS WHICH OCCUR IN	C
C	THAT REGION OF THE REACTOR BED FOLLOWING THE TEMPERATURE PEAK	
C	THIS ROUTINE IS USED ONLY WHEN INITIAL HYDRAZINE FEED RATE IS NON-	
- C	2thu-	
	INTEGER PRINT	10
	COMMON /FIZ/TELVP(70), TBLH4(42), TBLH3(42), SHTBL1(34), SHTBL2(34),	50
	1 SHT3L3(34)+SHT3L4(34)+ZTBLD(46)+ZTBLAP(46)+ZTBLA(46)	.30
	COMMON /GU/HL, HV, FC, TF, CFL, CGM, ENMXI, AGM, DIF3, DIF4, KP, PRES, GO,	40
	1 WM4+WM3+W42+WM1+ALPHA3+R+TVAP+ZEND+BGM+HF+DZ+ALPHA1+ALPHA2	50
·····		<u>6</u> 9
		70
	COMMON /FULL/ALIM/UPTION/CI/CZ/CJ/C4/CAV/G/TEMP/AP/WMAV/Z0/	80
	COMMON ZMUNDIZALA CUMUNA CU	90
	COMMUN /FEAGD/MELAGIREAGIRENT	100
		110
C C	IF A REDIVISION OCCURS WITHIN A PREVIOUS REDIVISION, NESTET IS USED TO OBTAIN A NEW INTERVAL COUNT	130
	IF(NINT-1)1,1,2	140
2	NESTOF=NINT	150
		160
	x512F=2.**I	170

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	er Lukit
	E. d.J
	SUBRUUTINE SLOPE (CG+GMMA+K+DETA+EN12+RATE+DPA+A+D1FF)
	INDAL - NMARA TRANSPORT
	INTEDER PRINT Diskaction 2/10 - Constant Official Operation Contant Contant - Diskaction 2/10 - Contant Official Operation Contant Contant Contant
	UMERSION K(1) = OMMA(1) BE(A(1)) OMA(1) (G(1)) (G(1)) (FS)(210) (FS)(210))
	TERMS (STOLECTOTOLEATSTOTICEDTSTOTICTOTICTOTICTOTICTOTICTOTICTOTICTOT
1	ビーに(MAATANI) (ビーリ) / AAA(ビーリ) / AUA(ビーリ) - (1996-1997 - アビエノノエンド いりノフロ)、エントロルノルコン、エロトロオノルロン、ビロエロト (ノスルン) - CUITOL (ソノスルン
	COMMENT ACCAMENTATION TO A TO A COMPLEMMALE ACMADING ALCOMPLET OF ULT OF ALCOMPTEMENT ACCAMENTATION AND A COMPLET
	ENNY STENNY STENNY STATENS FOR LUBATING DULI ALTING ALTING
	COmmO.a /VAR/DERIV(250).000/(250).7/250)
	CUMMON / YON DENIVEROUTION CLOCK C3.C4.CAV.G.TEMD.AD. WMAN. 70.
	COMMON /FLAGS/MFLAG. KFLAG. PRINT
	IFLAGE0
	FRAC=.99
12	8=0.0
02	I=1
	NOTEN
	AD1V=100.
	TOL=.01
	STURE=1.0
	KJ=0
	HULDER.
• -	NI=0
13	
	1L=0
	1K=0
	MMIO
.	
20	
	INIT-AUTV IE (NE SO 1) (O TO 16
1	200 TV TO 200 A M = 11 A T 4 1
1 U	PPPAA-UINIII Mar-Julaiinii
	MINT=0
	60 10 17
16	MMax= [4]T+.]TMT+1
<u> </u>	
	MAXINIAX
	PICA (5 = 1) PICA (5 = 4

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G910461-30

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G9 104	61-30	
17	X=0.0	480
	00 40 IJ=1, MMAX	490
	IF(IJ.GT.MINT) GO TO 49	500
	X=FLOAT(IJ=1)*DR	510
	GO TO 23	520
49		530
23	X-DTELVAIIKMUJEDUR CD-CC/[\+\//\/[_B_/K/T_B\\+CC/T\	540
£.)	fF(t,P,t Ŧ, 0, ft) "CP=0.0	550
C	THIS IS THE GENERAL EQUATION FOR A LINE WITH NEGATIVE Y-INTERCEPT	
	FACT1=K(I)+(CG(I))++(1EN12)+(CP)++EN12	570
	FACT2=EXP(GMMA(I)*HETA(I)*(1CP/CG(I))/(1.+BETA(I)*(1CP/CG(I)))	580
		590
27	1F(X) 37,46,37	600
37	KUF-FAUIL+FAUIZ S(I,)-(1 //-1 ///))+Y+Y+PCD	610
		530 530
• • •	GO TO 50	640
50	SUM=0.0	650
	SUMA=0.0	660
	DO 60 IL=2+MAX	670
	IF(IL.GT.MINT) GO TO 61	080
		696
61	50/10/00 50/00+50/00+50/10)	705
60	CONTINUE	720
	S(1) = 0.	730
	SGMA=(5(1)+2.0+SUM)+(DR/(2.0+DPA(I)))+(S(MMAX)+2.0+SUMA)+(HDR/(2.	740
	10+Uth(I))	- 750
	J2=SG-AA-FRAC*CG(I)	760
	101=02+106+66111	770
112	1F (PARTI) - 1307 LUTILA TE4644.4.4	780
1	IF (TOT)2,230,230	400
-2	- 60 Tu 115	810
110	IF(IFLAG.Ed.1)60 TO 115	820
	1F(02)150,115,115	830
115	$IF(MM-1) = 20 \cdot 120 \cdot 140$	840
. 150	AULU-D TE (DD10T FW 1) WRITE(6-196)	85U 640
	-FORMAT(44H01NTTIAL CHOICE THRU ORIGIN IS TOO LARGE)	- H70
	J1=D2	038
C	CHANGE THE EQUATION OF THE LINE	
	J=.999999 *A(I)	690
		900
L 1	USE PREU EDING RESULTS TO ESTIMATE B FOR NEW LINE	
	M1=M1+1	020
	H=H+(D2/(D2-D1))*(X0LD-B)	920
1741	xOLD=TUMP	940
	D1=D2	950
143	IF(M1-20) 145,145,147	960
147	$IF (JFLAG_{\bullet}Eu_{\bullet}L) GU IU 230$	980
		990 1000
	60 TO 702	1010
С	INITIAL CHOICE THRU ORIGIN IS SATISFACTORY	
	IFLAG=1	1030

	x=0.	1040
Ç,	CALCULATE THE VALUE OF THE TWO INTEGRALS FOR ALL DR (101 POINTS)	
	UO 170 11=1,MMAX	1050
	x=FLGAT(II-1)*80R	1960
		1070
	TERM1(TT) = K(T) * (CG(T)) * * (1, -EN12) * (CP) * * EN12	1080
	$\frac{1}{1} + \frac{1}{1} + \frac{1}$	1000
	TENEL (117-CAL COMMACI / +DETACI / + (1 + ~CF/CO(1 / //(1 + TBETACI / + (1 + ~CF/CO(1070
		1100
	XXX(11)=X	1110
	XOA(11)=XXX(11)/A(1)	1120
	RCP = TERMI(II)*TERM2(II)	1130
	FS1(11)=X+X+KCP	1140
	1F(λ) 165/170/165	1150
165	SLU(II)=(1•/X-1•/A(I))+X*X*RCP	1160
170	CONTINUE	1170
2	THE TRAPEZOIDAL RULE IS USED TO EVALUATE BOTH INTEGRALS	
479-		1100
173		1100
110		1740
	C(UU)=C(UU=1)+(FSF(UU)+FSF(UU=1))*(DR/(2.0*DPA(I)))	1210
	60 10 175	1220
170	C(JJ)=C(JJ=1)+(FST(JJ)+FST(JJ=1))*(BDR/(2.0*DPA(I)))	1239
175	CONTINUE	1240
	SEU(1)=0.	1250
	υ(1) = 0.	1260
	DO 120 KK=2. MMAX	1270
	JE(KL-31, MINT) 60 IO 179	1280
	$ \begin{array}{c} \mathbf{x}_{1} \\ (1 + \mathbf{x}_{1} + \mathbf{z}_{1}) \\ \mathbf{x}_{2} \\ \mathbf{x}_{3}	1200
	D(RR) = D(RR - 1) + (DR)(2, 0 + DPA(1)))	1290
		1309
1/9	D(RK) = D(RK-1) + (SEC(RK-1) + SEC(RK)) * (BDR/(2,0*DPA(1)))	1310
190	CONTINUE	1320
•	THE VALUE OF CP AT X=N IS CG -D(101)	
	E(1)=U(MMAX)	1330
186	CPA(1)=0,0	1340
	NLGATIVE VALUES OF CPA(1)=CP(0) CANNOT DE USED	
	STURE THE CPA(1) VALUE IN CASE A NEW F FACTOR MUST BE USED	
184	SFURE = CPA(1)	1350
	IF (KJ.EG.1) GO TO 135	1360
	1E(IM.EQ.0) 60 TO 145	1370
	$F(N_{1},F(N_{1})) = 0$ TO 368	1300
		1001
100		1390
	UU IVU LLHKIMMAA Teala statut oo too too	1400
	INTELOTOMINI DU IU 188	1410
	L(LL)=L(LL-1)-(SEC(LL)+SEC(LL-1))*(DR/(2.*DPA(1)))	1420
	SAM = FLOAT(LL-1)+DR	1430
	GU 10 189	1440
-188	-Eitel)=Eitel-1)-(SEC(LL)+SEC(LL-1))+(BUR/(2.0+DPA(I)))	1450
	SAM=SA:4+8DR	1460
189	CPA(LL)=CG(I)-((1./SAM)-(1./A(I)))*C(LL)-E(LL)	1470
	IF(LL.LT.MINT) CPA(LL)=0.0	1480
	1E(CPA(1))), (1,0,0), CPA(1))=0.0	1/100
100		1600
470		1200
		1210
	X=U.	1520
	IF(IM,EQ.0) GO TO 250	1530
	IK=1	1540
	GU TU 280	1550
;	THE NEXT ITERATION USES THE VALUES OF CP JUST CALCULATED	
	DO 290 LITY MAX	1560
- / -	TEGLIGT MINT) GO TO 195	1570
	er imsenselisitet on the Tag	10/0

G91 046	1-3 0	
	X=FLOAT(LI=1)*UR	1
	GO TO 199	1
195	KLK=LI-MINT	1
	X=8+FLOAT(KLK)+BDR	1
-199-	CONTINUE	-1
	TERM1(LI)=K(1)*(CG(I))**(1EN12)*(CPA(LI))**EN12	1
	TERM2(LI) = EXP(GMMA(1) + BETA(I) + (1, -CPA(LI)/CG(I))/(1, +BETA(I) + (1, -CPA(LI)/CG(I))/(1, +CPA(LI)/CG(I))/(1, +CPA(LI)/CG(I)/CG(I))/(1, +CPA(LI)/CG(I)/CG(I))/(1, +CPA(LI)/CG(I)/CG(I))/(1, +CPA(LI)/CG(I))/(1, +CPA(LI)/CG(I))/	1
1	CPA(LI)/CG(I))))	1
	XXX(LI)=X	1
	XOA(LI) = XXX(LI)/A(I)	1
		1
	FST(L1)=X*X*K0P	1
		1
130	SEU(LI)=(I=/X=I=/A(I))+X+X+KGP	1
200		1
<u> </u>		T
220	THIS IS FOR THE CASE WHERE THE INITIAL GUESS WAS TOU LARGE	,
230	IF (FRINTSENSE) WAIFADD FADTING CHBVE EANND AFTED 19.310 TOTALS T	1
200	HE WALLE (STA LYA) IS F12.7)	1
	TE(H.GT. 994#A(T)))EPTE=9.6#CG(T)/(A(T)=0)	1
	$\frac{11}{10} \cdot \frac{10}{10} \cdot 10$	1
	HE RANGE OF Y FROM /FRO TO A 15 HEFR	+
237	λ=0.	1
	e1=1	1
	DO 240 NN=1 MMAX	1
	IE (UN. 0T. MINT) 60 TO 246	ī
	X=FLGAT(JN-1)*DR	1
	60 TO 354	
246	KJK=NN-MINT	1
	X=B+FLUAT(KJK)+BDK	1
354	IF(IM.GE.1) GO TO 353	1
238	CPB(I4N) = CG(I) * X/(A(I) - B) - (B/(A(I) - B)) * CG(I)	1
	1F(CPB(NN).LT.0.0) CPB(NN)=0.0	1
-353	TEKM1(iiii)=K(I)+(CG(I))++(1EN12)+(CPB(NN))++EN12	1
	TERM2(NN)= LXP(GMMA(I)*BETA(I)*(1CPB(NN)/CG(I))/(1.+BETA(I)*(1	1
1	.CPB(HN)/C6(1)))	1
	XXX(IJN)=X	1
	X(A(NN)=XXX(NN)/A(1)	1
	RCP = TERM1(IN) * TERM2(IN)	1
		1
0 /- -	IF (X) 240+240+247	1
247	5LU(PNN) = 11./A-1./A(1))*X*X*KUP	1
240		1
87.0	UN 270 NI -1, MMAY	2
200		ک
370		2
570		2
250	00 10 100 00 260 11 = 1 · MMAX	2
250	GPA((),	2
260		2
e , () ()		
: T)	THE VALUES OF X AT A AND NEAREST A ARE USED IN FINDING THE DERIVATIVE	~
280	DERIF=(CG(I)=CPA(MAX))/BDR	2
	IM=IM+1	2
	IF(1M.GT.99.ANU.IFLAG.EQ.1)GO TO 701	2
	IF(IM.GT.99)G0 TO 328	2
-310	IF (KU.EQ.1) - IK=1	<u>-</u> 2
	IF (ABS(DERIF-HOLD) - 0.05+DERIF) 3, 3, 321	2

3	1F(1K,EG.1)60 TO 322	2150
321	HOLDEDERIF	2160
	1F(KJ.Eg.1) GO TO 192	2170
	1F(1K.EQ.1) GO TO 250	2180
	60 TO 192	2190
322	RATE=DERIF	220
	1+(C4+C6(I))777+4+777	2210
4	1F(H-HL)777,777,5	2229
5	DIFD=DIFF*((TEMP/492.)**1.823)*14.7/PRES	2230
	CALL UNBAR (VISVST(1), 1, TEMP, 0., VIS, KK)	2240
	- KHU=PKES+KMAV/(R+TEMP)	2250
	AKC=(.61*6)/(RHO)«((VIS/(RHO*DIFN))**667)*((G/(AP*VIS))**41)	2260
	KAT=AKC*CG(1)/UPA(1)	227(
	1F (KATE-RAT)778+776+8	2280
6	MFLAUSI	2290
	RATE=RAT	2301
	- 60 10 777	2310
778	MFLAGEN	2320
777	1F(6.GT993*A(1))60 TO 888	2330
	IF (PRINT-EQ.1) WRITE(6,182)IM	2340
195	FURMAT (11H ITERATION=, I3)	2350
	IF (FRINT-EG.1) WRITE(0,336)	2360
- 336 -	FURMAT(13X)1115H X/A CPA CPA CPA	2370
	L A/A CPA X/A CPA)	2380
A (1) -A	IF (PRINT.E.W.1) WRITE(0,183)(XOA(I),CPA(I),I=1,MMAX,4)	2390
183	FORMAT(9X)L12.7,1X,L12.7,1X,E1	2400
	12.//(X)E12.7)	2410
000	IF (PRINT-EN-1) WRITE(0+323)RATE	2420
	PURMATIZZAN THE SEUPE CUNVERGES TO EIZ. 7)	245!
32/		2440
520		2450
	льц — J. Сл. Тл. 139	2400
C	SINULIFICT JERSIAL WAS NOT LICONVERSELL IN OD ITEUNITADIS	2470
_ <u>_</u>	CEL HELONOO144 AND CTART OVED	
701	B=_00001*A(T)	2481
	IF (PRINT-EW.1) WRITE(6+700)	2400
700	FORMAT (2 84H INITIAL CHOICE THRU ORIGIN SEEMINGLY OK, BUT RESULTS	2500
	X RUITEN AFTER 99 ITERATIONS/48H SET X0=.000001+A AND USE MORE	2510
	AREFINED TECHNIQUE /)	2520
<u></u>		
	BUR=(A(I)-B)/BUIV	2540
	MMAX=INI F+JINT+1	2550
	MINT=INIT+1	2560
	MAX=MMAX-1	2570
	1.4=0	2580
		2590
	30 TO 237 /	2600
	END	2610

SUBROUTINE SGRAD	(GRAD+TGRAD)	0
REAL KAJKPAKC3A	KC4,MU	10
INTEGER PRINT	•	20
COMMON /FTZ/TBLV	P(70),TBLH4(42),TBLH3(42),SHTBL1(34),SHTHL2(34),	30
1 SHTBL3(3	4),SHTBL4(34),ZTBL0(46),ZTBLAP(46),ZTBLA(46)	40
	FC+TF+CFL+C6M+ENMX1+A6M+DIF3+DIF4+KP+PRES+60+	50
1 NM4+WM3+	W12, WM1, ALPHA3, R, TVAP, ZEND, BGM, HF, UZ, ALPHA1, ALPHA2	60

• •

• -	2	70
	COMMON /VAR/DERIV(250) + DHDZ(250) + 2(250)	80
	COMMON /TOLL/ALIMOOPTION.CI.CO.CS.C4.CAV.G.TEMP.AP.WMAV.ZO.	90
i t		108
		110
i I		110
		120
:	COMMON //FLAGS/MFLAG/FFLAG/FRINI	150
,		140
~	DIMENSION CPOX(ITI), PCPOX(IUI), DX(IUI), CPX(IUI), RHE((101)	150
	DEFINE DP FUNCTION	
	UP OF (XY TYZ) = 14 . (*Y/Z*(X/492.)**1.523+(1EXP(0672*2*492./(160
	x 14.7*X)))	170
C	DEFINE KC FUNCTION	
_	KCF(A+3+C+D+E) = +61*A/B*(C/(B*D))**-+667*(A/(E*C))**-+41	180
, C	ANALYTIC INTEGRATION FUNCTIONS FROM INTEGRAL EQUATION	
-	EVAL1(A,B) = B**3/3A**3/3.	190
		200
	WAF1 = .8	210
	WAF2 = .2	220
1	LTFL6=0	230
	P=PRES	240
	1=1EMP	250
	<u>ALPH2#ALPHA2</u>	260
	C11=C1	270
	C19=C2	2013
		200
		290
		300
		510
		320.
		330
	NPART = 50	340
		350
	$TPSP = 0_{\bullet}$	360
	RHO = C11 + C12 + C13 + C14	3 7 0
	DI3 = un3+14*7/P*(1/492*)++1*823	380
	DI4 = D04*14.7/P*(T/492.)**1.823	390
•	CALL UNBAR (VISVST)1/T/0./MU/KK)	400
	CALL UNBAR (CFTBL4,1,T,0.,CF4,KK)	410
	CALL UNBAR (CFTBL3,1,T,0.,CF3,KK)	420
	CALL UHBAR (CFTBL2,1,T,0,,CF2,KK)	430
	CALL UNBAR (CFTBL1,1,T,0,,CF1,KK)	
	KC3 = KCF(G,RH0,MU,DI3,AP)	450
	KC4 = KCE(G+RHO+MU+DT4+AP)	450
		400 11 7 0
	UC = .74+G+CCQAQ+/C//AQ+MILL++= 44	470 110 h
c	ᡊᠣ᠂᠊᠊᠆᠊ᡧ᠋᠂᠇ᠴᡏ᠐ᡏ᠖ᢟ᠓ᢂᠺᡏᡯ᠋ᠶ᠐ᡣ᠋ᠺᢂᢉᡢᡛᡢ᠐᠋ᠯ᠋᠉ᡣᢇᢪ᠔ᡩᠯ	400
	1. 10 A TH. CHT TAN K. YO	
~	LOCHIC JUSTICE NO	
L.		
~	043 = 043+(T+003+4)	490
C	CHOOSE STARTING VALUE FOR CPS TO BE = CI3/2.	
	CPS = 613/2.	500
	CMCPN = CI3-CPS	510
	DCPDX = KC3/DP3+(CI3-CPS)	
С	H4 CUNSTANT FOR EACH ENTRY TO THIS ROUTINE	
C	HJ VARIES WITH TEMP AT EACH ITERATION	
	CALL UNBAR (H4TBL+1+T+0.,H4+KK)	530
	CALL UNBAR (H3TBL 1 T. 0. H3 KK)	540
	IF (LP1.EQ.1) GO TO 6	550
	$T_{P} = T_{P} = T_{P}$	
• •	TPSP = TPS	570
		U 1 U

G910	461-30	
6	TPS = T-(H4*KC4*CI4+H3*DP3*DCPDX)/HC	580
	1F ([PS.LT.0.) TPS=1.	590
	CALL UNBAR (H3TBL+1, TPS, 0., H3, KK)	600
	DP3 = DP3F(TP5, D03, P)	610
		620
	INF = HO IMIN = T-TAS	6000 600
61	GAMMA = BGM/TPS	650
_	BETA = -CPS*H3*DP3/(KP*TPS)	660
	KU = ALPH2+EXP(-GAMMA)+CI1++EN3	6 7 0
- C 1	LINEAR EXTRAPOLATION USED TO GUESS AT X0	
		080
	$X_{1} = A - CP S / D CP D X$	690 7 00
	AUA = AU/2	700
11	$x_0 = 0.$	720
•••	- X U A = 0	7.50
	CPS = C13/(0P3/(A*KC3)+1.)	740
	DCPDX = C13/A	750
	TPS = T-(H4*KC4*CI4+H3+DP3*DCPDX)/HC	760
	IF (TPS.LT.0.) TPS=1.	7 7 0
	WRITE (60132) LP1, TPS	730
_132	- PURMAT COM 37XV WE HAVE CALCULATED A NEGATIVE XU DURING ITERATION	790
L 12	THE GRATE FOR CP EQUATION	. 70
r ¹²	CALL IRAPT (XUAII.INTARI)RIESUMI	630
	CD =	R I I
	CACPO = CMCPA	540
	CPS = CI3-A*RitsuM/KC3	660
	iF (LTFLG-1) 60,84,30	870
-80	IF (CP5-(.25*C13)) 81,81,130	880
81	LIFLO=1	890
	60 TO 22	ANC
84	L1FLG=0 Tr (chr) 80 470 470	910
	11 (015) 09/130/130	~~ 920 070
- 07	00 TO 46	930
130	CMCPN = C13-CPS	940
C	CALCULATE NEW TP	2.24
13	UCPDX = KC3/UP3*(CI3-CPS)	960
		970
	TGRAD = HC * (T - TPS)	980
	YPSPP = TPSP	990
	TPSP = TPS	1000
-	1M1PU = 1M1PN TUS = 1, (Number action transmission of DDM) (NC	1010
- 10	1P5 5 1-(114*KU4*U14+H5*UP5*UP5*UP5X)/HC	1020
		1040
	UP3 = UP3F(TP5,003,P)	1050
	TMTPN = T-TPS	1060
	GAMMA = BGM/TPS	1070
	ULTA = -CPS+H3+UP3/(KP+TPS)	1080
	- KI) = ALPH2+EXP(-GAMMA)+C11++EN3	1090
C	TEST TEMP CONCENTRATION FOR 5% LIMIT	
	* JF (ABS(TMTPO-IMTPN)/TMTPN = .05) 41;41;43	1100
41 C	IF TADDTUMUMUMUMUMUMUMUMUMUM (UJJ /UJ/UJ4) Tect cau tempedatude Laad – Cambade Laet e tempe	1110
с 43	IF IAMINI(TOC. TOCDAY - TOCDAY - TOCDAY ANATIZA	1120
+0 		· 1212 fi zit from
c	TEMPERATURE HAS FLUCTUATED TAKE AVERAGE AND RECALCULATE CPS	1100

TPSP = 1PS 1150 TPS = (TPSP+TPSCP+/2, 1160 TPS = (TPSP+TPSCP+/2, 1170 QAL UMMAP 447.58C+11F5+0,03+P) 1190 UP3 = UP3 (TPS,U03+P) 1190 UP3 = UP3 (TPS,U03+P) 1200 TMTPN = T=TPS 1200 CMPV = CPS 1200 CMPV = (CFS+UT,U) 1220 CMPV = CPS 1200 CMPV = CTS 1200 CMPV = CTS-UP3/KC34UCP0X 1220 CMPS = CT3-CPS 1200 LP1 = LP1+1 1200 CM CONVERSENCE YFT, AVERAGE THE CMS+S FOR LAST TWO CALC+S AND REPEAT 46 CPS = CT3/C1+U/S7(KC3+CS+K00)) 1300 CM CONVERSENCE YFT, AVERAGE THE CMS+S FOR LAST TWO CALC+S AND REPEAT 1300 CM CONVERSENCE YFT, AVERAGE THE CMS+S FOR LAST TWO CALC+S AND REPEAT 1300 CM CONVERSENCE YFT, AVERAGE THE CMS+S FOR LAST TWO CALC+S AND REPEAT 1300 CM CONVERSENCE YFT, AVERAGE THE CMS+S FOR LAST TWO CALC+S AND REPEAT 1300 CM CONVERSENCE YFT, AVERAGE THE CMS+S FOR LAST TWO CALC+S AND REPEAT 1300 CM CTAL STAND WARFEX 1300 1330 CM CLAST AVERAGE FACTONS FOR X0 1300	71	TPSPP = TPSP	1140
IMIPO = 1KFR: 1160 TPS = (TPSPF/PSP/P2, 1170 CALL UNDAR *473:0L-1 : TPS-0, +H3+KR1 1180 UP3 = DP3 (TSU03+P) 1200 UP3 = DP3 (TSU03+P) 1210 UP3 = DP3 (TSU03+P) 1210 UP3 = CP5 (TSU03+P) 1210 UP3 = DP3 (TSU03+P) 1210 UP3 = CP5 (TSU03+P) 1220 CP5 = CP5 (TSU03+P) 1230 CMUP = CMCHN 1250 LP1 = CP3 (TSU3+CSUCPOX 1250 LF (CP5.1, 0, 1 CP5:0, 1260 1270 LP1 = LP1+T 1280 d6 (CP5 = C13-UP5/KC3UCPOX 1290 C H5 CONVENCEMEE YET AVERAGE THE CP3+3 FOR LAST TWO CALC+S AND REPEAT 46 (CP5 = C13-UP5 and C13-CP5) 1300 C M5 CONVENCEMEE YET AVERAGE THE CP3+3 FOR LAST TWO CALC+S AND REPEAT 180 (CP4 = C45+30CP5) 1310 C M5 CONVENCEMEE YET AVERAGE TACC3*K001) 1320 C M5 CONVENCEMEE YET AVERAGE THE CP3+3 FOR LAST TWO CALC+S AND REPEAT 180 (CP4 = C13+CP3+30CP5) 1310 C M5 CONVENCEMEE XET AND YEAR 1300 C M5 CONVENCEMEE XET MARANC3*K001) 1320 C M5 CONVENCEMEE XENT HY AND AND YEAR <t< th=""><th></th><th>TPSP = TPS</th><th>1150</th></t<>		TPSP = TPS	1150
TPS = (TPSPF/72,		TMTPO = TMTFN	1160
CALL UNDAR 413.05.11.P510.11854K1 1180 UP3 UP3 UP3 (TSU03.P) 1200 UP3P = DP3 1200 UP3P = DP3 1200 UP3P = CP5 1210 UCPUX = (IC+(T=TP5)-H4*KC4*C14)/(H3+0P3) 1220 CPDP = CP5 1230 CMCHO = CHONN 1240 CPS = C13-UP3/RC3+UCP0X 1260 IF (CP1.1,0.) CP5m, 1260 CMCHO = C13-UP3/RC3+UCP0X 1270 LP1 = LP1+1 1280 GC Ho Converseme YC+, AveRade THE CP5+5 FOR LAST TWO CALC+S AND REPEAT 1300 GC Ho Converseme YC+, AveRade THE CP5+5 FOR LAST TWO CALC+S AND REPEAT 1300 GC Ho Converseme YC+, AveRade THE CP5+5 FOR LAST TWO CALC+S AND REPEAT 1300 GC Ho Converseme YC+, AveRade THE CP5+5 FOR LAST TWO CALC+S AND REPEAT 1300 GC Ho Converseme YC+, AveRade THE CP5+5 FOR LAST TWO CALC+S AND REPEAT 1300 GC Ho Converseme YC+, AveRade THE CP5+5 FOR LAST TWO CALC+S AND REPEAT 1300 GC Ho Converseme YC+, AveRade THE CP5+5 FOR LAST TWO CALC+S AND REPEAT 1300 GC Ho Converseme YC+, AveRade THE CP5+5 FOR LAST TWO CALC+S AND REPEAT 1300 GC Ho Converseme YC+,		TPS = (TPSP+TPSP+1/2.	1170
UP3 = DP3 (TP5,U03,P) 1190 UP3 = DP3 1200 TMTPN = T-TP5 1210 UC70x = (HC*(T-TP5)-H**C*C*C1*)/(H3*DP3) 1220 CP5 = CT3-UP3/KC3*UC7DX 1220 CP5 = CT3-UP3/KC3*UC7DX 1220 CP5 = CT3-UP3/KC3*UC7DX 1220 CMCHO = CMCPN 1220 CMCFN = CT3-CP5 1200 LP1 = LP3+1 1280 C = OS CONVENCEMENT (PC +, *VERAGE THE CP3*3 FOR LAST TWO CALC*S AND REPEAT 46 CP5 = .2*CP5+.3*CP5P 60 (F 0:53 1310 70 (F LP1-50) 01.61:44 1320 C + S = CT3/LP3P**CT3*A*CC3*X00)1 1320 C + S = CT3/LP3P**CT3*A*CC3*X00)1 1320 C + S = CT3/LP3P**(CT3-CP5) 1300 C + S = ASP 1300 C + CT3/LP3P**(CT3-CP5) 1300 C + CT3/LP3P**(CT3-CP5) 1300 <		CALL UNBAR (M3: BLV1+TPS+0, +H3+KK)	1180
uP3F = UP3 1210 TMTPN = T-TPS 1210 uCrDx = (HC*(T-TPS)-H4*KC4*C14)/(H3+0P3) 1220 CPAF = CPS 1230 CPAF = CPS 1240 CPS = CPS 1240 CPS = CPS 1240 CPS = C13-UP3/KC3+UCPDX 1260 LP1 = LP1+1 1200 C = C3-UP3/KC3+UCPDS 1210 G = C13-UP3/KC3+UCPS 1310 G = C13-UP3/KC3+UCPS 1310 G = C13-UP3/KC3+UCPS 1310 G = C13-UP3/KC3+USA 1310 G = C13-UP3/KC3+USA 1310 G = C13-UP3/H4C3+KC3+KC3+KC0) 1320 C = C13-UP3/H4C13-CPS) 1310 G = C13-UP3/H4C13-CPS) 1310 G = C13/L1+L-3/L4C3+KC3+KC3+K00) 1320 C = C13/L1+L-2/L4 1370 C = C13/L1+L		DP3 = DP3F(TPS,D03,P)	1190
TMTPN = T-TPS 1210 UCPUX = (HC*(T-TPS)-H**KC**C1*)/(H3*0P3) 1220 CPS-DF = CPS 1230 CMCHO = CMCPN 1240 CPS = C13-DP3/KC3*UCPDX 1240 CPS = C13-DP3/KC3*UCPDX 1240 CPS = C13-DP3/KC3*UCPDX 1240 LP1 = LP1+1 1240 CPS = C13-CPS 1260 CPS = C13/CPS 1210 CPS = C13/CPS 1210 CPS = C13/CPS 1310 S2 X00 = MAF1*X0P*WAF2*X0 1320 CPS = C13/(1+U-3/(KC3*A=KC3*X00)) 1320 CPUX = KC3/DP3*K(C1=CPS) 1340 S1 UCPUX = KC3/DP3*K(C1=CPS) 1340 S1 UCPUX = KC3/DP3*K(C1=CPS) 1340 S2 UP1 = LP1+1 1350 S2 UP1 = LP1+3 1360 S2 UP1 = LP1+4 1370 IF (LP1-25) 40.*0*0*44 1380 IF (LP1-25) 40.*0*0*44 1380 IF (LP1-25) 40.*0*0*15 1400 MAF2 = 1.**MF1 1360 IF (LP1-25) 40.*0*0*15 1420 9 wH1FE (br-90) 1420 16 UP1 AP3 1420 170		up3p = 093	1200
UCPUX = (HC*(T=TPS)-H4*KC4*C14)/(H3*0P3) 1220 CPLP = CPS 1230 CPLP = CPS 1240 CPS = C13-UP3/KC3*UCPDX 1250 IF (CPS.t.T.0.) CPS:n. 1260 CMCH0 = C13-CP5 1270 LP1 = LP1+1 1280 IF (CP1-50) 01.61.44 1290 C HO CONVENCENCE YET AVERAGE THE CP3*3 FOR LAST TWO CALC*S AND REPEAT 1300 G0 TO 53 1311 Y0 C HAR LEXUP*WAF2*X0 13120 CPS = C13/(1+1/L*3/(KC3*A=KC3*X00)) 1330 S3 UCPUX = KC3/UP3**(C13-CPS) 1349 UAH = C13-CPU 1340 H3 = H3P 1360 H4 C II = LP1+1 1370 IF (LP1-25) 40.40/44 1370 W WAF = WAF1+05 1390 UF (LP1-25) 40.40/44 1380 W WAF = WAF1+05 1390 UA = KC3/UP3+4C13-CPS) : WEIGHTED AVERAGE FACTORS FOR X0 1400 WAFT = WAF1+05 1390 WA = WAT ITERATION PROCEOURE WITH NEW FACTORS 1400 WAFTE (cr9a) 1400 WAFTE (cr9a) 1400		TMTPN = T-TPS	1210
CPSF = CPS 1230 CMCHO = CMCPN 1240 CPS = C13-DP3/KC30CPDX 1260 IF (CPS.LT.0.) CPSn. 1260 CMCPN = C13-CPS 1270 LP1 = LP1+1 1280 IF (LP1-50) 51/61/44 1280 C = MO CONVENGENCE YET AVERAGE THE CPS'S FOR LAST TWO CALC'S AND REPEAT 1300 G = ONVENGENCE YET AVERAGE THE CPS'S FOR LAST TWO CALC'S AND REPEAT 1300 G = ONVENGENCE YET AVERAGE THE CPS'S FOR LAST TWO CALC'S AND REPEAT 1300 G = ONVENGENCE YET AVERAGE THE CPS'S FOR LAST TWO CALC'S AND REPEAT 1300 G = ONVENGENCE YET AVERAGE THE CPS'S FOR LAST TWO CALC'S AND REPEAT 1300 G = ONVENGENCE WITH PARSE AND CALC'S AND REPEAT 1300 G = ON AAF1#XOP+WAF2*XN 1320 C = NOVENGENCE WITH PRESC OS AND CONS 1340 G = ON AAF1#XOP+WAF2*XN 1380 G = ON AAF1*XOP+WAF2*XN 1390 F = CHAPT 1300 G = CASTISFACTOR YON TO SO TO SO 1440 MF1 = LP1+1 1390 IF (LP1-25) 400 + 00 + 01 1430 G = HAPT 1400 MAF1 = LP1+1 1390 G = NORMAT (///2000 + 00 + 00		UCPUX = (HC*(T~TPS)-H4*KC4*CI4)/(H3*DP3)	1220
CMCH0 = CMCHN 1240 CPS = C13-UP3/RC3*UCPDX 1250 IF (CPS.I.T.+), CPS:n. 1260 CMCH0 = C13-CPS 1270 LP1 = LP1+1 1280 IF (LP1-50) 51+61+44 1280 C H0 CONVERGENCE YCT AVERAGE THE CP3'S FOR LAST TWO CALC+S AND REPEAT 1300 G G TO 53 1310 22 K00 = #AF1*X0P+WAF2*X0 1310 C H3 CONVERGENCE YCT AVERAGE THE CP3'S FOR LAST TWO CALC+S AND REPEAT 1300 G G TO 53 1310 22 K00 = #AF1*X0P+WAF2*X0 1330 C H3 CONVERGENCE YCT AVERAGE THE CP3'S FOR LAST TWO CALC+S AND REPEAT 1300 C H3 CONVERGENCE YCT AVERAGE FACTORS FOR LAST TWO CALC+S AND REPEAT 1310 24 UP1 = LP1+1 1370 1350 H3 = H3P 1350 1350 H4 UP1 + E H4F1+05 J0 F0 TO 99 1400 MAF2 = LAMF1+010, UP1CALLE TO FIND SUITABLE X0 AFTER FOUR TRIES OF 25 1440 KAP2 = LAMF1+010, UP1CALLE TO FIND SUITABLE X0 AFTER FOUR TRIES OF 25 1440 KAP2 = LAMAT 1470 1470 C H4PAAT ITERATION PROCEDURE WITH NEW FACTORS 14400 C GL C		CPSP = CPS	1230
CPS = C13-DP3/KC340CPDX 1250 IF (CPS.LT.+): CPS.LT.+): CPS.L 1260 CMCPH = C13-CPS 1270 LP1 = LP1+1 1280 IF (LP1-50) 51+61+44 1280 C +++ CPS.LT.+, AVERAGE THE CPS'S FOR LAST TWO CALC+S AND REPEAT 1300 G +			1240
IF (CPS:T.0.) CPSC0. 1260 CMCPN = C13-CPS 1270 LP1 = LP1+1 1280 C = H0 CONVENGENCE YEF AVERAGE THE CPS'S FOR LAST TWO CALC+S AND REPEAT 1300 G6 TO S3 1310 CP's = .2*CPS+.3*CPSP 1310 G6 TO S3 1311 22 X00 = AAF1*X0P+WAF2*X0 1320 CP's = C13/(1.*L+3') (KC3*A-KC3*X00)) 1335 S3 UCPUX = KC3/UPSP*(C13-CPS) 1340 CMG(M+* = C13-CPS) 1350 MAS = H3P 1360 G (4 UP1 = CP1+4) 1370 IF (LP1+25) 40.40.40.44 1380 IF (LP1+25) 40.40.40.44 1380 IF (AF1.6T.0.95) GO TO 99 1400 WAF2 = 1MAF1 1390 IF (AF1.6T.0.95) GO TO 99 1400 WAF2 = .1-MAF1 1390 IF (AF1.6T.0.95) GO TO 99 1400 VAF3 = UAMAF1 1400 V20X + RCATCHE WITH PRESC WEIGHTED AVERAGE FACTORS FOR X0 C HAUCHARCHEWE HALL PRESC		CPS = CI3 - DP3/kC3 + DCPDX	1250
$ \begin{array}{c} CMCPN = CI3-CPS & 1270 \\ LP1 = LP1+1 & 1280 \\ LP1 = LP1+1 & 1280 \\ LP1 = LP1+1 & 1280 \\ CP5 = .2xCP5+.ssCPSP & 1310 \\ CP5 = .2xCP5+.sscPSP & 1310 \\ CP5 = .2xCP5+.sscPSP & 1310 \\ CP5 = .2xCP5+.sscPSP & 1320 \\ CP5 = .2sC13/(1+U-3/(C3+A-KC3+X00)) & 1320 \\ CP5 = .2c13/(1+U-3/(KC3+A-KC3+X00)) & 120 \\ CP5 = .2c13/(1+U-3/(KC3+A-KC3+X00)) & 1470 \\ C & CACULATE GRADIENT \\ C & CALCULATE GRADIENT \\ C & CALCULATE GRADIENT \\ C & CACULATE GRADIENT \\ C & CACULATE GRADIENT \\ C & CALCULATE COT CA \\ CALCULATE COT CA \\ CALCULATE CAC CAC \\ CALCULATE CAC \\ CAL$		IF (CPS.LT.O.) CPS=0.	1260
LP1 = LP1+1 - 1280 IF (LP1-50) 61.61.44 1290 C H0 CONVENCENCE YET AVERAGE THE CP3'S FOR LAST TWO CALC'S AND REPEAT 46 CP3 = .2*CP3+.3*CP3P 47 CP3 = .2*CP3+.3*CP3P 48 CP3 = .2*CP3+.3*CP3P 49 CP3 = .2*CP3+.3*CP3P 40 CP3 = .2*CP3+.3*CP3P 40 CP3 = .2*CP3+.3*CP3P 40 CP3 = .2*CP3+.3*CP3P 41 CP1 = .2*CP3+.3*CP3P 42 LP1 = LP1+1 13 CP3 42 LP1 = LP1+1 13 CP3 44 LP1 = LP1+1 13 CP3 45 H3P 46 CP3 = .3*AFL 47 CP3 = .4*CP3+.3*CP3P 49 WAF1 = WAF1+.05 C H0 CUNVERCENCE WITH PHILSC.; WEIGHTED AVERAGE FACTORS FOR X0 C H0 CUNVERCENCE WITH PHILSC.; WEIGHTED AVERAGE FACTORS FOR X0 C H0 CUNVERCENCE WITH PHILSC.; WEIGHTED AVERAGE FACTORS FOR X0 C H0 CUNVERCENCE WITH PHILSC.; WEIGHTED AVERAGE FACTORS FOR X0 C H0 CUNVERCENCE WITH PHILSC.; WEIGHTED AVERAGE FACTORS FOR X0 C H0 CUNVERCENCE WITH PHILSC.; WEIGHTED AVERAGE FACTORS FOR X0 C H0 CUNVERCENCE WITH PHILSC.; WEIGHTED AVERAGE FACTORS FOR X0 C H0 CUNVERCENCE ACH		CMCPN = CI3-CPS	1270
If IL290 61.61.44 1290 G HO CONVERGENCE YET AVERAGE THE CPS'S FOR LAST TWO CALC'S AND REPEAT 1300 H6 CPS = .2xCPS+.8*CPSP 1300 G0 GO TO 53 1320 22 X00 = #AF1*XUP+WAF2*X0 1320 CPS = C13/(1+U-J)/XCC*A+CC*X00)) 1330 33 UCPUX = KC3/UP3**(C13-CPS) 1340 ACHA CHOP3**(C13-CPS) 1350 ACHA CHOP3**(C13-CPS) 1350 ACHA H3 1360 CHUX = KC3/UP3**(C13-CPS) 1350 1360 H3 = H3P 1360 1360 H4 = WAF1*.05 WAF1 = WAF1*.05 1390 H5 = L_1.44F1 1370 H6 = C13-CFU 1400 MAF1 = WAF1*.05 WEIGHTED AVERAGE FACTORS FOR X0 G H0 = ME1FWATION PROCEDURE WITH NEW FACTORS G0 H0 = MATI HERES - POWORAN STOP FOLLOWS' - 1400 G CALL EXIT 1430 G CALL EXIT 14400 C ALL EXIT HAGE HACTORY X0 FOUND AFTER+13.7H TRIES / 14400		LP1 = LP1+f ···	1280
C NO CONVERGENCE YET AVERAGE THE CPS*S FOR LAST TWO CALC+S AND REPEAT #6 CFS = .2sCPS+.3sCPSP 1310 GG TO 53 1320 CPS = .2sCPS+.3sCPSP 1310 GC TO 53 1320 CPS = C13/1.+L-3/(KC3*A-KC3*X00)) 1320 SJ DCPUX = KC3/DP3**(C13-CPS) 1340 CMCHW = C13-CPS 1340 H3 = H3P 1366 42 LP1 = LP3+1 1370 1F (LP1-25) 40.040.44 1370 44 WAF1 = WAF1+.05 1400 1F (LP1-25) 40.040.44 1370 1F (LP1-25) 40.040.44 1420 1F (LP1-10.140.44 1400 C ALCONTERGENCE WITH PRESE WEIGHTED AVERAGE FACTORS FOR Xn G to 1 </th <th></th> <th>IF (LP1-50) 61+61+44</th> <th>1290</th>		IF (LP1-50) 61+61+44	1290
46 CP: $z = 2eCPs + 3eCPs = 1300$ 1310 66 for 53 1310 22 X00 = #AF1*X0P*WAF2*X0 1320 CPS = C13/(1+b/3/(KC3*A+KC3*X00)) 1330 S3 DCPUX = KC3/UP3P*(C13-CPS) 1340 H3 = H3P 1350 H4 = MAF1*X0P*WAF2*X0 1350 H5 = LP1*1 1360 H6 = H3P 1360 H7 (LP1=25) 40.40.40.44 1370 H7 (LP1=25) 40.40.40.44 1380 H8 WA1 = MAF1*.05 WEIGHTED AVERAGE FACTORS FOR X0 C H0 CONVERGENCE WITH PROCEDUME WITH NEW FACTORS 1400 WA1TE (cr98) 1420 99 WRITE (cr98) 1420 70 1F (HK1F1.64.1) 1420 70 1F (HK1F1.64.1) 1420 70 1F (HK1F1.64.1) 1420 70 1F (HK1F1.64.1) 1420 71 1400 1440 70 1F (HK1F1.64.1) 1440 71 1400 1440 71 1400 1440 72 1440 1440 71 1440 <th>.</th> <th>HU CONVERGENCE YET AVERAGE THE CPS'S FOR LAST TWO CALC'S AND REPEA</th> <th>T</th>	.	HU CONVERGENCE YET AVERAGE THE CPS'S FOR LAST TWO CALC'S AND REPEA	T
66 T0 53 1310 22 X00 = #AF1#XUP+WAF2*X0 1320 CP5 = C13/(1,+U;3/(KC3+A=KC3+X00)) 1330 53 UCPUX = KC3/UP;3/(KC3+A=KC3+X00)) 1330 54 UCPL = L0;1 1340 CMCHN = C13-CP; 1350 H3 = H3P 1360 42 UP1 = L0;1 1370 IF (LP1-25) 40;40;44 1370 IF (LP1-25) 40;40;44 1370 UF (LP1-25) 40;40;44 1360 WAF2 = 1;-#AF1 1360 C MC CONVERGENCE WITH PRESE.; WEIGHTED AVERAGE FACTORS FOR X0 1440 MHTE (b;90) 1440 MAFE (b;90) 1440 SG FORMAT (///201X) UH4:3LE TO FIND SUITABLE X0 AFTER FOUR TRIES OF 25 1440 A IFE (b;90) 1440 C ALL EXIT 1440 A IFE (b;0) 1470 If FORMAT (/// 464:27MSATISFACTORY X0 FOUND AFTER, 13,7H TRIES / 1440 A S7X:5H X0 =;E12:5) 1490 C CALCULATE GRADIENT 1500 NX1 = NX+1 1520 NX1 = NX+1 1520 NX1 = NX+1 1520 NX1 = NX+1 1550 NX1 = NX+1 1550 <	46	CP5 = .2×CP5+.8×CP5P	1300
22 X00 = #AF1*X0P*WAF2*X0 1320 CPD = CI3/CI1+U-3/(KC3*A+KC3*X00)) 1330 S3 UCPUX = KC3/DP3P*(CI3-CPS) 1340 M3 = M3P 1360 42 LP1 = LP1*1 1360 IF (LP1-25) 40.40.44 1350 WAF2 = 1MAF1 1360 WAF2 = 1MAF1 1400 VILL = X1 1400 C SAF1FRE 10N PROCEDURE WITH NEW FACTORS CAL = X1F 1400		60 TO 53	1310
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	22	X00 = WAF1*XUP+WAF2*X0	1320
5.3 UCPUX = KC3/UP3P*(C13-CP5) 1340 CMCMPH = C13-CP5 1350 H3 = H3P 1360 H4 = LP1 = LP1+1 1370 IF (LP1-25) 40.40.44 1380 H4 wAr1 = WAF1+.05 1390 WAR2 = 1MAFL 1400 WAR2 = 1MAFL 1420 WAR2 = 1.FERATION PROCEDURE WITH NEW FACTORS 1420 Yarde Mark (X/Y20X,*UNA.OLE TO FIND SUITABLE X0 AFTER FOUR TRIES OF 25 1440 X YEMATLEMES EACH PHOGRAM STOP FOLLOWS* 1 1450 CALL EXIT 1400 1400 X YEMATLEMES (ACH PHOGRAM STOP FOLLOWS* 1 14400 X S7X,5H X0 = LE12.5 1 1470 C CALCULATE GRADIENT 1420		CPS = CI3/(1.+Ur'3/(KC3*A-KC3*X00))	1330
$CMCHV = C13-CP^{2}$ 1350 H3 = H3P 1366 42 LP1 = LP1+1 1370 IF (LP1-25) 4004044 1370 IF (LP1-25) 4004044 1380 44 WAF1 = WAF1+.05 1390 IF (ANF1, GT.U.95) GO TO 99 1400 WAF2 = 1MAF1 1410 C NG CONVERGENCE WITH PRESELT: WEIGHTED AVERAGE FACTORS FOR X0 1420 C NG CONVERGENCE WITH PRESELT: WEIGHTED AVERAGE FACTORS FOR X0 1420 99 WRITE (0.98) 1420 90 FORMAT ///20X,*U0X.5LE TO FIND SUITABLE X0 AFTER FOUR TRIES OF 25 1440 C ALL EXIT 1450 C SATISFACTORY X0 HAS GEEN FOUND 1450 70 IF (PRINT.EQ.1) WRITE(6.16)LP1.X0 14400 70 IF (PRINT.EQ.1) WRITE(6.16)LP1.X0 14400 C CALCULATE GRADIENT 1490 C 57X.5H X0 =.E12.5) 1440 C 1500 1500 NX1 = NX+1 1520 1500 NX1 = NX+1 1520 1530 P01 NA = 20 1550 1550 NX1 = NX+1 1560 1550 NX1 = NX+1 1560 1550 NX1	53	UCPUX = KC3/UP3P*(CI3-CPS)	1340
H3 = H3P 1360 42 LP1 = LP1+1 1370 IF (LP1-25) 40.40.40.44 1380 1F (LP1-25) 40.40.40.44 1400 MAF2 = 1.=CART 1400 MAF2 = 1.=CARTATION PROCEDURE WITH NEW FACTORS 1410 19 WRITE (b.788) 1420 19 WRITE (b.788) 1420 19 WRITE (b.788) 14400 10 CALL EXIT 14400 10 CALL EXIT 14400 14 14400 14400 10 CALL EXIT 14400 10 CAL EXIT 14400 11 1460 14400 10 IF (PRINT-E4.1) #RITE(6.16)LP1.X0 1470 14 IF (PRINT-E4.1) #RITE(6.16)LP1.X0 1470 14 IF (PRINT-E4.1) #RITE(6.16)LP1.X0 1470 14 IF (PRINT-E4.1) #RITE(6.16)LP1.X0 1500			1350
42 LP1 = LP1+1 1370 IF (LP1=25) 40,40,40 1360 84 WAF1 = WAF1+.05 1390 IF (AAF1.6T.095) GO T2 99 1400 WAF2 = 1AAF1 150 C NG CONVERGENCE WITH PRESE : WEIGHTED AVERAGE FACTORS FOR X0 1420 C NG CONVERGENCE WITH PRESE : WEIGHTED AVERAGE FACTORS FOR X0 1420 99 WRITE (5,98) 1430 90 WRITE (5,98) 1430 91 FORMAT ///20X, 'URAGLE TO FIND SUITABLE X0 AFTER FOUR TRIES OF 25 1440 X IFEMATIQNE EACH - PROGRAM STOP FOLLOWS' 1450 CALL EXIT 1400 C SATISFACTORY X0 HAS GEEN FOUND 1400 70 IF (PRINT.EG.1) WRITE(6,16)LP1,X0 1470 16 FORMAT (/// 46A:27HSATISFACTORY X0 FOUND AFTER:13,7H TRIES / 1480 λ 57X,5H X0 =:E12.5) 1490 C CALCULATE GRADIENT 1500 NX = 24 1510 1500 NX1 = NX+1 1520 1550 NX1 = NX+1 1550 1550 NMH1 = NX+1 1550 1550 NMH1 = NX+1		H3 = H3P	1360
IF (LP1-22) 40,40,404 1380 84 WAF1 = WAF1 = W151 + 05 1390 IF (AAF1 = WAF1 = W151 + 05 = 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0	42	LP1 = LP1+1	1370
44 WAF1 = WAF1 + M5 1390 IF (AFFL615, M, 95) GO TO 99 1400 WAF2 = 1 - MAFL 1440 C NG CUNVERGENCE WITH PRESE ; WEIGHTED AVERAGE FACTORS FOR X0 1440 C REPEAT ITERATION PROCEDURE WITH NEW FACTORS 1420 99 WRITE (5,98) 1430 93 FORMAT (///2000x * UNXoLE TO FIND SUITABLE XO AFTER FOUR TRIES OF 25 1440 X IVEHATIONS EACH PHOGRAM STOP FOLLOWS*) 1450 CALL £XIT 1460 70 IF (PRIAT.EQ.1) WRITE(6,16)LP1.X0 1470 16 FORMAT (/// 46A:27HSATISFACTORY XO FOUND AFTER.I3.7H TRIES / 1480 1490 C CALCULATE GRADIENT 1490 C CALCULATE GRADIENT 1500 NX1 = NX+1 1520 NX1 = NX+1 1520 NX1 = NX+1 1520 NX1 = NX+1 1550 291 XOA = XO/A 1550 N11 = 1 1560 N = 2 1570 R1 = 0. 1580 PS1 = 0. 1500 R2 = 0.	•	IF (LP1-25) 40,40,44	1380
IF (AAF1.61.0.95) GO TO 59 1400 WAF2 = 1AFL 1400 C NG CUNVERGENCE WITH PRESE : WEIGHTED AVERAGE FACTORS FOR X0 REPEAT ITERATION PROCEDURE WITH NEW FACTORS 1420 99 WRITE (b.98) 1430 90 KITE (b.98) 1440 X IVEHATIONS EACH	ųц	WAF1 = WAF1+.05	1390
WARP 2 1. WARP 11910CNO CONVERGENCE WITH PRESELS WEIGHTED AVERAGE FACTORS FOR XnCREPEAT ITERATION PROCEDURE WITH NEW FACTORSGG TO 1142099WHITE (b.98)1430143070FORMAT .///20X,*UNAGLE TO FIND SUITABLE XO AFTER FOUR TRIES OF 251440X ISEMATIONS EACH PROGRAM STOP FOLLOWS*)CAL CALT1450C SATISFACTORY XU HAS GEEN FOUND70IF (PRINT-EG.1) WRITE(6:16)LP1.X0141400XSTX.5H XD =.E12.5)CCALCULATE GRADIENTCCALCULATE GRADIENTC1500NXI = NX+11520NXMI = NX+11550NXMI = NX+11550NMI = 11560NXI = 0.1560NG = 0.1610DELXOA = (1,-XOA)/FLOAT(NX)C1610CALCULATE PROFILE CURVES FOR 3'' EGRAND FUNCTIONSXA = XOA1630C1640		1F (*AF1.6T.0.95) GO TO 99	1400
99 wRITE (6,98) 1430 95 FORMAT (///20X,*URAGLE TO FIND SUITABLE XO AFTER FOUR TRIES OF 25 1440 X IVENATIONS EACH PROGRAM STOP FOLLOWS*) 1450 CALL EXIT 1460 C SATISFACTORY XU HAS GEEN FOUND 1450 70 IF (PRINT.EQ.1) wRITE(6,16)LP1:X0 1470 16 FORMAT (///46A:27HSATISFACTORY XO FOUND AFTER:IS.7H TRIES / 1480 X 57X:5H X0 =:E12.5) 1490 C CALCULATE GRADIENT 1500 NX = 24 1510 1520 NX1 = NX+1 1520 1530 291 XOA = X0/A 1540 VIU = -KC3/DP3 1550 1500 N1 = 1 1560 1500 N = 22 1570 1560 R1 = 0. 1560 1580 PS1 = 0. 1660 1580 PS2 = R. 1600 1620 DELXOA = (1.*XOA)/FLOAT(NX) 1620 1620 G CALCULATE PROFILE CURVES FOR 3'' EGRAND FUNCTIONS 1630 1640 YA = XOA 1640 1640 1640	с С	NO CUNVERGENCE WITH PRESENT WEIGHTED AVERAGE FACTORS FOR X0 REPEAT ITERATION PROCEDURE WITH NEW FACTORS GO TO 1	1420
96 FORMAT ///20X,*UH461E TO FIND SUITABLE X0 AFTER FOUR TRIES OF 25 1440 X 18EMATIONS EACH PROGRAM STOP FOLLOWS*) 1450 CALL EXIT 1460 C SATISFACTORY X0 HAS GEEN FOUND 1460 70 IF (PRINT.EG.1) #RITE(6,16)LP1.X0 1470 16 FORMAT (/// 46X.27HSATISFACTORY X0 FOUND AFTER.I3.7H TRIES / 1480 1470 16 FORMAT (/// 46X.27HSATISFACTORY X0 FOUND AFTER.I3.7H TRIES / 1480 1490 2 C C C CALCULATE GRADIENT 1500 NX1 = NX+1 1520 NXM1 = NX+1 1520 NXM1 = NX+1 1550 IN11 = 1 1560 N = 2 1550 IN11 = 1 1560 N = 2 1570 PS1 = 0. 1580 PS2 = 0. 1580 PS1 = 0. 1600 PS2 = 0. 1600 PS2 = 0. 1600 PS2 = 0. 1610 DELX0A = (1X0A)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 31 EGRAND FUNCTIONS 1630 XA = X0A 1630	9 9	WRITE (0,98)	1430
X 13EPATEONS EACH PROGRAM STOP FOLLOWS*) 1450 CALL EXIT 1460 C SATISFACTORY X0 HAS GEEN FOUND 1460 70 IF (PRINT.EQ.1) #RITE(6.16)LP1.X0 1470 16 FORMAT (/// 46x.27HSATISFACTORY X0 FOUND AFTER.13.7H TRIES / 1480 λ 57X.5H X0 =.E12.5) 1490 C CALCULATE GRADIENT 1500 C CALCULATE GRADIENT 1500 NX = 24 1510 1520 NXM1 = NX+1 1520 1530 291 XOA = X0/A 1540 1550 INN1 = 1 1560 1550 NX1 = N.4 1550 1550 IN11 = 1 1560 1580 H2 = 0. 1580 1590 PS1 = 0. 1580 1590 PS1 = 0. 1600 1620 C CALCULATE PROFILE CURVES FOR 31'EGRAND FUNCTIONS 1620 C CALCULATE PROFILE CURVES FOR 31'EGRAND FUNCTIONS 1630 Go 770 I=1.1ML 1640	95	FORMAT V///20X1 UNABLE TO FIND SUITABLE XO AFTER FOUR TRIES OF 25	1440
CALL EXIT 1460 C SATISFACTORY X0 HAS BEEN FOUND 1470 70 IF (PRINT.EQ.1) #RITE(6,16)LP1,X0 1470 16 FORMAT (/// 46A.27HSATISFACTORY X0 FOUND AFTER,I3,7H TRIES / 1480 1480 λ 57X,5H X0 =,E12.5) 1490 C CALCULATE GRADIENT 1500 C CALCULATE GRADIENT 1500 C NX = 24 1510 NX1 = NX+1 1520 NXM1 = NX+1 1520 NXM1 = NX+1 1520 NM1 = NX+1 1550 IN1 = 1 1560 N = 2 1570 R1 = 0. 1580 R2 = 0. 1590 PS1 = 0. 1590 PS2 = A. 1600 PS2 = A. 1610 DELX0A = (1,-X0A)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR D'EGRAND FUNCTIONS 1630 XA = X0A 1630 Go CALCULATE PROFILE CURVES FOR D'EGRAND FUNCTIONS 1640		-X IVEHATIONS EACH PROGRAM STOP FOLLOWS!	1450
C SATISFACTORY X0 HAS SEEN FOUND 1470 70 IF (PRINT.EQ.1) #RITE(6,16)LP1.X0 1470 16 FORMAT (/// 464.27HSATISFACTORY X0 FOUND AFTER.I3.7H TRIES / 1480 1480 x 57X.5H X0 =.E12.5) 1490 C CALCULATE GRADIENT 1500 NX = 24 1510 NX1 = NX+1 1520 NXM1 = NX+1 1520 NXM1 = NX+1 1520 NX1 = NX+1 1530 291 X0A = X0/A 1540 VNU = -KC3/DP3 1550 IN11 = 1 1560 N = 2 1570 R1 = 0. 1580 H2 = 0. 1590 PS1 = 0. 1600 PS2 = 0. 1610 DELX0A = (1,-X0A)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 20 EGRAND FUNCTIONS 1620 XA = X0A 1630 DECX0A = X0A 1630 DECX0A = X0A 1630		CALLEXIT	1460
70 IF (PRINT-EQ.1) #RITE(6,16)LP1,X0 1470 16 FORMAT (/// 46A,27HSATISFACTORY X0 FOUND AFTER,13,7H TRIES / 1480 1480 λ 57X,5H X0 =,E12.5) 1490 C CALCULATE GRADIENT 1500 C CALCULATE GRADIENT 1510 NX = 24 1510 NX1 = NX+1 1520 NX1 = NX+1 1530 291 XOA = X0/A 1540 VNU = +KC3/DP3 1550 IN11 = 1 1560 $k = 2$ 1570 R1 = 0. 1580 H2 = 0. 1590 PS1 = 0. 1600 PS2 = A. 1610 DELXOA = (1XOA)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 21° EGRAND FUNCTIONS 1630 XA = XOA 1630	C	SATISFACTORY XU HAS BEEN FOUND	
16 FORMAT (/// 46X.27HSATISFACTORY X0 FOUND AFTER, 13,7H TRIES / 1480 13 17.5H X0 =, E12.5) 1490 1490 C CALCULATE GRADIENT 131 LP2 = 1 NX = 24 1510 NX1 = NX+1 1520 NXM1 = NX-1 1530 291 X0A = X0/A 1540 VNU = -KC3/0P3 1550 IN11 = 1 1560 N = 2 1570 R1 = 0. 1580 H2 = 0. 1590 PS1 = 0. 1600 PS2 = 0. 1610 DELX0A = (1,=X0A)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 31 EGRAND FUNCTIONS XA = X0A 1630 Go = 770 I=1+HX1	70	IF (PRINT.EQ.1) WRITE(6,16)LP1.XO	1470
X 57X,5H X0 =,E12.5) 1490 C CALCULATE GRADIENT 1500 131 LP2 = 1 1500 NX = 24 1510 NX1 = NX+1 1520 NXM1 = NX-1 1530 291 XOA = XO/A 1530 VNU = -KC3/UP3 1550 IN11 = 1 1560 k = 2 1570 R1 = 0. 1580 H2 = 0. 1590 PS1 = 0. 1600 PS2 = A. 1600 DELXOA = (1XOA)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 31 EGRAND FUNCTIONS 1630 XA = XOA 1630 Grade - Grad - Grad - Grade - Grade - Grade - Grade - Grade - Gra	16	FORMAT (/// 464.27HSATISFACTORY XO FOUND AFTER, 13.7H TRIES /	1480
C CALCULATE GRADIENT C 131 LP2 = 1 NX = 24 NX1 = NX+1 NX1 = NX+1 1520 NXM1 = NX+1 1530 291 XOA = XO/A VNU = -KC3/UP3 IN11 = 1 K = 2 R1 = 0. H2 = 0. PS1 = 0. PS2 = 0. DELXOA = (1XOA)/FLOAT(NX) C CALCULATE PROFILE CURVES FOR INTEGRAND FUNCTIONS XA = XOA G T70 I=1.HX1 1640	c	3 5/3.5H = 12.5	1490
131 LP2 = 1 1500 NX = 24 1510 NX1 = NX+1 1520 NXM1 = NX-1 1530 291 XOA = XO/A 1540 VNU = -KC3/DP3 1550 IN11 = 1 1560 N = 2 1570 R1 = 0. 1580 PS1 = 0. 1590 PS2 = 0. 1590 DELXOA = (1XOA)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 31' EGRAND FUNCTIONS 1630 XA = XOA 1630	C C	CALCULATE GRADIENT	
NX = 24 1510 NX1 = NX+1 1520 NXM1 = NX-1 1530 291 XOA = XO/A 1540 VNU = -KC3/UP3 1550 IN11 = 1 1560 K = 2 1570 R1 = 0. 1580 H2 = 0. 1590 PS1 = 0. 1600 PS2 = 0. 1600 DELXOA = (1.=XOA)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 31' EGRAND FUNCTIONS 1630 XA = XOA 1630	131	LP2 = 1	1500
NX1 = NX+1 1520 NXM1 = NX+1 1530 291 X0A = X0/A 1540 VHU = -KC3/DP3 1550 IN11 = 1 1560 K = 2 1570 R1 = 0. 1580 PS1 = 0. 1590 PS1 = 0. 1600 PS2 = 0. 1600 DELX0A = (1X0A)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR INTEGRAND FUNCTIONS 1630 XA = X0A 1630 D0 XA = X0A 1640		NX = 24	1510
NXM1 = NX=1 1530 291 XOA = XO/A 1540 VNU = -KC3/DP3 1550 IN11 = 1 1560 K = 2 1570 R1 = 0. 1580 H2 = 0. 1590 PS1 = 0. 1600 PS2 = 0. 1610 DELXOA = (1XOA)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR INTEGRAND FUNCTIONS 1630 XA = XOA 1630 D01 (A)		NX1 = NX+1	1520
291 $XOA = XO/A$ 1540 $Vivu = -kC3/DP3$ 1550 $IN)1 = 1$ 1560 $k = 2$ 1570 $R1 = 0.$ 1580 $R2 = 0.$ 1590 $PS1 = 0.$ 1600 $PS2 = 0.$ 1610 $DELXOA = (1XOA)/FLOAT(NX)$ 1620 C CALCULATE PROFILE CURVES FOR 20° EGRAND FUNCTIONS 1630 $XA = XOA$ 1630 $D0.770$ I=1.000 1640		- NXM1 NX-1	
VNU = -KC3/0P3 1550 IN)1 = 1 1560 k = 2 1570 R1 = 0. 1580 R2 = 0. 1590- PS1 = 0. 1600 PS2 = 0. 1610 DELX0A = (1X0A)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 30 EGRAND FUNCTIONS 1630 XA = X0A 1630 D04/00 (0.000) 1040	<u>- 291</u>	$x_{OA} = x_{O/A}$	1540
IN11 = 1 1560 $k = 2$ 1570 $R1 = 0.$ 1580 $R2 = 0.$ 1590 PS1 = 0. 1600 PS2 = 0. 1610 DELX0A = (1X0A)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 30 EGRAND FUNCTIONS 1630 XA = X0A 1630 D0 770 I=1/NX1 1640		VNU = -KC3/0P3	1550
N = 2 1570 R1 = 0. 1580 R2 = 0. 1590 PS1 = 0. 1600 PS2 = A. 1610 DELXOA = (1.=XOA)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR 31 EGRAND FUNCTIONS 1630 XA = XOA 1630 DELYON (A = 100 FTLC DUE on FIDET ADDRESSION 1640		IN(1 = 1	1560
R1 = 0. 1580 R2 = 0. 1590- PS1 = 0. 1600 PS2 = 0. 1610 DELX0A = (1X0A)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR STEERAND FUNCTIONS XA = X0A 1630			1570
H2 = 0. 1590- PS1 = 0. 1600 PS2 = θ. 1610 DELXOA = (1XOA)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR STEGRAND FUNCTIONS XA = XOA 1630			1580
PS1 = 0. 1600 PS2 = 0. 1610 DELX0A = (1.→X0A)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR IN EGRAND FUNCTIONS XA = X0A 1630 D0 770 I=1;;;;;;; 1640 1640 1640			
PS2 = H. 1610 DELXOA = (1XOA)/FLOAT(NX) 1620 C CALCULATE PROFILE CURVES FOR INTEGRAND FUNCTIONS XA = XOA 1630 D0 770 I=1;HX1 1640			1000
C CALCULATE PROFILE CURVES FOR ENERGRAND FUNCTIONS XA = XOA 1630 55 770 I=1;;;;; DUE DE EDET ADDRESS 1640			1610
C CALCULATE PROFILE CORVES FOR an EXPRAND FUNCTIONS XA = X0A 1630 50 770 Istrikt 1640	c	ULLAUA - (],"AUA)/FLUAI(NA) CALCHLATE ORACTLE CHONES EAD THEREADAND ENHORTANG	1620
AA - AVA 1630 	U I	VALUDEATE FRUPTLE UVRVED FUR AT EXTRANU FUNCTIONS	1620
		AA - AVA 	1030
LE THE TAR THE TAR A FUELD AND MATHEMATIC TO THE TARGET AND A TRACT THE	1'	(PLY/A) (S A LINEAD PODET) & DUP WE ETOET ADEDAVIMATION	1040.

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G910461-30

G 910461-30	
IF (LP2.GT.1) 60 TO 664	1650
CPX(I) = (XA - XOA) / (1 - XOA) * CPS	1660
664 KHET(1) = K0*CI3**(1=N)*CPX(I)**N*EXP(GAMMA*BETA*(1CPX(I)/CI3)/	1670
X (1.+6ETA*(1CPX(I)/CI3)))	1680
	1690
	1700
C' TAKE INTERVAL FUNCTIN MIDRIS AS CONSTANT VALUE FOR CRAVAN AND DHET	1710
DO 771 I=1+NX	1720
CPX(I) = (CPX(I)+CPX(I+1))/2.	1730
	1740
771 CONTINUE	1750
XA = XOA+DELXOA	1760
$C = \{A \neq V U \neq I_{\bullet}\} / (A \neq V U\}$	1770
C CPOX(1) IS SPECIAL CASE . X-YD	
	1780
DXU = DXL+DELXOA	1790
RR1 = 0.	1800
UO 377 I=1,NX	1810
<pre>kk1 = kk1+khET(I)*(EVAL2(DxL,DXU)-CTRM*EVAL1(DXL,DXU))</pre>	1820
DXL = UXU	1830
	1840
577 CONTINUE CPUX(1) = CI3=6±6/003±001	1850
iF (CP0X(1).LT.0.) CP0X(1)=0.	1870
C SOLVE GENERAL EQUATION OF TWO INTEGRALS FOR CP(X/A)	10/0
769 UO 772 I=1, INT1	1880
	1890
XOA = XA	1900
「「「「「スペーズ」入会十辺とし入し合 「フマン」 CANATINENE	1910
	1920
XAD = XA	1940
DU 773 I=INT1+NXM1	1960
P51 = P51 + RHET(I+1) + EVAL2(XA, XAD)	1970
PS2 = PS2+RHET(1+1) + EVAL1(XA+XAD)	1980
	1990
-773 - CONTINUE	2010
R2 = PS1-CTRM*PS2	2020
INT1 == INT1+1	2030
CPOX(K) = C13 - A + A/DP3 + (R1 + R2)	2040
IF (CPOx(K).LT.0.) CPOX(K)=0.	2050
$\lambda V A = \chi 0 / A$	2060
	2070
R1 = 0.	2000 2000
R2 = 0.	2100
P51 = 0;	2110
P52 = 0.	2120
U UPUANNAIJ ID SPEUIAL UASE 🔸 🛊 XIA	3140
DXU = DXL+DELXOA	2140
$\frac{1}{2}$	2160
DO 378 I=1,NX	2170
DXL = DXU	2190
•	

- -
DXU = UXUPDEEX04 2200 378 CONTINUE 2210 CPONTINUE 2220 CFCPONTINUELT.O.) CPONTINUED. 2220 CFCPONTINUELT.O.) CPONTINUED. 2230 CFCPONTINUELT.O.) CPONTINUED. 2240 UCEDUATE A MEM THS 2240 UCEDUATE A MEM THS 2240 UP39 = UP3 2240 UP31 = UP37 2240 UP31 = UP37 2240 UP3 = UP3 2240 UP3 = UP3 2240 UP3 = UP37 2240 DF5 = T-FIH*#KC4*C1*H*H3*DD3*DCPONT/HC 2270 CALU UH4AR (H316L1,1F3*O37HP) 2340 TMITM = T-FP5 2340 CFF UP3765C5 NEEDED REFORE CHECK ON TEMP-CONC CAN BE MADE 2350 CFF UP3765C13-CPONTRY 2350 CCALCULATE NEY DASSES NEEDED REFORMENT PASS 2350 CCALCULATE NEY CPONTRY 2351 CCALCULATE NEY CPONTRY 2350 CCALCULATE NEY CPONTRY 2350 CCALCULATE NEY CPONTRY 2350 CCALCULATE NEY CPONTRY 2350	G 9104	61-30	
378 Continute 2210 Crowinkinj = Cl3-Ama/OP3*(1.*CTRM)*RR2 2220 Crowinkinj = Cl3-Ama/OP3*(1.*CTRM)*RR2 2220 Contente A Mew Tes 2230 OLCPUX = KC3/DP3*(Cl3-CPOX(NX1)) 2240 H3P = H3 2240 UCPUX = KC3/DP3*(Cl3-CPOX(NX1)) 2240 H3P = H3 2240 UCALL UHAR (H3TeL:1, TP5:0.*H3*KX) 2240 UTTP5 = T-(H**KC**Cl4+H3*DP3*DCPDX)*/HC 2240 Call UHAR (H3TeL:1, TP5:0.*H3*KX) 2240 UTTP0 = TMTPH 2300 TMTP0 = TMTPH 2300 Call UHAR (H3TeL:1, TP5:0.*H3*KX) 2301 Call UHAR (H3TeL:1, TP5:0.*H3*KX) 2301 Call Ch2-Concerventing 2301 Call Ch4*Concerventing 2301 Call Ch4*Concerventing 2301 Call Ch4*Concerventing 2301 Call Call Ch4*Concerventing 2301 Call Call Ch4*Concerventing 2301 Call Call Ch4*Concerventing 2301 Call Ch4*Concerventing 2301 Call Call Ch4*Concerventing 2301 Call Call Ch4*Concerventing 2301		DXU = DXU+DELXOA	2200
CPUX(IX1) = C13-AXA/0P3*(1,-CTRM)+R2 2220 IF (CPUX(IX1,1,T,0,) CPUX(IX1)) 2230 C CALCULATE A NEW THS 2240 UCPUX = KC3/DP3*(C13-CPOX(IX1)) 2240 M3P = H3 2250 C ULCULATE A NEW THS 2250 DF3P = LP3 2250 DF3P = LP3 2250 DF3P = LP3 2260 DF3P = T-[H4*KC4*C14+H3*DP3*DCPDX)/HC 2270 CALU UHABR (H3TeL1,1*P3*05.H3*K) 2270 DF3 = DP3*CFF3*05.FX 2300 TMTPM = T-TP5 2300 C LOUAR (LSP, C6,1) 60 T0 27 2300 C MASTER SCS.SEUED BFORE CHECK ON TEMP, CONC CAN BE MADE 2300 JF (LP2, C6,1) 60 T0 27 2300 C MASTER SCS.SEUED BFORMERT PASS 2300 C C ALCULATE MEW CPX(1) PROFILE FOR NEXT PASS 2300 C C ALCULATE MEW CPX(1) PROFILE FOR NEXT PASS 2370 C ALCULATE MEW CPX(1) PROFILE FOR NEXT PASS 2370 G VALCULATE ME PROFILE PROFILES EVERY 5TH PASS TO SMOOTH 2490 STORE PRESENT CALCULATED PROFILES 2490 G AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO SMOOTH	378	CONTINUE	2210
IF (CPOX(NX1),LT,0.) CPOX(NX1):0. 2230 CCC.CLCULATE A NEW TPS. 2240 UCPUX = KC3/DP3*(CI3-CPOX(NX1)) 2240 H3P = H3 2250 UP3* = CP3 2260 CALL UHAR (H3TGL:1:PS:0.+H3:KK) 2270 CALL UHAR (H3TGL:1:PS:0.+H3:KK) 2270 TMTPU = TMTPN 2300 TMTPU = TMTPN 2300 C.COP = CMCPN 2330 C.COP = CMCPN 2330 C.COP = CMCPN 2330 C.CACDU = CMCPN 2330 C.CACDU = CMCPN 2330 C.CACULATE NEW CPX(I) PROFILE FOR MEXT PASS. 2360 C.CALCULATE NEW CPX(I) PROFILE FOR MEXT PASS. 2360 C.CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2370 G.CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2370 G.CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2370 G.CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2410 C.CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2410 C.CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2410 <td></td> <td>CPOX(NX1) = CI3-A+A/DP3+(2CTRM)+RR2</td> <td>2220</td>		CPOX(NX1) = CI3-A+A/DP3+(2CTRM)+RR2	2220
C ALCULATE A NEW TPS 2240 DCPDX = KG3/DPX=C[13-CPOX(NX1)) 2260 H3P = H3 2260 UP3X = UP3 2260 TPS = T-[HN*KCH+C]4+H3+DP3+DCPDX/HC 2270 CALU UHAR (H3T6L:1TPS)0,H3+KL) 2280 UP3 = UP3 2300 TMTPM = TMTPH 2300 TMTPM = TATPS 2310 C [Jo JASSES NEELED BEFORE CHECK ON TEMP,CONC CAN BE MADE 2330 CMCPH = C13-CPOX(H31) 2300 C CALCULATE MEMORY/IMTPN051 26+26+27 2350 C C CALCULATE MEMORY/IMTPN051 26+26+27 2360 C C CALCULATE MEMORY/IMTPN051 26+26+27 2360 C CALCULATE METGHIL NEWAGE OF OLD AVERAGED AND CALCULATED PROFILES 2370 C CALCULATE METGHIL NEWAGE OF OLD AVERAGED AND CALCULATED PROFILES 2390 C AVERAGE PRESENT CALCULATED PROFILE 2400 C SUDRE PRESENT CALCULATED PROFILE 2400 C SUDRE PRESENT CALCULATED PROFILE 2400	•	IF (CPOX(NX1).LT.0.) CPOX(NX1)=0.	2230
UCPUX = RC3/DP3*(C13*CPUX(RA11) 2240 H3P = H3 2200 UP3P = (DP3) 2200 Th5 = T=(H**C4*C14+H3*DP3*DCPDX)/HC 2200 CALL URDAR (H316L.1TP5;0,H3KK) 2200 UP3 = DP3*CFD*D03*PD 2200 TMTP0 = TMTP1 2300 TMTP0 = TMTP1 2300 TMTP0 = TMTP1 2300 C FLOP_RESIDED BEFORE CHECK END TEMP; CONC CAN BE MADE 2310 C FLOP_RESIDED BEFORE CHECK END TEMP; CONC CAN BE MADE 2330 C CALCULATE NEW (PARCHT)/TMTPN051 26*26*27 2350 C C CALCULATE NEW (PARCHT)/CMCPN051 26*26*27 2350 C ALCULATE NEW (PARCHT)/CMCPN051 26*26*27 2350 G C ALCULATE NEW (PARCHT)/	Ç Ċ		
IDD 1 DP3 2230 DP3 = I-P3 2240 TP5 = I-INM*KC4*C14*H3*DP3*DCPDX}/HC 2270 CALUNDAR (H316L.1.TP5:0.+H3.KK) 2240 DF3 = DP3(HP3/D3/P) 2300 TMTPM = TMTPH 2300 C Fu0 PASSES MEELED BEFORE CHECK ON TEMP.CONC CAN BE MADE 2300 C Fu0 PASSES MEELED BEFORE CHECK ON TEMP.CONC CAN BE MADE 2330 C CALCULATE AND CONCERN 2330 C CALCULATE MEW CPX(1) PROFILE FOR NEXT PASS 2360 C C CALCULATE MEW CPX(1) PROFILE FOR NEXT PASS 2370 C C ALCULATE MEW CPX(1) PROFILE FOR NEXT PASS 2370 C C ALCULATE MEW CPX(1) PROFILE FOR NEXT PASS 2370 C C ALCULATE MEEDSHILD AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2390 C AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO 5MOUTH 2410 C STORE MRESENT CALCULATED PROFILE 2420 C AVERAGE PRESENT CALCULATED PROFILE 242		UCPUA = KC3/UP3+(CI3-CP0X(NAI))	2240
TPS = T-(H=KC0+E14+H3+D93+DCPDX1/HC 2270 CALL UHABA (H31BL1:TPS:0.+H35KK) 2270 UN1 = D+SF(H3:D03/P) 2200 INTPU = TMTRI 2300 TMTRI = T-TPS 2300 C TWO PASSES NEELED BEFORE CHECK ON TEMP.CONC CAN BE MADE 2310 C TWO PASSES NEELED BEFORE CHECK ON TEMP.CONC CAN BE MADE 2330 C THO PASSES NEELED BEFORE CHECK ON TEMP.CONC CAN BE MADE 2330 C CALCULATE DEFORCHCPNI/TITPN051 26+26+27 2350 C CALCULATE NEW CPX(1) PROFILE FOR NEXT PASS 2340 C CALCULATE NEW CPX(1) PROFILE FOR NEXT PASS 2340 C CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2340 24300 C ALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2340 24400 C ALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2490 2440 C AVERAGE PRESENT CALCULATED PROFILE SEVERY 5TH PASS TO 5MOUTH 2440 C AVERAGE PRESENT CALCULATED PROFILE SEVERY 5TH PASS TO 5MOUTH 2440 C CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILE 2420 2440 C AVERAGE PRESENT CALCULATED PROFILE SEVERY 5TH PASS TO 5MOUTH 2440 C AVERAGE PRESENT CALCULATED PROFILE SEVERY 5TH PASS TO 5MOUTH 2440 C AVERAGE PRES		$\frac{101}{1039} = \frac{103}{103}$	2200
CALL UNDAR (H3TBL+1,TPS+0,H3F,K1) 2299 DFAT DEST (H3FB,D03FP) 2300 TMTPU = THTP1 2300 C Two PASSES NEEDED BEFORE CHECK ON TEMP, CONC CAN BE MADE 2310 C Two PASSES NEEDED BEFORE CHECK ON TEMP, CONC CAN BE MADE 2320 C Two PASSES NEEDED BEFORE CHECK ON TEMP, CONC CAN BE MADE 2330 C C Two PASSES NEEDED BEFORE CHECK ON TEMP, CONC CAN BE MADE 2330 C C AUCULATE NEW CPN(1) TMTPN05) 26,26,27 2350 26 C ALCULATE NEW CPX(1) PROFILE FOR NEXT PASS 2360 C C CALCULATE NEW CPX(1) PROFILE FOR NEXT PASS 2370 C C CALCULATE HEIGHTED XVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2390 GU TU 55 26 CALCULATE MED PAST CALCULATED PROFILES EVERY 5TH PASS TO 5M00TH 2400 C AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO 5M00TH 2400 C SIONE PRESENT CALCULATED PROFILE 2470 C SIONE PRESENT CALCULATED PROFILE 2470 C AVERAGE PRESENT AND PAST CALCULATED PROFILE 2440 DCHCDX = KC3AVEPX+(1) = CPOX(1) 2440 UCPCX = KC3AVEPX+(1) STOD_CPX(NX1) 2440 DCHCDX = CALCULATED PROFILE 2450 MARTHE (6,16) CPOX(NX1) 2450 THP4 = TFPS		TPS = T-(H4*KC4*CI4+H3*DP3+DCPDX)/HC	2270
UP3 = UP3F(FP5:003/P) 2200 TMTPN = T+TPS 2310 TMTPN = T+TPS 2310 S1 IF (LP2,Ed,1) GO TO 27 2320 CMCPO = CMCPN 2330 CMCPO = CMCPN/TMTPN / TMTPN051 26.26.27 23 C CALCULATE NEW CPX(T) PROFILE FOR NEXT PASS C CALCULATE MEW CPX(T) PROFILE FOR NEXT PASS 2360 C CALCULATE MEW CPX(T) PAPFICE OF OLD AVERAGED AND CALCULATED PROFILES 2360 C CALCULATE MEWATED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2360 C CALCULATE MEWATED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2360 C CALCULATE MEWATED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2360 C CALCULATE MEWATED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2360 C CALCULATE ALEGHATED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2360 C CALCULATE ALEGHATED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2400 C		CALL UNBAR (H3TBL+1+TPS+0++H3+KK)	2280
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TMTPN = 7-TPS 2310 TAUTPN = 7-TPS 2310 33 IF (LPP>E0.1) 60 TO 27 2320 CMCPN = CHSCEDD BEFORE CHECK ON TEMP+CONC CAN BE MADE 2330 CMCPN = CHSCEDD BEFORE CHECK ON TEMP+CONC CAN BE MADE 2330 CMCPN = CHSCEDD BEFORE CHECK ON TEMP+CONC CAN BE MADE 2330 CMCPN = CHSCEDD BEFORE CHECK ON TEMP+CONC CAN BE MADE 2330 CMCPN = CHSCEDD BEFORE CHECK ON TEMP+CONC CAN BE MADE 2300 CMCPN = CHSCEDD BEFORE CHECK ON TEMP+CONC CAN BE MADE 2300 CMCPN = CHSCEDD BEFORE CHECK ON TEMP+CONC CAN BE MADE 2300 CMCPN = CHSCEDD BEFORE CHECK ON TEMP+CONC CAN BE MADE 2300 C CALCULATE MEEMPOTITIN/TMTPN051 26+26+27 2300 C CALCULATE MEEMPOTITIN/TMTPN051 26+26+27 2300 C CALCULATE MEEMPOTITIC PAROFILE FOR NEXT PASS 2370 C CALCULATE MEEMPERST CALCULATED PROFILE SEVERY STH PASS TO SMGGT: 2400 C CALCULATE MEEMPORTILE PROFILE 2440 C CALCULATED PROFILE 2400 C CALCULATED PROFILE 2400 C CALCULATED PROFILE 2400		TMTPO = TMTPN	2300
C IND PASSES NEEDED BEFORE CHECK ON TEMP, CONC CAN BE MADE 2320 35 IF (LPP2.60.1) 60 TO 27 2330 CMCPD = CMCPN 2330 IF (ABS(TMIPD-INTPN)/IMTPN = .05) 26:26:27 2350 26 IF (ABS(TMIPD-INTPN)/IMTPN = .05) 26:26:27 2350 26 IF (ABS(CMCPO-CMCPN)/CMCPN = .05) 36:86:27 2360 26 C Calculate New CPX(I) PROFILE FOR NEXT PASS 2370 27 UO 55 1=1:NX1 2370 28 C Calculate Mew CPX(I) PROFILE FOR NEXT PASS 2370 29 C Calculate Mew CPX(I) PROFILE FOR NEXT PASS 2370 29 C Calculate Mew CPX(I) PROFILE FOR NEXT PASS 2370 29 C Calculate Mew CPX(I) PROFILE FOR NEXT PASS 2400 20 C Calculate Mew CPX(I) 2410 20 C Calculate PROFILE 2410 21 C Continue Calculate PROFILE 2420 24 Continue Calculate PROFILE 2420 25 Continue Calculate PROFILE 2420 25 Continue Calculate PROFILE <td< td=""><td>~ -</td><td>TMTPN = T-TPS</td><td>2310</td></td<>	~ -	TMTPN = T-TPS	2310
33 1F (LPP,E0.1) GU TO 27 2330 CMCPN = CI3-CPOXIIX1 2330 IF (ABS(TATPO-TATPN)/TATPN05) 26.26.27 2350 26 IF (ABS(TATPO-TATPN)/TATPN05) 26.26.27 2350 26 IF (ABS(TATPO-TATPN)/TATPN05) 26.26.27 2360 27 0.55 1=1.4.02 2360 26 C CALCULATE MELGAPC-TMCPN)/CMCPN05) 88.68.27 2360 27 0.55 1=1.4.02 2360 26 CALCULATE MELGAPC-TMCPN //CMCPN05) 88.68.27 2360 27 0.55 1=1.4.02 2360 28 CALCULATE MELGAPC-TMCPN //CMCPN05) 88.68.27 2360 27 0.55 1=1.4.02 2360 28 CALCULATE MELGAPC-TMCPN //CMCPN05) 88.68.27 2360 28 CALCULATE MELGAPC-SUPARECOPOCIDICE 2360 29 CALCUATE MELGAPC-SUPARECOPOCIDICE 2360 29 CALCULATE MELGAPCONTINE PROFILE 2420 2400 2420 2420 25 COLTIADE 2430 2400 2420 2420 25 COLTIADE 2420 25 COLTIADE 2420	6 1	NO PASSES NEEDED BEFORE CHECK ON TEMPICONC CAN BE MADE	0.7.4.0
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CHO F (ABS(THIPO-THTPN)/TMTPN05) 26.26.27 2350 26 IF (ABS(CPUPO-CHCPN)/CMCPN05) 88.68.27 2360 C Calculate Meth CPX(I) PROFILE FOR NEXT PASS 2370 C Calculate Meth CPX(I) PROFILE FOR NEXT PASS 2370 C Calculate Method PASS(I) 34.57.34 2370 C Calculate Method VERAGE of OLD AVERAGED AND CALCULATED PROFILES 2390 C Calculate Method VERAGE of OLD AVERAGED AND CALCULATED PROFILES 2390 C Calculate Method VERAGE of OLD AVERAGED AND CALCULATED PROFILES 2410 C Calculate Method VERAGE of OLD AVERAGED AND CALCULATED PROFILES 2410 C Calculate On Mathod VERAGE of OLD AVERAGED AND CALCULATED PROFILES 2410 C Calculate On Mathod VERAGE of OLD AVERAGED AND CALCULATED PROFILES 2410 C Calculate On Mathod VERAGE of OLD AVERAGED AND CALCULATED PROFILES 2410 C Standa VERAGE of OLD AVERAGED AND CALCULATED PROFILES 2420 C Standa VERAGE of OLD AVERAGED AND CALCULATED PROFILES 2420 Standa VERAGE ON CONTINUE 2420 2420 Standa VERAGE (HATAND PROFILE 2420 2420 Standa VERAGE (HATAND PROFILE 2420		CMCDN - CT3_CD0V/HV+)	2330
26 IF (AdS(CMCPO-CMCPN)/CMCPN05) 88/88/27 2360 26 IF (AdS(CMCPO-CMCPN)/CMCPN05) 88/88/27 2360 26 C CALCULATE NEW CPX(I) PROFILE FOR NEXT PASS 2370 27 10 50 151/NA1 2390 28 C CALCULATE MEW CPX(I) * 2400 2390 29 C CALCULATE MEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2390 29 C CALCULATE MEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2390 29 C AVERAGE PRESENT CALCULATED PROFILES EVERY 5TH PASS TO SMOOTH 2410 20 C AVERAGE PRESENT CALCULATED PROFILE 2420 25 CONTINUE 2420 26 CHOPN = C13-CPX(NX1) 2430 26 CHOPN = C13-CPX(NX1) 2440 27 UCPDX = KG3/UP39*(C13-CPX(NX1)) 2440 28 CALL UH4AR (H3TB-DP3P+0EPD3P+0EPDX/HC 2460 29 CALL UH4AR (H3TB-DP3P+0EPD3P+0EPDX/HC 2460 29 CALL UH4AR (H3TB-11*DS,0,+H3*KK) 2480 29 CALL UH4AR (H3TB-11*DS,0,+H3*KK) 2490 29 CALL UH4AR (H3TB-11*DS,0,+H3*KK) 2490 29 CALL UH4AR (H3T		IF (ABS(TMIP0-TMTPN)/TMTPN = .05) 26.26.27	2340
C Calculate New CPX(I) PROFILE FOR NEXT PASS 2370 P7 U0 55 1=1+NX1 2370 IF (NOJL(P2:5)) 3+57.34 2390 C Calculate weighted AVerage of OLD AVErageD AND CalculateD PROFILES 2390 34 CPX(I) = .8+CPX(I)+.2*CPOX(I) 2390 C Calculate weighted AVerage of OLD AVErageD AND CalculateD PROFILES 2400 C Average Present and PAST CalculateD PROFILES EVERY 5th PASS to 5M00TH 2410 C Stort PRESENT Calculated PROFILE 2420 S5 Contlinut 2430 C Stort PRESENT Calculated PROFILE 2420 S5 Contlinut 2430 UCPCX = kC3/UP3P*(CI3-CPX(NX1)) 2440 UCPCX = kC3/UP3P*(CI3-CPX(NX1)) 2440 UCPCX = kC3/UP3P*(CI3-CPX(NX1)) 2450 IHP = I-(HM*KC4+CH4+H3P0P3P3P0ECEX)/HC 2460 DP3 = UP3F(TPS:0.+H3+KK) 2480 DP4 = UP3F(TPS:0.+H3+KK) 2480 DP3 = UP3F(TPS:0.+H3+KK) 2480 DF1 = LP1P4 2500 THP0 = THPH 2500 THP0 = THPH 2500 VF(L) = LP0P41 2530 S5 <td>26</td> <td>IF (AdS(CMCP0-CMCPN)/CMCPN05) 88:88:27</td> <td>2360</td>	26	IF (AdS(CMCP0-CMCPN)/CMCPN05) 88:88:27	2360
C CALCULATE NEW CPX(I) PROFILE FOR NEXT PASS C PT U0 55 1=1+NX1 IF (MOJL(P2+5)) 34+57,34 C CALCULATE #EIGHED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 34 CPX(I) = .4+CPX(I)+.2+CPOX(I) GU TD 55 C AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO 5MOOTH 57 CPX(I) = (CCOX(I)+CPCOX(I))/2+ C SIORE PRESENT CALCULATED PROFILES 54 PCPUX(I) = CPOX(I) 55 CONTINUE C SIORE PRESENT CALCULATED PROFILE 54 PCPUX(I) = CPOX(I) 55 CONTINUE C SIORE PRESENT CALCULATED PROFILE 54 PCPUX(I) = CPOX(I) 2400 C SIORE PRESENT CALCULATED PROFILE 54 PCPUX(I) = CPOX(I) 55 CONTINUE C SIORE PRESENT CALCULATED PROFILE 54 PCPUX(I) = CPOX(I) 2400 C SIORE PRESENT CALCULATED PROFILE 54 PCPUX(I) = CPOX(I) 2400 C SIORE PRESENT CALCULATED PROFILE 54 PCPUX(I) = CPOX(I) 2400 C SIORE PRESENT CALCULATED PROFILE 2400 2400 C SIORE PRESENT CALCULATED PROFILE 2400 2400 C SIORE PRESENT CALCULATED PROFILE 2400 2400 C SIORE PRESENT CALCULATED PROFILE 2400 2400 2400 1F (TPS-LT.0,) TPS-1. CALL UNUAR (H3TBEL)TPS:0.+H3+KK) 2400 2500 250	С		2000
C 2379 P7 U0 55 IF (NULLP2,5)) 34,57,34 2380 C CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2390 34 CPX(1) = .usCPX(1)+.2xCP0X(1) 2490 C AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO 5M00Th 2410 C STORE PRESENT CALCULATED PROFILE 2420 55 CONTINUE 2430 C STORE PRESENT CALCULATED PROFILE 2430 C STORE PRESENT CALCULATED PROFILE 2430 C CHCPN = C13-CPX(NX1) 2440 UCPCX = KC37/DP3FC161-CPX(NX1)) 2450 TH5-= I- (HM=KC44KE14+H3PM3PD3PABCPDX1/HC 2460 IF (TPS,LT.0.) TPS-1. 2470 CALL UNDAR (H3TBL+1.TPS+0.+H3+KK) 2480 DP3 = UP3F (TPS+003)P) 2490 TM1PN = TMPN 2500 TM1PN = TMPN 2500 IF (LP2-50) 29.29.30 2530 30 WHITE (6.19) CP0X(NX1) 19 FORMAT (///31X+52HUMABLE TO CONVERGE ON CP5 IN 50 TRIES CP(X/ 250 xA) =E12.5 2540 251 ConMat (JA) S2HOMABLE TO C	C CA	LCULATE NEW CPX(I) PROFILE FOR NEXT PASS	
P7UG 55 $l=1+N*1$ 2570IF (NOU(LP2+5)) 34+57.342380C CALCULATE #EIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES2390GU CALCULATE #EIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES2390GU TU 55GU TU 55C AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO SMGUTH2410C STORE PRESENT CALCULATED PROFILE2420S5CONTINUE2420C STORE PRESENT CALCULATED PROFILE2420S5CONTINUE2440UCPCN = c(35/UP3Pe(C13-CPX(NX1))2450UCPCN = c(35/UP3Pe(C13-CPX(NX1))2460IF (TP3.LT.0.) TP5=1.2470CALL UNDAR (H3TBL.)TPS:0.*H3*KK)2480DP3 = UP3F (TP5:D03*P)2500TMIPU = TNPH2500TMIPU = TNPH2500CMAT (///31x.52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(x/2560GO TO 28291GENMAT (///31x.52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(x/25602560S24 GMAA = H6M/TP5S25 GAD.TGRADS25 GMAA = -CPX(INX1) +H3*DP3/(KP*TP5)KN = ALPH2*EXP(-6GMMA)*C11**EN3C260GO TO 281G TO 281G TO 281JF (PRINT-E0.1) WRITE(6.19) (DX11;CPOX(1);151;NX1)S660GO TO 291JF (PRINT-E0.1) WRITE(6.19) (DX11;CPOX(1);151;NX1)2640JF (PRINT-E0.1) WRITE(6.19) (DX11;CPOX(1);151;NX1)2640JF (PRINT-E0.1) WRITE(6.192)(DX11;CPOX(1);151;NX1)2640JF (PRINT-E0.1) WRITE(6.192)(DX11;CPOX(1);151;NX1) <td>С</td> <td></td> <td></td>	С		
IF (MOJ(LP2,5)) 34,57,34 2380 C CALCULATE #EIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2390 GU TO 55 2390 GU TO 55 2390 GU TO 55 2390 GU TO 56 2390 GU TO 55 2390 GU TO 56 2390 GU TO 56 2390 C AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO SMOOTH 57 CPX(1) = (C+OX(1)++CPOX(1))/2. C SIJORE PRESENT CALCULATED PROFILE 2420 56 PC+0X(1) = CPX(N1) 2420 CALCUATE * (C13-CPX(N41) 2440 UCPCX = x(C3/0)P3P4(C13-CPX(NX1)) 2450 TP5 = 1 - (HW+KC4+C14+H3P+DP3P)P4PEDP3/+MC 2460 IF (TP5, IT, 0,) TP5=1. 2470 CALL UHBAR (H3TBL+1,TP5+0.+H3+KK) 2480 DP3 = UP3f (TP5, 003, P) 2490 TMHP0 = TMTPN 2500 TM1P0 = TMTPN 2500 TM1P0 = TMTPN 2500 IF (LP2=50) 29,29,30 2530 2540 2540 1B FORMAT (///31X+52HUHABLE TO CONVERGE ON CP5 IN 50 TRIES CP(X/ 2540 2540	-27	<u>UO 55 I=1+NX1</u>	2370
C CALCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES 2390 34 CPX1D = .uscPX1D+.2*CPOX(I) 2400 C AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO SMOUTH 2410 C AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO SMOUTH 2410 C STORE PRESENT CALCULATED PROFILE 2410 C STORE PRESENT CALCULATED PROFILE 2420 S5 CONTINUE 2420 DCPX = CI3-CPX(NX1) 2440 UCPDX = KC3/UP3PK(CI3-CPX(NX1)) 2440 UCPX = KC3/UP3PK(CI3-CPX(NX1)) 2460 IF (TPS.LT.0.) TPS=1. 2470 CALU UNDAR (H3TBL.1.TPS.0.,H3.KK) 2480 DP3 = UP3F(TPS.D03.P) 2490 TMIPU = THIPH 2500 IF (LP2-50) 29:29.30 2530 30 WRITE (6,16) CPOX(NX1) 2540 10 FONMAT (///31x/52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) =:E12.5) 2500 2500 WRITE (6,16) CPOX(NX1) 2540 2570 10 FONMAT (///31x/52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) =:e12.5) 2500 2570 S22 FORMAT (SIN;**K63*(CF3-CPS) = **E12.5 / 54X,**HC*(T-TPS) = *E12.5 / 2560	r r		2320
SMCFALL	- C CA 	CONTRACT RESOLUTION AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES	(1700
C AVERAGE PRESENT AND PAST CALCULATED PROFILES EVERY 5TH PASS TO SMOOTH 57 CPX(1) = (CrOX(1)+PCOX(1))/2. C STORE PRESENT CALCULATED PROFILE 56 PCPUX(1) = CPUX(1) 2410 2420 55 CONTINUE CHCPN = C13-CPX(NX1) 2440 UCPDX = KC3/UP3P*(C13-CPX(NX1)) 2450 TPS = I-(HH4*KC4*C14+H3P*BD3P*BCFDX)/HC 2460 IF (TPS,IT.0.) TPS=1. CALL UNBAP (H3TBL+1,TPS+0,+H3*KK) 2440 DP3 = UP3F (TPS,DD3*P) 2490 TM1P0 = TMP4 TM1P0 = TMP4 10 CPUX(1) 2500 2500 TM1P4 = T-PS 2500 10 WRITE (6,16) CP0X(NX1) 2500 11 F (LP2=0) 29:29:30 2530 30 WRITE (6,16) CP0X(NX1) 2550 12 FORMAT (///31X+52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 2570 2520 2500 2520 2500 2520 2500 2520 2500	34	CPA(1) ~ +0+CPA(1)++C*CPUA(1) CO TO 56	2390
57 CPX11) = (C OX(1) +PCPOX(1)/20 2410 C SIDRE PRESENT CALCULATED PROFILE 2420 56 PCPUX(1) = CPOX(1) 2430 55 CONTINUE 2440 UCPDX = XC3/UP3P*(C13-CPX(NX1)) 2450 TPS = I - (H4*AC4*C14 H3P*DP3P*DCPEX)/HC 2450 IF CTPS.LT.0.) TPS=1. 2470 CALL UNBAR (H3TBL+1,TPS,0.,H3+KK) 2480 DP3 = UP3F (TPS,D03,P) 2490 TM1P0 = TNIPH 2500 TM1P4 = T-IPS 2510 LP4 = LP41 2500 XA) = xE12.51 29.29.30 30 WRITE (6.16) CPOX(NX1) 2540 14 FORMAT (1//31X-52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) = xE12.51 2540 WRITE (0.522) GRAD, TGRAD 2570 522 FORMAT (513+YE3+(C13-CPS) = *-E12.5 / 54X, *HC*(T-TPS) = *-E12.5 / 2560 GO TO 28 2590 29 GAMMA = BGM/TPS 2600 bETA = - CPX(NX1) *H13+DP3/(KP*TPS) 2610 KN = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 GO TO 291 2640 9 FORMAT (///111*/13HMATE(6-19)(DX(11)-CPOX(C J	FRAGE PRESENT AND PAST CALCULATED PROFILES EVERY STH PASS TO SMOOTH.	2400
C STORE PRESENT CALCULATED PROFILE 56 PCPDX(I) = CPOX(I) 2420 55 CONTINUE CMCPN = CI3-CPX(NX1) 2440 UCPDX = K(3/UPP*(CI3-CPX(NX1)) 2450 TP5 = I-(HW*KG4KG14+H3PB79P3P4CPDX)/HC 2460 IF (TPS.LT.0.) TP5=1. 2460 DP3 = UP3F(TPS.D0.3.P) 2490 TMIP0 = TNIPN 2500 TMIP0 = TNIPN 2500 TMIP0 = TNIPN 2500 TMIP0 = TNIPN 2500 TMIP1 = T-FPS 2500 IF (LP2-50) 29+29-30 2520 IF (LP2-50) 29+29-30 2530 30 WRITE (6.16) CPOX(NX1) 2540 H# FORMAT (///31X+52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) ==612.51 250 WRITE (6.552) GRAD, TGRAD 2570 60 TO 28 250 29 GAMMA = BGM/TPS 2600 BETA = -CPX(NX1)+H3+DP3/(KP*TPS) 2600 BETA = -CPX(NX1)+H3+DP3/(KP*TPS) 2600 GO TO 291 60 TO 291 70 FORMAT (///11X+114HX/A CP(X/A) X/A CP(X/A) 2650 70 X/A CP(X/A) X/A CP(X/A) 2660 70 X/A CP(X/A) X/A CP(X/A) 2670 70 TF (PRINT-E0-1) WRITE(6+82)LP2-CPOX(NX1) 70 FORMAT (///41X)34HCONCENTRATION GRADIENT FOUND AFTER,13+0H TRIES / 2690 70 GRAU = DCPDX+DP3 2710	57		2410
56 PCPuX(I) = CP0X(I) 2420 55 CONTINUE 2430 CHCPN = CI3=CPX(NX1) 2440 UCPDX = KC3/UP3P*(CI3=CPX(NX1)) 2450 TP5_= I=(HM=KC4+C14+H3P=P3P=D5P=D5PA=D5PA=D5PA=D5PA=D5PA=D5PA=D5PA	C SI	ORE PRESENT CALCULATED PROFILE	
55 CONTINUE 2430 CHCPN = C13-CPX(N(1) 2440 UCPDX = KC3/UP3P*(C13-CPX(NX1)) 2450 TH5 = F-(H#*KC4*C14+H3P*BP3P*BCPDX)/HC 2460 IF (TPS.LT.0.) TP5=1. 2470 CALL UH&R (H3TBL:1.TPS+0H3.KK) 2480 DP3 = UP3F(TPS.D03.P) 2490 TMTP0 = TMTPN 2500 IF (LP2-50) 29.29.30 2520 IF (LP2-50) 29.29.31 2530 30 WRITE (6.16) CP0X(NX1) 2540 18< FORMAT (///31X.52HUMABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550	56	PCPUX(I) = CPOX(I)	2420
CHCPN = C13-CPX(NX1) 2440 UCPDX = KC3/UP3P*(C13-CPX(NX1)) 2450 Th2 = T-(H4*KC4*C14+H3*BPD3P*DEPERA)/HC 2460 IF (TPS*LT*0*) TPS=1* CALL UNMEAR (H3TBL*1*TPS*0**H3*KK) 2440 DP3 = UP3F(TPS*D03*P) 2490 TM1P0 = TM1PN 2500 TM1P0 = TM1PN 2500 TM1P1 = T-FPS 250 IF (LP2-50) 29*29*30 2530 30 wRITE (6*16) CP0X(NX1) 2550 14 FORMAT (///31X*52HUNABLE TO CONVERGE ON CP5 IN 50 TRIES *** CP(X/ 2550 XA) =*E12*5) WRITE (6*16) CP0X(NX1) 2560 WRITE (6*522) GRAD*TGRAD 2550 GALMAT = GENTPS 2600 2590 29 GALMAT = GENTPS 2600 BETA = -CPX(NX1)*H3*DP3/(KP*TP5) 2**E12*5/ 54X**HC*(T-TP5) 2**E12*5) 2560 WRITE (***C3**(C13-CP5) 2**E12*5/ 54X**HC*(T-TP5) 2**E12*5) 2560 29 GALMAT = GENTPS 2600 29 GALMAT = GENTPS 2600 2590 29 GALMAT = CPX(NX1)*H3*DP3/(KP*TP5) 2600 2500 2610	55	CONTINUE	2430
DCPEX = KC3/DP3P*(CI3=CPX(NX1)) 2450 TP5 = T=(HW*KC4*CI4+H3P*PD3P*DEPD3)/HC 2460 IF (TP5.LT.0.) TP5=1. 2470 CALL UNBAR (H3TBL:1.TP5.0.+H3.KK) 2480 DP3 = DP3F(TP5.D03.P) 2490 TMTP0 = TMTPN 2510 LP2 = LP2+1 2520 IF (LP2-50) 29+29:30 2530 30 WRITE (6.16) CPOX(NX1) 2540 14 FORMAT (///31x+52HUNABLE TO CONVERGE ON CP5 IN 50 TRIES CP(X/ 2550 XA) =.+E12.5) 2540 152 FORMAT (51x+KC3+(CI3-CP5) =*+E12.5 / 54x+*HC*(T-TP5) =*,E12.5) 2560 WRITE (6.16) CPOX(NX1) 2540 16 FORMAT (///31x+114H3*DP3/(KP*TP5) 2590 29 GAMMA = BGM/TPS 2600 BETA = -CPX(NX1)*H13*DP3/(KP*TP5) 2610 Kn = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 07 0 291 2640 19 FORMAT (///31x+114HX/A CP(X/A) X/A CP(X/A) 2650 X //A CP(X/A) X/A CP(X/A) 2640 17 F(PRINT+EG+1) WRITE(6+092)LP2+CPOX(INX1) 2670 28 FORMAT (///41x+34HICONCENTRATION GRADIENT FOUND AFTER+I3+0H TRLS / 2690 2670 X //5X+OE12+b) 2670 2670 X // 0		CHCPN = CI3 - CPx(NX1)	2440
115 2 1-(HARKLAVELINHSJUDISHDELPA//ML 2460 IF (TPS,LT.0.) TPS=1. 2460 CALL UHBAR (H3TBL+1:TPS,0.+H3,KK) 2480 DP3 = UP3F(TPS,D03,P) 2490 TMTP0 = TMTPH 2500 TMTP1 = T-FPS 2510 LP2 = LPPH 2520 IF (LP2-50) 29:29:30 2530 30 WHITE (6,16) CPOX(NX1) 2540 18 FORMAT (///31x,52HUMABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 xA) =:E12.5) GRAD,TGRAD 2570 60 TO 28 2590 2570 29 GAMMA = BGM/TPS 2600 BETA = -CPX(IX1)*H3*DP3/(KP*TPS) 2610 BETA = -CPX(IX1)*H3*DP3/(KP*TPS) 2610 BETA = -CPX(IX1)*H3*DP3/(KP*TPS) 2620 60 TO 291 2640 19 FORMAT (///31x*114HX/A CP(X/A) X/A CP(X/A) 2640 19 FORMAT (///31x*114HX/A CP(X/A) X/A CP(X/A) 2640 2640 19 FORMAT (///31x*114HX/A CP(X/A) X/A CP(X/A) 2640 2670 19 FO		$\Box CPD\lambda = KC3/DP3P*(C13-CPX(NX1))$	2450
$\begin{array}{c} \text{IP} (1P3.L(0.0), 1P3-1. \\ \text{CALL UNBAR (H3TBL.1, TP5.0., H3, KK)} \\ \text{CALL UNBAR (H3TBL.1, TP5.0., H3, KK)} \\ \text{DP3} = JP3F(TP5.D03, P) \\ \text{TM1P0} = TMTPN \\ \text{2490} \\ \text{TM1P0} = TMTPN \\ \text{2500} \\ \text{TM1P1} = T-PS \\ \text{2510} \\ \text{LP2} = LPP41 \\ \text{2510} \\ \text{LP2} = LPP41 \\ \text{2510} \\ \text{2520} \\ \text{IF} (LP2-50) 29, 29, 30 \\ \text{2530} \\ \text{2530} \\ \text{2530} \\ \text{2540} \\ \text{18} FOKMAT (///31x, 52HUMABLE TO CONVERGE ON CPS IN 50 TRIES CP(x/ 2550) \\ \text{XA}) = +E12.5 \\ \text{XA} = +E12.5 \\ \text{WRITE (6, 522) GRAD, TGRAD } \\ \text{2570} \\ \text{522} FOKMAT (51x, +KC3+(C13-CPS) = +, E12.5 / 54x, +MC+(T-TPS) = +, E12.5) \\ \text{2570} \\ \text{60} TO 28 \\ \text{2590} \\ \text{29} GAMMA = H6M/TPS \\ \text{2610} \\ \text{KD} = ALPH2+EXP(-6AMMA)*CI1**EN3 \\ \text{2620} \\ \text{60} TO 291 \\ 2630 \\ \frac{19}{19} FOKMAT (///31x+114HX/A CP(X/A) X/A CP(X/A) 2650 \\ \text{X} X/A CP(X/A) X/A CP(X/A) X/A CP(X/A) 2650 \\ \text{X} X/A CP(X/A) X/A CP(X/A) X/A CP(X/A) 2650 \\ \text{X} X/A CP(X/A) X/A CP(X/A) X/A CP(X/A) 2650 \\ \text{X} X/A CP(X/A) X/A CP(X/A) X/A CP(X/A) 2650 \\ \text{X} MRITE (6, 62)LP2,CPOX(NX1) \\ \text{2640} \\ \text{2710} \\ \text{CRAU = DCPDX+DP3 \\ \end{array}$			2460
DP3 = UP3F(TP5,D03,P) 2490 TMTP0 = TNTPH 2500 TMTP0 = TNTPH 2510 LP2 = LP241 2520 IF (LP2-50) 29,29,30 2530 30 WRITE (6,16) CP0X(NX1) 2540 18 F0KMAT (///31X,52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) = F12.51 2560 WRITE (6,522) GRAD,TGRAD 2570 522 F0KMAT (51X,*KC3+(C13-CP5) =*,E12.5 / 54X,*HC+(T-TP5) =*,E12.5) 2560 G0 T0 28 2590 29 GAMMA = B6M/TP5 2500 BETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 Kn = ALPH2*LXP(-GAMMA)*CI1**EN3 2620 G0 T0 291 2630 BF (PRINT:CG:1) WRITE(G:19)(DX(1)*CPOX(1)*I=1*NX1) 2640 19 F0KMAT (///11X+114HX/A CP(X/A) X/A CP(X/A) 2640 19 F0KMAT (///11X+114HX/A CP(X/A) X/A CP(X/A) 2640 19 F0KMAT (///11X+114HX/A CP(X/A) X/A CP(X/A) 2650 X / (5X+10E12+b)) 2670 X / (5X+10E12+b)) 2670 X / (5X+10E12+b)) 2670 X / (5X+10E12+b)) 2680 82 F0KMAT (///41X,34HCONCENTRATION GRADIENT FOUND AFTER,I3+0H TRIES / 2690 X / GRAU = DCPDX		IT THOULD THOUSE THE STATES AND A SAME A	2476
TMTPO = TMTPN 2500 TMTPO = TMTPN 2510 LP2 = LP2+1 2520 IF (LP2-50) 29,29,30 2530 30 wRITE (6,16) CPOX(NX1) 2540 18 FORMAT (///31x,52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 xA) =,E12.5) 2560 wRITE (6,522) GRAD,TGRAD 2570 522 FORMAT (51x,*KC3*(C13-CPS) =*.E12.5 / 54x,*MC*(T-TPS) =*.E12.5) 2580 GO TO 28 2590 29 GAMAA = BGM/TPS 2600 bETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 K0 = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 GO TO 291 2630 9 FORMAT (///11x+114HX/A CP(X/A) X/A CP(X/A) 19 FORMAT (///11x+114HX/A CP(X/A) X/A CP(X/A) 2650 X /A CP(X/A) X/A CP(X/A) 2650 2670 X /A CP(X/A) X/A CP(X/A) 2650 2620 60 TO 291 2630 2630 2630 2630 9 FORMAT (///11x+114HX/A CP(X/A) X/A CP(X/A) 2650 X /A CP(X/A) X/A CP(X/A) 2640 2640		DP3 = 0P3F(TPS)D03P)	2490
TMIPN = T-FPS 2510 LP2 = LPP+1 2520 IF (LP2=50) 29,29,30 2530 30 write (6,16) CPOX(NX1) 2540 18 FORMAT (///31X+52HUMABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) =,E12.51 2560 write (6,522) GRAD, TGRAD 2570 522 FORMAT (51x,*KC3+(CI3-CPS) ='+E12.5 / 54x,*HC+(T-TPS) =',E12.5) 2560 GO TO 28 2590 29 GAMMA = B6M/TPS 2600 bETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 KO = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 GO TO 291 2630 B0 - IF - (PRINTEGA:1) WRITE(6,19)(DX(1)+CPOX(1)+I=1,NX1) 2640 19 FORMAT (///11x+114HX/A CP(X/A) X/A CP(X/A) 2640 X X/A CP(X/A) X/A CP(X/A) X/A CP(X/A) 2650 X / (5X+10E12+b1) 2670 IF (PRINT+E0,1) WRITE(6,92)LP2+CPOX(HX1) 2670 X / (5X+10E12+b1) 2670 IF (PRINT+E0,1) WRITE(6,92)LP2+CPOX(HX1) 2670 X / (5X+10E12+b1) 2690 X / (5X+10E12+b1) 2690 X / (5X+10E12+b1) 2690 X / (5X+10E12+b1) 2690 X / (5X+27HCP((4) - AT - PARTICLE S		TMIPO = TMIPN	2500
LH2 = LP2+1 2520 IF (LP2-50) 29,29,30 2530 30 WRITE (6,16) CPOX(NX1) 2540 18 FORMAT (///31X,52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) =,E12.5) 2560 WRITE (6,522) GRAD,TGRAD 2570 522 FORMAT (51x,*KC3+(CI3-CPS) =*,E12.5 / 54x,*WC+(T-TPS) =*,E12.5) 2580 60 TO 28 2590 29 GAMMA = BGM/TPS 2600 BETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 KO = ALPH2*EXP(-GAMMA)*CI1*EN3 2630 GO TO 291 2630 BB IF (PRINT.EQ.1) WRITE(6,19)(DX(1), CPOX(1), I=1,NX1) 2640 19 FORMAT (///11x,114HX/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2650 2670 X / (5x,10E12.b)) IF (PRINT.EQ.1) WRITE(6,62)LP2,CPOX(NX1) 2660 2670 2670 X / (5x,10E12.b)) IF (0,602)LP2,CPOX(NX1) 2680 2670 2680 82 FORMAT (///41x,34HCONCENTRATION GRADIENT FOUND AFTER.I3,oH TRIES / 2690 2690 2740 X - OPD2x+DP3 2710 2710		TMIPN = T-TPS	2510
IF (LP2-50) 29+29+30 2530 30 WRITE (6,16) CP0X(NX1) 2540 18 F0KMAT (///31X+52HUHABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) =+E12.5) 2560 wRITE (6,522) GRAD+TGRAD 2570 522 F0KMAT (51X+*KC3+(CI3-CPS) =*+E12+5 / 54X+*HC+(T-TPS) =*,E12+5) 2560 60 T0 28 2570 9 GAMMA = B6M/TP5 2600 BETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 K0 = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 60 T0 291 2630 88 IF (PRINT+EG+1) WRITE(6+19)(DX(1)+CPOX(1)+1=1+NX1) 2640 19 F0KMAT (///S1X+114HX/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2650 2670 19 F0KMAT (///S1X+114HX/A CP(X/A) X/A CP(X/A) 2660 X / (5X+10E12+b)) IF (PRINT+EG+1) WRITE(6+62)LP2+CPOX(NX1) 2660 2670 2670 18 F0KMAT (///41X+34HCONCENTRATION GRADIENT FOUND AFTER+I3+0H TRIES / 2690 2680 2680 2680 82 F0KMAT (//41X+34HCONCENTRATION GRADIENT FOUND AFTER+I3+0H TRIES / 2690		<u>- LH2 = LH2+1</u>	2520
30 WRITE (6,16) CPOX(NX1) 2540 18 FORMAT (///31x,52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) =,E12.5) 2560 WRITE (6,522) GRAD,TGRAD 2570 522 FORMAT (51x,*KC3*(CI3-CPS) =*E12.5) 2580 GO TO 28 2590 29 GAMMA = BGM/TPS 2610 BETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 CO TO 291 2630 38 IF (PRINT.EG.1) WRITE(6,19)(DX(I)*CPOX(I)*I=1,NX1) 2640 19 FORMAT (///11x+114HX/A CP(X/A) X/A CP(X/A) 2650 X //A CP(X/A) X/A CP(X/A) 2640 2650 X //A CP(X/A) X/A CP(X/A) 2650 2610 88 IF (PRINT.EG.1) WRITE(6,19)(DX(I)*CPOX(I)*I=1,NX1) 2640 2650 X //A CP(X/A) X/A CP(X/A) X/A CP(X/A) 2650 X //A CP(X/A) X/A CP(X/A) 2660 2670 X //A CP(X/A) X/A CP(X/A) 2660 2670 X //A CP(X/A) X/A CP(X/A) 2660 2670 X //A CP(X/A) X/A CP(X/A) 2660		IF (LP2-50) 29,29,30	2530
18 FORMA1 (///31X+52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/ 2550 XA) =+E12.5) 2560 WRITE (6,522) GRAD, TGRAD 2570 522 FORMAT (51x,*KC3*(CI3-CPS) =*.E12.5 / 54x,*HC*(T-TPS) =*.E12.5) 2580 GO TO 28 2590 29 GAMMA = BGM/TPS 2600 BETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 RO = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 GO TO 291 2640 19 FORMAT (///S1X+114HX/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2660 2650 X X/A CP(X/A) X/A CP(X/A) 2650 82 FORMAT (///S1X+114HX/A CP(X/A) X/A CP(X/A) 2660 X X/A CP(X/A) X/A CP(X/A) 2660 X / (5X+10E12+b)) IF (PRINT+E0+1) WRITE(6+02)LP2+CPOX(NX1) 2680 2670 82 FORMAT (///41X+34HCONCENTRATION GRADIENT FOUND AFTER+I3+0H TRIES / 2690 2690 2710 GRAU = DCPDX+DP3 2710 2710 2710	30	WRITE (6,16) CPOX(NX1)	2540
XA/ = FEI2.3/ 2560 WRITE (6,522) GRAD, TGRAD 2570 522 FORMAT (51x, *KC3*(CI3-CPS) =*,E12.5 / 54x, **KC*(T-TPS) =*,E12.5) 2580 G0 TO 28 2590 29 GAMMA = BGM/TPS 2600 BETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 K0 = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 G0 TO 291 2640 19 FORMAT (///S1X+114HX/A CP(X/A) X/A CP(X/A) 2660 X X/A CP(X/A) X/A CP(X/A) 2660 X X/A CP(X/A) X/A CP(X/A) 2660 X / (5X+10E12+b)) IF (PRINT-EQ-1) WRITE(6+02)LP2+CPOX(NX1) 2660 2670 19 FORMAT (///41X+34HCONCENTRATION GRADIENT FOUND AFTER-I3+0H TRIES / 2690 2670 X / (5X+10E12+b)) 2680 2670 2680 82 FORMAT (///41X+34HCONCENTRATION GRADIENT FOUND AFTER-I3+0H TRIES / 2690 2690 X / (5X+10F(4) AT - PARTICLE SURFACE =+E12+5) 2710 2710	18	FURMAI (77/51X/52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP(X/	2550
522 FORMAT (51x,*KC3*(CI3-CPS) =*,E12.5 / 54x,*MC*(T-TPS) =*,E12.5) 2590 G0 TO 28 2590 29 GAMMA = BGM/TPS 2600 BETA = -CPx(Nx1)*H3*DP3/(KP*TPS) 2610 K0 = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 G0 TO 291 2630 08 IF (PRINT.EQ.1) WRITE(6,19)(DX(I)*CPOX(I)*I=1*NX1) 2640 19 FORMAT (///S1X*114HX/A CP(X/A) X/A CP(X/A) 2650 x X/A CP(X/A) X/A CP(X/A) 2660 x (5x,10E12.6)) 2670 2670 2670 IF (PRINT.EQ.1) WRITE(6.82)LP2,CPOX(NX1) 2680 2670 82 FORMAT (///41x,34HCONCENTRATION GRADIENT FOUND AFTER.I3.0H TRIES / 2690 2690 x			2560
GO TO 28 2590 29 GAMMA = BGM/TPS 2600 BETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 K0 = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 GO TO 291 2630 38 IF (PRINT.EQ.1) WRITE(6.19)(DX(1).CPOX(1).I=1.NX1) 2640 19 FORMAT (///11X+114HX/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2660 X X/A CP(X/A) X/A CP(X/A) 2660 X / (5X,10E12.b)) 2670 2670 IF (PRINT.EQ.1) WRITE(6.62)LP2.CPOX(NX1) 2680 2670 82 FORMAT (///41X.34HCONCENTRATION GRADIENT FOUND AFTER.I3.0H TRIES / 2690 2690 X - 45X.27HCP(X) AT PARTICLE SURFACE =.E12.5.) 2700 GRAU = DCPDX+DP3 2710	522	- REALL LOFUCCT CHARTIONAD - F(WMAT-(54)-+KC3+(CT3-CDC) = -F12F12_4 / K4Y-14C+47-TDC) R-F12-F12	2070
29 GAMMA = BGM/TPS 2600 BETA = -CPX(NX1)*H3*DP3/(KP*TPS) 2610 K0 = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 G0 TO 291 2630 88 IF (PRINT.EQ.1) WRITE(6.19)(DX(1).CP0X(1).IB1.NX1) 2640 19 FORMAT (///11X+114HX/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2660 X X/A CP(X/A) X/A CP(X/A) 2660 X / (5X,10E12.6)) 2670 2670 IF (PRINT.EQ.1) WRITE(6.62)LP2.CPOX(NX1) 2680 2670 82 FORMAT (///41X.34HCONCENTRATION GRADIENT FOUND AFTER.I3.0H TRIES / 2690 2690 X - 45X.27HCP(X) - AT - PARTICLE SURFACE =.E12.5.) 2700 GRAU = DCPDX+DP3 2710			2590
BETA = -CPx(Nx1)*H3*DP3/(KP*TPS) 2610 kn = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 GO TO 291 2630 08 IF (PRINT.EQ.1) WAITE(6.19)(DX(I)*CPOX(I)*I=1*NX1) 2640 19 FORMAT (///11x+114HX/A CP(X/A) X/A CP(X/A) 2650 x X/A CP(X/A) X/A CP(X/A) 2660 2670 x X/A CP(X/A) X/A CP(X/A) 2660 x (5x,10E12.6)) 2670 2670 IF (PRINT.EQ.1) WRITE(6.02)LP2*CPOX(NX1) 2680 2670 82 FORMAT (///41x*34HCONCENTRATION GRADIENT FOUND AFTER*I3*0H TRIES / 2690 2690 x - 45X*27HCP(4) - AT - PARTICLE SURFACE =*E12*5 - 3 2700 GRAU = DCPDX*DP3 2710	29	GAMMA = BGM/TPS	2600
k0 = ALPH2*EXP(-GAMMA)*CI1**EN3 2620 G0 T0 291 2630 08 IF (PRINT*EQ:1) WRITE(6:19)(DX(I)*CPOX(I)*I=1*NX1) 2640 19 FORMAT (///\$1X*114HX/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2660 X X/A CP(X/A) X/A CP(X/A) 2660 X / (5X*10E12*6)) 2670 2670 IF (PRINT*EQ:1) WRITE(6:02)LP2*CPOX(NX1) 2680 2680 82 FORMAT (///41X*34HCONCENTRATION GRADIENT FOUND AFTER*I3*0H TRIES / 2690 2690 X - 45X*27HCP(X) AT PARTICLE SURFACE =*E12*5*) 2700 GRAU = DCPDX*DP3 2710		BETA = -CPX(NX1)+H3+DP3/(KP+TPS)	2610
G0 T0 291 2630 88 IF (PRINT.EQ.1) WRITE(6.19) (DX(1).CPOX(1).I=1.NX1) 2640 19 FORMAT (///1X.114HX/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2660 X X/A CP(X/A) X/A CP(X/A) 2660 X /(5X.10E12.6)) 2670 2670 IF (PRINT.EQ.1) WRITE(6.62)LP2.CPOX(NX1) 2680 82 FORMAT (///41X.34HCONCENTRATION GRADIENT FOUND AFTER.I3.0H TRIES / 2690 2690 X 45X.27HCP(X) AT PARTICLE SURFACE =.E12.5.) 2700 GRAU DCPDX+DP3 2710 2710		KN = ALPH2*EXP(-GAMMA)*CI1**EN3	2620
88 IF (PRINT.EQ.1) WRITE(6.19)(DX(I)/CPOX(I)/I=1.NX1) 2640 19 FORMAT (///11X+114HX/A CP(X/A) X/A CP(X/A) 2650 x X/A CP(X/A) X/A CP(X/A) 2650 x X/A CP(X/A) X/A CP(X/A) 2660 x /(5x)10E12.6)) 2670 2670 IF (PRINT.EQ.1) WRITE(6.02)LP2, CPOX(NX1) 2680 82 FORMAT (///41X+34HCONCENTRATION GRADIENT FOUND AFTER.I3.0H TRIES / 2690 2690 x		GO TO 291	2630
19 FORMAT (///XIX+114HX/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2650 X X/A CP(X/A) X/A CP(X/A) 2660 X /(5X,10E12.6)) 2670 2670 IF (PRINT.EQ.1) WRITE(6.62)LP2, CPOX(NX1) 2680 82 FORMAT ///41X,34HCONCENTRATION GRADIENT FOUND AFTER.I3.0H TRIES / 2690 X 45X,27HGP(X) AT PARTICLE SURFACE =,E12.5 2700 2700 GRAD DCPDX+DP3 2710 2710		-IF- (PRINT.EQ.1) WAITE(6,19)(DX(1),CPOX(1),131,NX1)	
X X/A CP(X/A) X/A CP(X/A) 2660 X /(5X,10E12.6)) 2670 2670 IF (PRINT.EQ.1) WRITE(6.62)LP2,CPOX(NX1) 2680 82 FORMAT C//41X,34HCONCENTRATION GRADIENT FOUND AFTER.I3.0H TRILS / 2690 X	19	FORMAT (///\$1X+114HX/A CP(X/A) X/A CP(X/A)	2650
IF (PRINT,EQ.1) WRITE(6.62)LP2,CPOX(NX1) 2680 82 FORMAT (///41X,34HCONCENTRATION GRADIENT FOUND AFTER,I3,oH TRIES / 2690 2690 32 FORMAT (///41X,34HCONCENTRATION GRADIENT FOUND AFTER,I3,oH TRIES / 2690 2670 32 FORMAT (///41X,34HCONCENTRATION GRADIENT FOUND AFTER,I3,oH TRIES / 2690 2670 32 FORMAT (///41X,34HCONCENTRATION GRADIENT FOUND AFTER,I3,oH TRIES / 2690 2670 34 FORMAT (///41X,34HCONCENTRATION GRADIENT FOUND AFTER,I3,oH TRIES / 2690 2670 35 FORMAT (///41X,34HCONCENTRATION GRADIENT FOUND AFTER,I3,oH TRIES / 2690 2670 36 FORMAT (///41X,34HCONCENTRATION GRADIENT FOUND AFTER,I3,oH TRIES / 2690 2710 37 FORMAT (///41X,34HCONCENTRATICLE SURFACE =,E12,5) 2710	•	X X/A (P(X/A) X/A (P(X/A) X/A (P(X/A))	2000
82 FORMAT (///41x; 34HCONCENTRATION GRADIENT FOUND AFTER; 13; oH TRIES / 2690 45X; 27HCP(%) AT PARTICLE SURFACE =; E12,5 ; 2700 GRAU = DCPDX+DP3 2710		TE (PRINT_F0.1) WRITE(6.03) P2.CPAY/NY11	2010
$\frac{45X_{+}27HCP(X)}{45X_{+}27HCP(X)} = \frac{45X_{+}27HCP(X)}{45X_{+}27HCP(X)} = \frac{100}{2710}$	82	FORMAT (///41x) 34HCONCENTRATION GRADIENT FOUND AFTER IS AN TRIES /	2690
GRAU = DCPDX+DP3 2710			
		GRAU = DCPDX+DP3	2710

	CPx1=CPXF(U+X0A+CPS)	120
	CPX2=CPXF(V,XOA,CPS)	130
	- KHETI=NHETF (CI3vCPX1vSAMMAvBETAvKOv1)	140
•	RHET2=RHETF(CI3,CPX2,GAMMA,BETA,K0,1)	150
€	ALCULATE FIRST, LAST TERMS OF RIEMANN SUM FIRST	
4	TRM1=FOXI1(U,RHEY1)/2.	160
		170
Ð		180
	CFA=CFAF(0)FHYAVAYCFST $DUET = DUETE/CIR, COV, CANDA, DETA, KO, A)$	140
- • - • - • - • • •	KHEI - KHEIF(CIJICFAIGAMMAIDEIAIKUII) Sim-chmicâyti/hidh.ducti	200
	JOH - JOHTH	210
8	CONTINUE	220
ğ	RTESUMEH+(TRM1+SUM+TRM2)	200
<u></u>	RETURN	
	END	260
		0
	DIMENSION $T(1), X(6), Y(6), A(6)$	10
€		UNBAR004
C	MODIFIED 7/62	UNBAR005
- C	TO DO QUADRATIC AND LINEAR INTERPOLATION ALSO	UNBAR006
C		UNBAR007
	N = 3	30
** ***	N2=	40
	IF (T(II)-3.) 700+701+702	50
· 701	IF (T(11)+0.) 00,701,704	60
704	IF ((11)-2.) 705,706,701	70
705-	· N·2-1	

-	TGKAD = HC+(T-TPS)	2720
	IF (PRINT.EQ.1) WRITE(6,83)GRAD,TGRAD	2730
- 83-	FURMAT "(51X;***C3*(CI3+CPS) =*;E12.5 / 54X;*HC*(T-TPS) =*;E12.5)	2740
28	RETURN	2750
		2760

RHLTF(A,B,C,D,E,N) = E*A**(1-N)*B**N*EXP(C*D*(1.-B/A)/(1.+D*(1.-

0

10

20

30

40

50

60

70

80

90

100

110

90

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SUBROUTINE TRAPP (U, V, NPART, RIESUM)

FUNCTION DEFINING CP(X) FOR RHET FUNCTION CP(X) IS ASSUMED TO VARY LINEARLY WITH X

DEFINE RHET FOR VARIABLE CP, CPS, TP

FUNCTIONS DEFINING INTEGRANDS

CPXF(X+Y+Z)=(X-Y)/(1.-Y)+Z

- -

.

REAL KO+KC3

FUX11(X,R)=X++2+R

GO 10 707

N=NPART-1

PARTENPART

UPH = U+H

SUM=0.

H=(V-U)/PART

NUMERICAL INTEGRATION USING TRAPEZOIDAL METHOD

COMMON /BBBB/DP3+A+KC3+KU+XOA+CP5+CI3+GAMMA+BETA

B/A)))

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104

796 N		
707 N	12= 1	
701 1	I = II+1	
702 N	11 = N + 1	
	IF ($T(L) + 0$,) 60,60,51	
60	KK = -1	
	22 = 0.	
	60 TO 9999	
51 s	$\mathbf{x} = \mathbf{T}(\mathbf{i})$	
		• •
52 N		
50 6		
63		
1		
	JZ = NX+11+1	
	F(XX - I(JI)) 301 + 306 + 400	
- 411[]		
T 0 0 -	1F (XX-1(J)) 3114+304+302	
302 (CONTINUE	
309 H		
7	(X = T(J2))	
308 -	IX1 = J2-N	
		
301 k		
>	$(X = \{(j)\})$	
306 🔍	$x_1 = J_1$	
	60 TG 305	
304	ボデ (JーJ1-1) 301;305;307	
-307		
303 .	$I \times 1 = J - I I 2$	
305 (CO1471:4UE	
y	$x_{11} = x_{X}$	
	1F (14Y) 1500+ 1500+ 3000	
1500	LO 1599 L=1.W1	
:	LY = JXI + IX	
	Y(L) = T(LY)	
1599	JX1 = JX1 + 1	
. 6	50 TU 54	
- 3008		
	12 2 J2+NY	
1	F(YY-T(31))311:316:401	
401 .	D0 312 J=J1+J2	
IVA -	TF (YY=T4,1) 1 314,314,319	
312 (CONTINIA	
310-4	······································	
1	νη στη 10 (Υ - Τι 10)	
310		
110 0		
2.1 4 L		
	λτ αν πτ /ν ω πεειξι	
314		
-010-1		

· G91 046	i1-3 0	
	1F (J=J1+1) 311,316,317	700
317	IF(J-J2) = 313,318,319	710
315	CGITTINGE	720
	JX? = JX1	
	LY = JY1 + NY * (JX2 - II - 1)	750
	LY1 = LY	760
	$10 \ 3099 \ L=1101$	770
	Y(L) = T(LY1)	780
	LY1 = LY1+NY	800
3099	JX2 = JX2+1	810
		820
3098	Y(1) = ZZ	840
	DU 4400 I=1.14	850
		860
	Y(1+1) = 0,	870
	Y(1+1) = Y(1+1) + T(1Y1) * X(MM)	880
- 4050	LY1 = LY1+NY	900
4400	CONTINUE	910
<u> </u>		
- 4199	X(L) = 1(J1) .141 = .14141	930
44.77	XINT = YY	940
• •	1= 1	960
54	0 = 1.	970
	X(N+3) = X(2)	
····		1000
	A(J+1) = X(J+1) - X(J)	1010
· ·	TPAL1 = XINT - X(J)	1020
	$\frac{11}{12} \times \frac{11}{12} \times 11$	1030
•••	x(1) = 0.	1040
	- X(2) = 0	1060
	X(3) = 0.	1070
	X(J) = 1.0	1000
<u> </u>	- 60 TO 59 	
57	D = D * TPAL1	1110
	60 TU (711+712+713) +N	1120
	$\frac{60}{55} = \frac{10}{55}$	1130 1140
712	X(J) = -TPAL1	1150
	60 TO 55	
713	X(J) = (X(J+2)-X(J)) * TPAL1	1170
55	A(1) = A(N+2)	1190
_	22 = A	1200
	00 56 J=1+N1	12:10
<u> </u>		
-56		1240
59	1 39 - 39 9999	1250
- 9999	₩K to set the set of	1260
		1270
	•	1280

BLOCK DATA 0 COMMON /MUVST/VISVST(30) 10 C BLOCK DATA FOR VISCOSITY VS TEMPERATURE UATA (VISVST(1)+1=1+30) / 0.0+1.+13.+0.0+ -20 360++540++720++900++1080++1260++1440++1620++1800++1980++ 30 × 2160.,2340.,2520., 40 Х X .048 E-4+.070 E-4+.093 E-4+.117 E-4+.141 E-4+.164 E-4+ 56 * -180 E-41.207 E-41.228 E-41.247 E-41.266 E-41.285 E-41 60 Х .302 E-4/ 70 80 ΕΙνύ

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	BLUCK DATA	0
	COMMUN /FT2/THLVP(70),THLH4(42),THLH3(42),SHTHL1(34),SHTHL2(34),	10
	1 SHTBL3(34), SHTBL4(34), ZTBLD(46), ZTBLAP(46), ZTBLA(40)	20
C	BLUCK DATA FOR FUNCTIONS OF TEMPERATURE	
	DATA (THEVP(I)+I=1+70)/10.0+1.+33.0+0.0+492.+519.+528.37+529.08+5	30
	134.601534.717538.341543.917545.737500.201569.987579.261579.481595.	40
	234,610.13,614,08,618.07,627,49,628,82,645.68,650,76,665,57,674.99,	50
	3686.13,692.39,m97.47,744., 798.;852.;9 42. :1032.;1<u>1</u>22.;1176.;.0520,.	60
	41479,.2011,.2069,.2398,.2436,.2823,.2920,.3539,.5453,.7367,.9727,.	70
	5982311.510+2.20412.46212.74013.40713.56215.24015.97118.06519.7111	80
	01.91,13.40,14.70,33.80,73,48,147.0, 3 82.1, 823.0,1528.,2131./	90
		- 1 00
	6720.,900.,1060.,1260.,1440.,1620.,1800.,1980.,2150.,2340.,2520.,27	110
	900.0,2880.,3068.,-1991.342~1951.02,-1919.50,-1896.04,-1895.70,-188	120
	x2.55,-1878.12,-1879.46,-1884.63,-1892.38,-1901.94,-1912.88,-1924.8	130
	x5+-1937.54+-1950.74+-1964.45+-1978.32+-1992.36+-2006.62/	140
	DATA (TBLH3(1)+1=1+42)/0.0+1.+19.0+0.0+0.0+180.+360.+536.4+540.+	150
	~~ X720++900++1000++1260++1440++1620++1800++1980++2160++2340++2520 ++27	160
	x00.,2880.,3060.,353,07,1055,57,1103.97,1159.35,1160.40,1213.46,125	170
	x9.64,1298.00,1329.71,1355.28,1375.57e1391.11,1402.52,1410.13,1414.	180
	x57,1416,37,1416,05,1414,15,1410,56/	190
	DATA (SHTBL1(1)+1=1+34)/0.0+1.+15.0+0.0+540++720+900++1080++1260	200
	1.,1440.,1620.,1800.,1980.,2160.,2340.,2520.,2700.,2880.,3060.,.380	210
	<u>~~24,,4601,5203,15784,5222,50577,50077,105,7442,57675,7079,5000</u>	220
		230
	DATA (SHIN-2(1))1=1/34/70.0/1./10.0/0/00/720./900./1000./1260	240
	5,1440,1620,1300,1980,12160,2340,2320,22700,2880,13060,1.500	250
-		200
	/5//90/4//9512//25/// 0//////////////////////////////	270
		200
		290
	X51+24951+25241+25691+25641+25621+27361+27901+26961+28761+29141+294	300
		310
	UATA 151115441171441709071071071070707070707007007700770071200071200	280
		000 A448
	XX47360-3 760-3 900370677007364079706710675604047360007360200736000347 XX 7460-3 760-3 9001.3 6009.3 09887	340
	NO. (110010) (07010)067110000610)7600/	350
	END .	200

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| E -         | BLOCK DATA FUR SPECIFIC HEAT VS TEMPERATURE                                        |       |
|-------------|------------------------------------------------------------------------------------|-------|
|             | COMMION /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)                           | 10    |
|             | DA(A (CFTBLt(I)) = 1,34) / 0., 1., 15., 0.,                                        | 20    |
| C           | TEMPERATURES                                                                       |       |
|             | X 540, / 720, / 900, / 1080, / 1260, / 1440, / 1620, / 1800, /                     | 30    |
| •           | x 1960. , 2160. , 2340. , 2520. , 2700. , 2880. , 3060. ,                          | 40    |
| £           | SPECIFIC HEATS                                                                     |       |
|             | X 3.4194, 3.4596, 3.4685, 3.4765, 3.4899, 3.5151, 3.5454, 3.5006,                  | 50    |
|             | x 3.6208; 3.6654; 3.7150; 3.7696; 3.8291; 3.8802; 3.9288 /                         | 60    |
| _           | UAIA (CFTBL2(I), I=1, 34) / $0 + 1 + 15 + + 1$                                     | 70    |
| <del></del> | TEMPERATURES                                                                       |       |
|             | x 540, , 720, , 900, , 1080, , 1260, , 1440, , 1620, , 1800, ,                     | 80    |
| •           | x 1950. + 2160. + 2340. + 2520. + 2700. + 2880. + 3060. +                          | 90    |
| С           | SPECIFIC HEATS                                                                     |       |
| •           | X .2465 / .2495 / .2524 / .2569 / .2624 / .2682 / .2738 / .2790 /                  | 100   |
|             | X .2836 / .2878 / .2914 / .2946 / .2974 / .2998 / .3n19 /                          | 110   |
|             |                                                                                    | 120   |
| С           | TEMPERATURES                                                                       |       |
|             | X 540. / 720. / 900. / 1080. / 1260. / 1440. / 1620. / 1800. /                     | 130   |
| _           | x 1960. / 2160. / 2340. / 2520. / 2700. / 2880. / 3060. /                          | 140   |
| C           | SPECIFIC HEATS                                                                     |       |
|             | X .5005 / .5424 / .5891 / .6344 / .6773 / .7176 / .7553 / .7905 /                  | 150   |
|             | <del>- X . 236 v . 8541 v . 8823 v . 9075 v . 9304 v . 9512 v . 9697 /</del>       | · 160 |
| -           | DATA (CFTBL4(1),I=1+34) / 0++ 1++ 15++ 0++                                         | 170   |
| €-          | TEMPERATURES                                                                       |       |
|             | X 540. / 720. / 900. / 1080. / 1260. / 1440. / 1620. / 1800. /                     | 180   |
| • •         | X 1960. / 2160. / 2340. / 2520. / 2700. / 2880. / 3060. /                          | 190   |
| С           | SPECIFIC HEATS                                                                     |       |
|             | <del>···X •3604 v •4601 v •5261 v •5784 v •6212 v •6577 v •6899 v •7185 v ··</del> |       |
|             | x •7442 + •7673 + •7879 + •8063 + •8226 + •8373 + •8503 /                          | 210   |
| ·· · •      |                                                                                    | 220   |
|             |                                                                                    |       |
| **          |                                                                                    |       |

| ç        | BLUCK DATA<br>HOCK DATA FOR HEAT OF REACTION VE TEMPEDATURE      | 0   |
|----------|------------------------------------------------------------------|-----|
| ~        | COMMON /CCC/H4TBL(40)+H3TEL(40)                                  | 10  |
|          | DATA -(H4TH) (I) + I=1,40) / 0.1 1. 18. 0.1                      | 20  |
| С        | TEMPERATURES                                                     |     |
|          |                                                                  |     |
|          | X 1260. 1440. 1620. 1800. 1980. 2160. 2340.                      | 40  |
| ·        | × 2529 2709 - 2800 - 3060                                        | 50  |
| С        | HEALS AF REACTION                                                | 50  |
| •        |                                                                  | 60  |
|          |                                                                  | 00  |
|          | x-1884.63/-1892.38/-1901.94/-1912.88/-1924.85/-1937,54/-1950.74/ | 70  |
|          | <del>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</del>                 |     |
|          | DATA (H3TBL(1)/I=1/40) / 0., 1., 18., 0.,                        | 90  |
| <b>G</b> | - TEMPERATURES                                                   |     |
|          | X 180. / 360. / 535.4 / 540. / 720. / 900. / 1080. /             | 100 |
| ••• ••   | A 1260 1440 1620 1800 1980 2160 2340                             | 110 |
|          | X 2520 . 2700 2800 . 3060 .                                      | 120 |
| c        |                                                                  | 120 |
| -0       |                                                                  |     |
|          | X1055.57 (1103.97 (1159.35 (1160.40 (1213.46 (1259.64 (1298.00 ) | 130 |
| ••• ··-  | x1329.71 /1355.28 /1375.57 /1391.11 /1402.52 /1410.13 /1414.57 / | 140 |
|          | X1416.37 /1416.05 /1414.15 /1410.56 /                            | 150 |
|          | END                                                              | 160 |
|          | _ · _ /                                                          |     |

|   | BLOC            |                                                            |    |
|---|-----------------|------------------------------------------------------------|----|
| C | BLUC            | C DATA TABLE OF VAPOR PRESSURE VS TEMP (USED TO FIND TVAP) | 3  |
|   | <del>UATA</del> | (VPTCL(1)+1=1+44) / 0. + 1. + 20. + 0. +                   | 20 |
|   | X               | 50. • 100. • 150. • 200. • 250. • 300. • 350. • 400. •     | 3( |
|   | X               | 450. • 500. • 550. • 600. • 650. • 700. • 750. • 800. •    | 40 |
|   | ^               | 350. , 900. , 950. , 1000.,                                | 5( |
|   | X               | 770. 1 820. 1 855. 1 880. 1 905. 1 925. 1 945. 1 965. 1    | 60 |
|   | X               | 960. + 995. +1010. +1025. +1035. +1050. +1060. +1070. +    | 79 |
|   | ****            |                                                            | 80 |
|   | END             |                                                            | 90 |

END

|   | CLUCP DATA                                                      | 0   |
|---|-----------------------------------------------------------------|-----|
|   | COMMON /LIZTEL/BHVST(16),DHLVST(18)                             | 10  |
| С | BLOCK DATA TABLES FOR DELHV AND DELHL VS TEMP (USED TO FIND HV) |     |
|   | UA1A (UHVST(I),I=1,18) / 0., 1., 7., 0.,                        | 20  |
|   | x 100. , 360. , 534.6 , 540. , 720. , 900. , 1080. ,            | 30  |
|   | A 1390.16 , 1332.82 , 1280.02 , 1279.12 , 1237.79 , 1208.80 ,   | 40  |
|   | A                                                               | 50  |
|   | DATA (DHLVST(I)\$1=1+13) / 0++ 1++ 7++ 0++                      | 60  |
|   | A 100. , 360. , 534.6 , 540. , 720. , 900. , 1080. ,            | 70  |
|   | K 652.14 + 665.96 + 679.61 + 679.89 + 700.89 + 733.19 + 777.22  | 80  |
|   | λ /                                                             | 9D  |
|   | ÉNU -                                                           | 100 |
|   |                                                                 |     |

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## TWO-DIMENSIONAL STEADY-STATE MODEL

| C MAIN PROGR                           | RAM DOES REACT                         | OR CALCULATIONS FOR LIQUID REGIONS                    |                                  |
|----------------------------------------|----------------------------------------|-------------------------------------------------------|----------------------------------|
| C                                      | *****                                  | ₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽₩₽                | ******                           |
| C. DESCRIPTION                         |                                        |                                                       |                                  |
| C                                      |                                        | A FUNCH CARDS FOLLOWS                                 |                                  |
| C                                      | • • • • • •                            |                                                       | FORMAT                           |
| C CARD 1                               |                                        | CONTAIN NEASE (ONLY ONE CARD 1 PER RUN)               | " <del>(13)</del>                |
|                                        |                                        | (CARDS 2 THRU 21 SHOULD<br>BE REPEATED FOR EACH CASE) |                                  |
| C CARD 2                               | COL'S 1-80                             | TITLE CARD ANY ALPHANUMERIC                           | (14A6)                           |
| с                                      | ······································ | INFORMATION DESIRED                                   |                                  |
| C CAND 3                               | COL'S 1-3                              | CONTAIN NRINGS                                        | (13)                             |
| C                                      | COL'S 4-6                              | CONTAIN NOFZ                                          | (13)                             |
| C CARD #                               |                                        | CONTATN F/43                                          | 150 44                           |
|                                        | UL'S 1=8<br>                           | CUNIAIN F(1)                                          | (には。4)<br><del>- (ドメ: 山</del> )・ |
| Č                                      | 17-24                                  | F(3)                                                  | (E8.4)                           |
| C                                      | 25-32                                  | F(4)                                                  | (E8.4)                           |
| C                                      | 33-40                                  | F(5)                                                  | (E8.4)                           |
| e                                      | 41-48                                  | F(6)                                                  | (E8.4)                           |
|                                        | 49-56                                  | F(7)                                                  | (E8.4)                           |
| с<br>с                                 | 65-72                                  |                                                       | (58.4)                           |
| <b>G</b> - 7 - 7                       | 72-80                                  | F(10)                                                 | (E8.4)                           |
| C                                      | ( WHERE                                | THE SUBSCRIPT INDICATES THE RING NUMBER )             |                                  |
| C CARD 5                               | CONTAINS GO                            | S FORMAT EXACTLY AS IN CARD 4                         |                                  |
| C CARD 6                               | CONTAINS 201                           | 5 FORMAT EXACTLY AS IN CARD 5                         |                                  |
| G CARD 7                               | COL'S 1-10                             | CONTAIN ALPHAS                                        | (E10.5)                          |
| <b>G</b>                               | 11-20                                  | HF                                                    | (210.5)                          |
| C                                      | 21-30                                  | R                                                     | (E10.5)                          |
| ç                                      | 31-40                                  | MN2114                                                | -(E10.5)                         |
|                                        | 41-50                                  |                                                       | (E10.5)                          |
|                                        | <del>51~60</del><br>61-70              |                                                       | (E10.5)                          |
| Č                                      | 71-70                                  |                                                       | (E10.5)                          |
| č                                      | /1 00/                                 |                                                       | ([10:0]                          |
| C CARD U                               |                                        | CONTAIN ALPHAR                                        | -(E10.5)                         |
| C                                      | 11-20                                  | AGM                                                   | (E10.5)                          |
| <b></b>                                | 21-30                                  | BGM                                                   | (E10.5)                          |
| C                                      | 31-40                                  | KP                                                    | (E10.5)                          |
| •••••••••••••••••••••••••••••••••••••• | 41 <del>~50</del>                      | TF************************************                | (E10.5)                          |
| <u> </u>                               | 51-60                                  | UP                                                    | (E10.5)<br>-+ <del>510.5</del>   |
| č                                      | 71-80                                  | NMAX2                                                 | (E10.5)                          |
| - <del>C</del>                         |                                        |                                                       |                                  |
| C CARD 9                               | - COL'S- 1-10                          | CONTAIN P                                             | (E10.5)                          |
| C                                      | 11-20                                  | ZEND                                                  | (E10.5)                          |
| <u> </u>                               |                                        |                                                       | -1E10-5)                         |
| ~                                      | モールク                                   |                                                       | 1510 51                          |

|                                                                                                          | 1-60 RADIUS (E10.5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| (THE TA                                                                                                  | BLE FOR CALALYST PARTICLE RADIUS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| VS AXI                                                                                                   | AL POSITION AND RADIAL POSITION FULLOWST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| CAND +0                                                                                                  | 1-8 CONTAIN THE NUMBER 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                          | 9-16 CONTAIN THE NUMBER 1 (E8.4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1                                                                                                        | 7-24 CONTAIN NOFE (FLOATING PT.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2                                                                                                        | 25-32 CONTAIN NRINGS (FLOATING PT.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                          | FOR THE INTERPOLATION TABLE USED TO OBTAIN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                                                                                          | THE CAT. PARTICLE RADIUS AS A FUNCTION OF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                          | AXIAL DISTANCE AND RADIAL DISTANCE ****                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                          | CONTATAL THE AVIAL STATION 7 VALUES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| CARDS 11A,118,                                                                                           | CUNIAIN INE AALAL DIBILUN & VALULU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                          | 10 PER CARD, COL'S 1-80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| CARDS 124,128,                                                                                           | CONTAIN THE RADIAL STATION RAD VALUES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                          | $\frac{(10FB.4)}{(10FB.4)}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                          | IU PER CARUF CVE 3 1-00 **********************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CARUS 134,138                                                                                            | CONTAIN THE CATALYST PARTICLE RADII AS FUNCTIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                          | OF AXIAL AND RADIAL PUSITION WITHIN THE REACTOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                          | $A(1,1), A(1,2), \ldots, A(1,NRING5)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                          | A(2)1) A(2)2) 0 A (2) NA(D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                          | • • •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| * -                                                                                                      | $A(NOFZ,1), A(NOFZ,2), c_0, A(NOFZ,NRINGS)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                                                                                                          | 10 PER CARD, COLVS 1-80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| (THE T                                                                                                   | ABLE FOR CATALYST PARTICLE SURFACE AREA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <del>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</del>                                                              | TAL DISTANCE AND RADIAL DISTANCE FOLLOWST                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                                                                                                          | TADLE TO THENTICAL TO THAT FOR PARTICLE RADIUS VS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| •                                                                                                        | ADLE IS IDENTIAL BACTTON EVEDT THAT THE RADII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                                                                          | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                          | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| CARD 14                                                                                                  | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| CARD 14                                                                                                  | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THEEE CANDS ARE IDENTICAL TO CARDS 114-115                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| CARD 14<br>CARDS 15A+15B++++                                                                             | THESE CARDS ARE IDENTICAL TO CARDS 11A,118,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| CARD 14<br>CARDS 15A,15B,                                                                                | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,115,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,12B,                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| CARD 14<br>CARDS 15A+15B+<br>CARDS 16A+16B+                                                              | THESE CARDS ARE IDENTICAL TO CARDS 12A,12B,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| CARD 14<br>CARDS 15A+15B+<br>CARDS 16A+16B+<br>CARDS 1** 17B+                                            | THESE CARDS ARE IDENTICAL TO CARDS 12A,12B,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CARD 14<br>CARDS 15A+15B+<br>CARDS 16A+16B+<br>CARDS 1 <sup>++</sup> 17B+                                | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,115,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,12B,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A<br>FUNCTION OF AXIAL AND RADIAL POSITION WITHIN THE<br>HEACTOR AND SAME FORMAT AS CARDS 43A,13B,                                                                                                                                                                                                                                                                                              |
| CARDS 15A+15B+<br>CARDS 15A+15B+<br>CARDS 16A+16B+<br>CARDS 1* 17B+                                      | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,118,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,128,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A<br>FUNCTION OF AXIAL AND RADIAL POSITION WITHIN THE<br>REACTOR SAME FORMAT AS CARDS \$3A,138,                                                                                                                                                                                                                                                                                                 |
| CARD 14<br>CARDS 15A+15B+<br>CARDS 16A+16B+<br>CARDS 1 <sup>**</sup> 17B+                                | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,118,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,128,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A<br>FUNCTION OF AXIAL AND RADIAL POSITION WITHIN THE<br>REACTOR SAME FORMAT AS CARDS 43A,138,                                                                                                                                                                                                                                                                                                  |
| CARDS 15A,15B,<br>CARDS 15A,15B,<br>CARDS 16A,16B,<br>CARDS 1 <sup>**</sup> 17B,                         | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,115,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,12B,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A<br>FUNCTION OF AXIAL AND RADIAL POSITION WITHIN THE<br>REACTOR SAME FORMAT AS CARDS 43A,13B,                                                                                                                                                                                                                                                                                                  |
| CARDS 15A+15B+<br>CARDS 15A+15B+<br>CARDS 16A+16B+<br>CARDS 1 <sup></sup> 17B+<br>(THE<br>PART           | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,118,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,128,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A<br>FUNCTION OF AXIAL AND RADIAL POSITION WITHIN THE<br>REACTOR SAME FORMAT AS CARDS 43A,138,                                                                                                                                                                                                                                                                                                  |
| CARDS 15A+15B+<br>CARDS 15A+15B+<br>CARDS 16A+16B+<br>CARDS 1* 17B+<br>(THE T<br>PART)                   | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,118,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,128,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A<br>FUNCTION OF AXIAL AND RADIAL POSITION WITHIN THE<br>REACTOR SAME FORMAT AS CARDS 43A,138,<br>IABLE FOR INTERPARTICLE VOID FRACTION OF CATALYST<br>ICLES VS AXIAL AND RADIAL POSITION FOLLOWS)<br>TABLE IS IDENTICAL TO THAT FOR PARTICLE RADIUS VS<br>AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII                                                                                      |
| CARDS 15A+15B+<br>CARDS 15A+15B+<br>CARDS 16A+16B+<br>CARDS 1** 17B+<br>(THE PART)                       | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,11B,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,12B,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A<br>FUNCTION OF AXIAL AND RADIAL POSITION WITHIN THE<br>REACTOR SAME FORMAT AS CARDS 43A,13B,<br>IABLE FOR INTERPARTICLE VOID FRACTION OF CATALYST<br>ICLES VS AXIAL AND RADIAL POSITION FOLLOWS)<br>TABLE IS IDENTICAL TO THAT FOR PARTICLE READIUS VS<br>AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY INTERPARTICLE VOID FRACTIONS                                     |
| CARDS 15A,15B,<br>CARDS 16A,16B,<br>CARDS 1 <sup></sup> 17B,<br>(THE<br>PART)                            | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,118,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,128,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A<br>FUNCTION OF AXIAL AND RADIAL POSITION WITHIN THE<br>REACTOR SAME FORMAT AS CARDS 43A,138,<br>IABLE FOR INTERPARTICLE VOID FRACTION OF CATALYST<br>ICLES VS AXIAL AND RADIAL POSITION FOLLOWS)<br>TABLE IS IDENTICAL TO THAT FOR PARTICLE RADIUS VS<br>AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY INTERPARTICLE VOID FRACTIONS                                      |
| CARDS 15A+15B+<br>CARDS 15A+15B+<br>CARDS 16A+16B+<br>CARDS 1** 17B+<br>CARDS 1** 17B+<br>CARDS 1** 17B+ | AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY PARTICLE SURFACE AREAS<br>THIS CARD IS IDENTICAL TO CARD 10<br>THESE CARDS ARE IDENTICAL TO CARDS 11A,11B,<br>THESE CARDS ARE IDENTICAL TO CARDS 12A,12B,<br>CONTAIN THE CATALYST PARTICLE SURFACE AREAS (AP) AS A<br>FUNCTION OF AXIAL AND RADIAL POSITION WITHIN THE<br>REACTOR SAME FORMAT AS CARDS 43A,13B,<br>IABLE FOR INTERPARTICLE VOID FRACTION OF CATALYST<br>ICLES VS AXIAL AND RADIAL POSITION FOLLOWS)<br>TABLE IS IDENTICAL TO THAT FOR PARTICLE RADIUS VS<br>AXIAL AND RADIAL POSITION EXCEPT THAT THE RADII<br>ARE REPLACED BY INTERPARTICLE VOID FRACTIONS<br>THIS CARD IS IDENTICAL TO CARD 10 |

| CARDS 204,208,                                 | THESE CARDS ARE IDENTICAL TO CARDS 124,128,                                                  |            |
|------------------------------------------------|----------------------------------------------------------------------------------------------|------------|
| C<br><del>G - Cards 21A7<b>21</b>B7</del><br>C |                                                                                              | 5 A        |
|                                                | REACTOR SAME FORMAT AS CARDS 13A1138                                                         |            |
| 6 · · · · · · · · · · · · · · · · ·            | ·<br>                                                                                        |            |
| ч ++++++++++++++++++++++++++++++++++++         | ┍╾╾╾┶⋇⋍⋇⋍⋇⋍⋇⋍⋇⋍⋇⋍⋇⋍⋇⋍⋇⋎⋺⋾⋇∊₩⋳<br>ijij⋽⋼⋈⋈⋺⋈⋵∊⋈⋈⋏⋎1∊⋈⋈⋵⋎⋺⋴⋉∊⋈⋳                                | ****       |
| COMMEN /BLOKI/F                                | 25),H(25),RAD(25),GAT20(25),G0(25),Z0(25)                                                    | 1          |
| COMMON /BLOK2/AT                               | APTDELTA, DR. DFA, DON2H4, DONH3, R, CGM, RADIUS, NMAX1,                                     |            |
| X NMAX2+AL                                     | PHA1, ALPHA2, BETA, AGM, BGM, P, ZEND, MH2, MN2, MNH3, MN2H4                                 |            |
| COMMON /BLOKS/K                                | ♪KU↓KP↓KC3↓KC4↓HF↓HL↓HV;TF↓CF↓CFBAR↓GAMMA↓C4↓NRING5<br>\\\\$7/234↓.AB\\\$7/234↓.BF↓\\$7/234↓ | (          |
| COMMON /AAA/VISY                               | /SE(30)+TRLVP(6R)                                                                            |            |
| COMMON /CCC/H4TE                               | BL(40),H3TBL(40)                                                                             |            |
| COMMON /LIZTBL/C                               | HVST(18);DHLVST(18)                                                                          | 1          |
| COMMON /DAVTBL/V                               | /PTBL(44)                                                                                    |            |
| DIMENSION ZL (25)                              | ·TI (25) ·7I V(25) ·TI V(25) · I7(25) ·77(25,75) ·TT(25,75)                                  | 1          |
| DIMENSION TITLE (                              | ++++                                                                                         | 12         |
| READ (5,702) NCA                               | ISE                                                                                          | 1          |
| 702 FURMAT (13)                                |                                                                                              |            |
| KOUNT = 1                                      |                                                                                              | 1          |
|                                                |                                                                                              | 1          |
|                                                | The                                                                                          | 1          |
| 609 FORMAT (+1+,28X,                           | 1446//)                                                                                      | 1          |
| HEAD INPUT CONSTAN                             | H5-                                                                                          |            |
| READ (5,810) NRI                               |                                                                                              | 2          |
| 8FAD (5-811) (GI                               | 1///1=1/NRINGS/<br>)//)./=1.NRINGS/                                                          | 2          |
|                                                | )(1))(1)(1)(0))                                                                              | 2          |
| 810 FORMAT (213)                               |                                                                                              | 2          |
| 811 FORMAT (1968.4)                            |                                                                                              | 2          |
| LINE SUBSCRIPT VIV                             | REFERS TO THE ANNULAR REGIONS                                                                |            |
| 1 = 0                                          | ED IVEVVININGS FROM THE CENTER OUTWARD                                                       | 2          |
|                                                | PHA3+HF+R+MN2H4+MNH3+MN2+MH2+ALPHA1+ALPHA2+AGM+BGM+                                          | 2          |
| X KP+TF+CF+N                                   | MAX1, NMAX2, P, ZEND, DON2H4, DONH3, CGM, RADIUS                                             | 2          |
| 800 - FORMAT (BE10.5)                          |                                                                                              | <u>2</u>   |
| WRITE (6,36) (J)                               | )F(J);GU(J);ZU(J);JZ1;NR1NGS)<br>                                                            | 3 2        |
| X701 /(47X+12+5X                               | 3E(2.5)                                                                                      | 3          |
| WRITE (6,37) ALF                               | PHA3+HF+R+MN2H4+MNH3+MN2+MH2+ALPHA1+ALPHA2+AGM+BGM+                                          | 3          |
| X KP+TF+CF+N                                   | MAX1, NMAX2, P, ZEND, DON2H4, DONH3, CGM, RADIUS                                             | 3          |
|                                                | -PHA3 @*E10.4+3X+*HF-=*F10.4+3X+*R-=*E10.4+3X+*MN2H                                          |            |
| X4 = E10.473X7M                                | NH3 =*E30,4/3X/*MN2 =*E10,4/3X/*MK2 =*E10,4 //                                               | 3          |
| X IBGM =IF1(                                   | 1.4.3X.1KD =1F10.4.3X.1TF =1F10.4.3X.1CF =1F10.4 //                                          | ت<br>3     |
|                                                | E #*E10+4,3X,*NMAX2 #*E10,*;3X;*P #*E10.4,3X;                                                | 3          |
| X 'ZEND ='EI                                   | 10.4.3X. D04 ='E10.4.3X. D03 ='E10.4.3X. CGM ='E10.                                          | - 4        |
|                                                |                                                                                              |            |
| NZTBL = NOFZ+NRI                               | ING HNOF ZANK ING 5+4                                                                        | 4;         |
| NOFZ5 = NOFZ40                                 |                                                                                              | 14.<br>14. |
|                                                | HM65                                                                                         | 4          |
| C READ IN A, AP, DELTA                         | A 15 2 TABLES (DIVARIATE)                                                                    | •          |
|                                                | 52+1++282+43                                                                                 |            |
| 48 FURMAT (4E8,4)                              |                                                                                              | 4          |
| · · · · · · · · · · · · · · · · · · ·          | 119                                                                                          |            |
|                                                | ·                                                                                            |            |

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| 61-30                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUAD (E-41) (ANGRETS, THE NORRES)                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| KEAD (3/41) (AVSZ(I)+I=3/NOFZ4)                          | 480                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FUKPAL (1000+4)<br>DEAD (5.41) (ANGB(1), T-MAEBE, MAEBE) | 490                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| READ (37417 (AV32(1))1-NUF23/NUF20)                      | 500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                          | 510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 12 = 10120100000000000000000000000000000                 | 520                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| READ (5+41) (AVS7(1)+1=11+19)                            | 530                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 11 = 12+1                                                | 540                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| I2 = I1 + NKINGS - 1                                     | 560                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| CONTINUE                                                 | 570                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| READ (5,40) (APV52(1),1=1,4)                             | 580                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| READ (5,41) (APVSZ(1),1=5,NOFZ4)                         | 590                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| REAU (5:41) (APVSZ(1), I=NOFZ5, NOFZ6)                   | 600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 11 = NOF26+1                                             | 610                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 12 = NUFZ6+NRINGS                                        | 620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| UG 43 J=1.NOFZ                                           | n30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| - READ - (5/41) - (APVS2(1)/I=11/12)                     | 640                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| I1 = I2 + 1                                              | 650                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| I2 = I1+HRINGS-1                                         | 660                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| CONTINUE                                                 | 670                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| (5)40) (DELVSZ(1), I=1)4)                                | 680                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                          | 690                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| TA - NOTZEAN                                             | 700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 11 - 107ZOTI                                             | 710                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| $\frac{1}{10} = \frac{1}{10} = 1$                        | /20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| READ (5.41) (DELVSZIT).T-T1.T2)                          | 730                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                          | 740<br>760                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 12 = 11+nh1ng5-1                                         | 730<br><b>76</b> 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| CONTINUE                                                 | 700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ANITE (by604)                                            | 780                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FORMAT (///59X, 13H A VS Z TABLE)                        | 790                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| WRITE (6,45)- (AVSZ(1),I=1,4)                            | 800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| WRITE (6,50)                                             | 810                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| -FORMAT ( /- /- )                                        | 820                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| WRITE (6,46) (AVSZ(I),I=5,NOFZ4)                         | 830                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| WKITE (6,50)                                             | 640                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| WRITE (6,46) (AVSZ(I),I=NOFZ5,NOFZ6)                     | 850                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| WRITE (6,50)                                             | 860                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FURMAT (39X+4E13.5)                                      | 870                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FORMAT (19613,5)                                         | <del>88</del> 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 11 = 10+26+1                                             | 890                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 12 = MOFZG+MRINGS                                        | 900                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                          | 910                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| WRITE 101407 (AA2C(1))12111121                           | 920                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                          | 930                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                          | 940                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| UUNIIAUL<br>WDITE (44.406)                               | 950                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| WRITE (070007)<br>Format (777508,13000 VS 7 TARLE)       | 960                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                          | 970                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| wRITE (6.50)                                             | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                          | フラひ<br>キーハーパ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| wRITE (6,50)                                             | 1010                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| WRITE (6,46) (APVSZ(1), I=NUFZ5, NOFZ6)                  | 1020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| WRITE (0,50)                                             | 1030                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 11 = NOF26+1                                             | 1040                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 12 = NOFZ6+NRINGS                                        | 1050                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| WRITE (6,46) (APV5Z(1), J=11,12)                         | 1070                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                          | SL-30<br>READ (5,41) (AVSZ(1),I=5,NOFZ4;<br>FORMAT (10E8,4)<br>READ (5,41) (AVSZ(1),I=NOFZ5,NOFZ6)<br>II = NOFZ641<br>IZ = NOFZ641<br>IZ = NOFZ641<br>IZ = I+4KIN055-1<br>CUNTIAUE<br>READ (5,41) (APVSZ(1),I=1,42)<br>READ (5,41) (APVSZ(1),I=5,NOFZ4)<br>READ (5,41) (APVSZ(1),I=NOFZ5,NOFZ6)<br>II = NOFZ6441<br>IZ = IN44KIN65-1<br>CONTIAUE<br>READ (5,41) (APVSZ(1),I=1,42)<br>READ (5,41) (APVSZ(1),I=1,42)<br>READ (5,41) (DEVSZ(1),I=1,42)<br>READ (5,41) (DEVSZ(1),I=1,42)<br>II = NOFZ644<br>II = IZ44<br>NATIE (6,46) (AVSZ(1),I=1,12)<br>II = IZ44<br>II = |

| 11 = 12+1       1000         12 = 11+NRING5-1       1100         wRITE (0,607)       1110         007 FORMAT (17/757X117)H DELTA VS 2 TABLE)       1120         wRITE (0,645) (DELV52(11)+1=1,4)       1130         wRITE (0,645) (DELV52(11)+1=5,N0FZ4)       1140         wRITE (0,645) (DELV52(11)+1=5,N0FZ4)       1150         wRITE (0,646) (DELV52(11)+1=00FZ5,N0FZ6)       1170         wRITE (0,646) (DELV52(1)+1=11,12)       120         12 = N0FZ64NRIM65       1200         10 49 J=1N0FZ2       1210         wRITE (0,647) (DELV52(1)+1=11,12)       1220         11 = 12+1       1230         12 = N0FZ64NRIM65       1200         wRITE (0,647) (DELV52(1)+1=11,12)       1220         wRITE (0,647) (DELV52(1)+1=11,12)       1220         y       230       12 = 14+NRIM05-1         49 CunTiNUE       1250         wRITE (0,627)       1260         wRITE (0,647) (DELV52(1)+1=1+142)       1280         0 DR = RAD1U57-10ATINRING5)       1280         0 CHALMAT (111)= DATINATNG5)       1280         0 CHALMAT (111)= DATINATNG5)       1300         0 CHALMAT (101)= DATINATNG5)       1300         0 DU 13 J=2-NNIN65       1300         0 DU 1400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ·G91046                                | 1-30                                                              |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------|--------------|
| I2       I1+NRINGS-1       100         WRAIT       (0,607)       1100         WRAIT       (0,607)       1120         WRITE       (6,645)       (0EUS2(I),I=I),I=(A)       1130         WRITE       (6,65)       1140       1140         WRITE       (6,65)       1140       1140         WRITE       (6,65)       1170       1140         WRITE       (6,66)       10EUS2(I),I=I=,N0F25,N0F26)       1160         WRITE       (6,66)       10EUS2(I),I=I=,N0F25,N0F26)       1170         WRITE       (6,66)       10EUS2(I),I=II,I2)       120         11       = N0F264nNING5       1200       100         WRITE       (6,67)       1220       11         II       = I4+NINKS-1       1230       1220         II       = I4+NINKS-1       1240       1240         V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -                                      | 11 = 12+1                                                         | 1080         |
| 48       CONTINUE       1100         607       FORMAT (17/757X117) DELTA VS 2 TABLE)       1110         607       FORMAT (17/757X117) DELTA VS 2 TABLE)       1120         wRITE (6,65)       1130         wRITE (6,64)       DELVS2(1),1=5,N0F24)       1140         wRITE (6,64)       DELVS2(1),1=5,N0F26)       1160         wRITE (6,64)       DELVS2(1),1=100F25,N0F26)       1170         wRITE (6,64)       DELVS2(1),1=11,12)       120         10       9 J=1,N0F26       1200         11       124       N0F2641       1200         110       WRITE (6,64)       DELVS2(1),1=11,12)       1210         112       N0F2641       1200       120         112       N0F2641       1200         111       1241       1230         112       N0F2641       1200         111       1210       1230         112       N0F2       1200         1111       1241       1230         112       N0F2       1200         1110       N110       N110       1200         1110       N110       N110       1200         1111       N00       N110       1200       <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        | I2 = I1 + NRINGS - 1                                              | 1090         |
| wklife (5,607)       1110         607 FORMAT (7/757/17H) OELTA VS 2 TABLE)       1120         wRITE (6,45) (DELVS2(1),1=1.4)       1130         vkRITE (6,45)       1140         wRITE (6,45)       1140         wRITE (6,45)       1160         wRITE (6,46)       (DELVS2(1),1=S,NOFZ4)       1160         wRITE (6,46)       (DELVS2(1),1=NOFZ5,NOFZ5)       1160         wRITE (6,46)       (DELVS2(1),1=11,12)       120         10 wRITE (6,46)       (DELVS2(1),1=11,12)       120         11 = NOFZ641       1230       126         wRITE (6,46)       (DELVS2(1),1=11,12)       120         12 = 11/NOFZ       1210       126         wRITE (6,46)       (DELVS2(1),1=11,12)       126         wRITE (6,46)       12010-VAPOR       1200         wRITE (6,47)       1240       1240         wRITE (10,41,41,41,41,41,41,41,41,41,41,41,41,41,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 48                                     | CONTINUE                                                          | 1100         |
| 667         FORMAT (17/757X117)1 OELTA VS 2 TABLE)         1130           WRITE (6,45) (DELVS2(1),I=1,4)         1130           WRITE (6,45) (DELVS2(1),I=1,4)         1140           WRITE (6,46) (DELVS2(1),I=5,N0FZ4)         1150           WRITE (6,46) (DELVS2(1),I=5,N0FZ6)         1170           WRITE (6,46) (DELVS2(1),I=N0FZ5,N0FZ6)         1170           WRITE (6,46) (DELVS2(1),I=N0FZ5,N0FZ6)         1170           WRITE (6,46) (DELVS2(1),I=11,I2)         120           D0 4 J=1,N0FZ6         120           I1 = Z+1         1230           I2 = NUFZ64NRIM6S         1200           WRITE (6,46) (DELVS2(1),I=11,I2)         1210           WRITE (6,46) (DELVS2(1),I=11,I2)         1210           WRITE (6,47)         1200           Y = ONMAT ('1',22X,'POSITIONS AND TEMPERATURES AT EACH AXIAL STATION IZ70         1200           Y = FORMAT ('1',22X,'POSITIONS AND TEMPERATURES AT EACH AXIAL STATION IZ70         1200           Y = ONMAT ('1',22X,'POSITIONS AND TEMPERATURES AT EACH AXIAL STATION IZ70         1200           Y = ONMAT ('1',22X,'POSITIONS AND TEMPERATURES AT EACH AXIAL STATION IZ70         1200           Y = TADIUS/FLOATINNINGS -         1300           OUTIVUE         1200         1200           OD AND = ZANULAR KINGS -         1300           CONTI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        | WRITE (0+607)                                                     | 1110         |
| WRITE (6,45) (DELVS2(1),1=1,4)       1130         WRITE (6,50)       1140         WRITE (6,50)       1150         WRITE (6,50)       1150         WRITE (6,46) (DELVS2(1),1=5,N0FZ4)       1160         WRITE (6,46) (DELVS2(1),1=N0FZ5,N0FZ6)       1170         WRITE (6,46) (DELVS2(1),1=N0FZ5,N0FZ6)       1190         11 = N0FZ6+1       1200         WRITE (6,46) (DELVS2(1),1=11,12)       1210         WRITE (6,46) (DELVS2(1),1=11,12)       1220         WRITE (6,46) (DELVS2(1),1=11,12)       1210         WRITE (6,46) (DELVS2(1),1=11,12)       1220         WRITE (6,46) (DELVS2(1),1=11,12)       1220         WRITE (6,46) (DELVS2(1),1=11,12)       1220         WRITE (6,46) (DELVS2(1),1=11,12)       1220         Yester (11,1,12)       1220         WRITE (11,1,12)       1200         Yester (11,1,12)       1200         WRITE (11,1,12)       1300 <td< td=""><td>607-</td><td>FURMAT (///STX117H DELTA VS Z TABLE)</td><td>1120</td></td<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 607-                                   | FURMAT (///STX117H DELTA VS Z TABLE)                              | 1120         |
| .RiTe (6,56)       1140         wRITE (6,56)       1150         wRITE (6,56)       1160         wRITE (6,56)       1160         wRITE (6,56)       1160         wRITE (6,56)       1170         wRITE (6,56)       1160         wRITE (6,56)       1170         wRITE (6,56)       1100         12 = N0F26+NRINGS       1200         00 49 JIIN072       1211         wRITE (6,47)       1220         11 = 1221       1230         12 = 11+NRIN05-1       1240         wRITE (6,47)       1220         27 FORMAT (+1+-22A+POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         X       L13010 AND L16010-VAPOR REGIONS*)       1280         OH = RADIUS/FLOAT(NRINGS)       1310         0 DH = ZADIUS/FLOAT(NRINGS)       1310         10 CONTINUE       1320         CALL UNDAR (1970-0, TVAP+KK)       1330         CALL UNDAR (VPTUL:1,P+0, TVAP+0, OELHL+KK)       1350                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        | WRITE (6,45) (DELVSZ(I),I=1,4)                                    | 1130         |
| WRITE (6,46) (DELVS2(1),I=5,N0FZ4)       1150         WRITE (6,46) (DELVS2(1),I=N0FZ5,N0FZ6)       1160         WRITE (6,46) (DELVS2(1),I=N0FZ5,N0FZ6)       1170         I1 = N0FZ64-NINGS       1200         D0 49 J=1,N0FZ       121         WRITE (6,46) (DELVS2(1),I=I1,I2)       1210         D0 49 J=1,N0FZ       121         VMRITE (6,46) (DELVS2(1),I=I1,I2)       121         D1 1 = I2+1       1230         VMRITE (6,46) (DELVS2(1),I=I1,I2)       121         VMRITE (6,46) (DELVS2(1),I=I1,I2)       121         VMRITE (6,46) (DELVS2(1),I=I1,I2)       1200         D0 49 J=1,N0FZ       1240         VMRITE (6,47) (DELVS2(1),I=I1,I2)       1220         VMRITE (6,47)       1240         VMRITE (6,47)       1240         VMRITE (6,47)       1240         VMRITE (6,47)       1240         VMRITE (1,47,47,47,47,47,47,47,47,47,47,47,47,47,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        | */RITE (6:50)                                                     | 1140         |
| WRITE (6,650)       1150         WRITE (6,64)       1170         II = NOF26+INRINGS       1100         12 = NOF26+INRINGS       1200         12 = NOF26+INRINGS       1200         12 = NOF26+INRINGS       1200         11 = 12×1       1220         11 = 12×1       1230         11 = 12×1       1230         12 = TIVMRINGS-1       1240         49       CunTINUE       1250         mRITE (6,27)       1200         0 H = RADIUS/FLOAT(INRINGS)       1270         27       FORMAT (*1*,22x)*POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         28       ConTINUE       1300         0 H = RADIUS/FLOAT(INRINGS)       1300       1220         ConTINUE       1300       1322         101 <continue< td="">       1330       1310         CALL UNDAR (DHUS/FLI/PR/D_0,FDELHVKK)       1350         CALL UNDAR (DHUS/FLI/PR/D_0,FDELHVKK)       <t< td=""><td></td><td>WRITE (6,46) (DELVSZ(I),T=5,NOFZ4)</td><td>1150</td></t<></continue<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        | WRITE (6,46) (DELVSZ(I),T=5,NOFZ4)                                | 1150         |
| WEITE (5.46) (DELVS2(I),I=NOFZ5,NOFZ6)       1170         WITE (5.46) (DELVS2(I),I=NOFZ       1180         11 = NOFZ6+NINGS       1200         D0 49 J=I,NOFZ       1210         WRIE (5.46) (DELVS2(I),I=I1,I2)       1210         WRIE (5.46) (DELVS2(I),I=I1,I2)       1210         11 = 12+1       1230         12 = 11+NNINGS1       1230         12 = 11+NNINGS1       1240         WHIE (5.47) (DELVS2(I),I=I1,I2)       1240         WART (1',22A, 'POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         X LIGUID AND LIQUID-VAPOR REGIONS')       1240         DR = RADIUS/FLOATINNINGS)       1290         C GUTAIN MUPPINTS OF ANNULAR KINGS       1310         RADU(J) = RADUS/LOATINNINGS       1320         GALL UNBAR (VPTBLI)+PO,.TVAP.KK)       1350         CALL UNBAR (VPTBLI)+PO,.TVAP.KK)       1350         CALL UNBAR (VPTBLI)+PO,.TVAP.KK)       1360         CALL UNBAR (UPTS-I)+FINCT       1370         HV = HL+OELHV-OELHL       1380         ULAVF =                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        | WRIJE (6150)                                                      | 1160         |
| WHITE (1,1,50)       1100000000000000000000000000000000000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        | WRITE (6,46) (DELVSZ(1), I=NOFZ5, NOFZ6)                          | 1170         |
| 11 = NOF26+i       1100         12 = NOF26+NINGS       1200         10 0 49 J=INOF2       1210         WHIE (60+46) (DELVS2(I),I=I1,I2)       1210         11 = I2+1       1230         12 = I1+NNINGS-1       1230         12 = I1+NNINGS-1       1240         49 CONTINUE       1250         WHIE (60+67)       1260         00 R RADIUS/FLOAT(NRINGS)       1260         00 R RADIUS/FLOAT(NRINGS)       1280         01 I CONTINUE       1300         01 I J= JR/2,       1310         NAU(1) = DR/2,       1300         101 I CONTINUE       1320         1280 CALL UNDAR (VPTUL:1/P.O., TVAP, KK)       1330         CALL UNDAR (UPTUL:1/P.O., TVAP, KK)       1350         CALL UNDAR (UPTUL:1/P.O., TVAP, G, DELHL, KK)       1350         CALL UNDAR (UPTUST:1 TVAP, O., DELHL, KK)       1350         CALL UNDAR (UPTUST, I TVAP, O., DELHL, KK)       1360         UBV = NL+DELHV-DELML       1390         UBV = 0       1400         UBV = 0 <t< td=""><td></td><td>WRITE (8150)</td><td></td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        | WRITE (8150)                                                      |              |
| i2 = $m/rZ6+m/rMos$ 1200         00 A9 JEINORZ       1210         01 = 12+1       1220         11 = 12+1       1230         12 = 11+m/inds-1       1240         14 = CONTINUE       1260         white (6,27)       12010         150 = M/r/2,2,1*POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1260         27 FORMAT (*1'+22.**POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         X === LigUid AND LigUID=VAPOR REGIONS*)       1280         DK = RADIUS/FLOAT(MRINGS)       1290         COUTINUE       1310         RAU(1) = DR/2,       1300         COUTINUE       1320         CALL UNDAR (UPTS) - FANULAR KINGS       1300         CALL UNDAR (UPTS) - FANULAR KINGS       <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        | I1 = N0FZ6+1                                                      | 1190         |
| D0 49 JET, MOF2       1210         WRITE (6,46) (DELVS2(I), T=11, I2)       1220         11 = I2+1       1230         12 = I1+MRIN0S-1       1240         49 CONTINUE       1250         wRITE (6,27)       1260         77 FORMAT (*1:22x: POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1260         DK = RADIUS/FLOAT (NRINOS)       1290         C       GUTAIN HIOPOINTS OF ANNULAR KINGS       1300         DU 101 J=2:NNINGS       1310         NAU(1) = DR/2.       1330         CALL UNBAR (VPTBL,1:P:0.,TVAP:KK)       1350         CALL UNBAR (DHVST:1:TVAP:0.,FDELHVKK)       1360         HV = HL+DELHV-DELHL       1390         LIGVP = 0       1400         JESS       1400         JESS       1410         JESS       1440         HK = HL+DELHV-DELHL       1490         DEKIV = 0.       1440         HK = 0.       1440         HK = 0.       1440         HK = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        | 12 = NUFZG+NRINGS                                                 | 1200         |
| WRIE (0.46) (DELVS2(I), I=11, I2)       1220         11 = 12+1       1230         12 = 11+NRINGS-1       1240         49       CUNTINUE       1260         97       FORMAT ('1'+22x+POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1260         7X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        | D0 49 J=1,NOFZ                                                    | 1210         |
| 11 = 12+1       1230         12 = 11+MR1M65-1       1240         49 CUNTIAUE       1250         WRITE (6,27)       1260         27 FORMAT (*1:22), *POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         27 FORMAT (*1:1+22), *POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         27 FORMAT (*1:1+22), *POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         27 FORMAT (*1:1+22), *POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         27 FORMAT (*1:1+22), *POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         27 FORMAT (*1:1+22), *POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1280         0 DR * RADIUS/FLOAT (*NINOS)       1290         C double data and the station of the station                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        | WRITE (6,46) (DELVSZ(I), T=11,12)                                 | 1220         |
| i2 = 11 + in ines - 1124049CunTinue1250white (6,27)126027FORMAT (11*,22), *POSITIONS AND TEMPERATURES AT EACH AXIAL STATION1270XXLiguiD-wapOR REGIONS*)1280DR = RADJUS/FLOAT(INRINGS)1290COUTARN HIPPOINTS OF ANNULAR HINGS1300B0101 J=2; NRINGS1310RAD(1) = DR/2,1300B0101 J=2; NRINGS1310RAD(1) = RADJUS/FLOAT(INRINGS)1320CALL UNBAR (VPT0L,1; P, 0, , TVAP, KK)1340CALL UNBAR (VPT0L,1; P, 0, , TVAP, rKK)1340CALL UNBAR (VPT0L,1; P, 0, , TVAP, rKK)1340CALL UNBAR (VPT0L,1; P, 0, , DELHL, KK)1350CALL UNBAR (VPT0L,1; P, 0, , DELHL, KK)1360H = (1+2) = C1410CALL UNBAR (VPT0L, 1; P, 0, , DELHL, KK)1390L10VP = 01440J2 = 0,1440J2 = 0,1450J3 = 0, <td></td> <td>I1 = I2+1</td> <td>1230</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        | I1 = I2+1                                                         | 1230         |
| 49       CONTINUE       1250         wHITE (6,27)       1260         27       FORMAT (*11*,22X, *POSITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270 $X$ LIGUID-WAPOR REGIONS*)       1280         DK = RADIUS/FLOAT(NRINGS)       1290                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        | 12 = 11+NRINGS-1                                                  |              |
| wRITÉ (6,27)       1260         27       FORMAT (11*,22,*)*0SITIONS AND TEMPERATURES AT EACH AXIAL STATION       1270         X LI3ULD AND LIGUID-WAPOR REGIONS*)       1280         DR = RADJUS/FLOAT(INRINGS)       1290         C = OUTAIN MIDPOINTS OF ANNULAR HINGS       1310         NAU(1) = DR/2.       1300         DU 191 J=2*NRINGS       1310         RADUJ) = RAD(J-1)*DR       1320         101 CONTINUE       1320         CALL UNDAR (VPTBL1:P.0.,TVAP.KK)       1340         CALL UNDAR (UNST.1.TVAP.0.,DELHL.KK)       1360         CALL UNDAR (UNST.1.TVAP.0.,DELHL.KK)       1360         HV = HL+DELHU-DELHL       1370         HV = HL+DELHU-DELHL       1380         - #1+0ELHU-DELHL       1380         - #1+0ELHU-DELHL       1380         - #1+0ELHU-DELHL       1380         - #1+0ELHU-DELHL       1440         - #1+0ELHU-DELHL       1440         - #1+0ELHU-DELHL       1440         - #1+0ELHU-DELHL       1440         - #1+10       1440         - #1+10       1440         - #140       1440         - #1410       1440         - #1410       1440         - #1410       1440                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 49                                     | CUNTINUE                                                          | 1250         |
| 27       FORMAT (11*,22x+POSITIONS AND TEMPERATURES AT EACH AXIAL STATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -                                      | WRITE (6,27)                                                      | 1260         |
| $X \longrightarrow Liguid And Liguid-VAPOR REGIONS*) 1280 DR = RADIUS/FLOAT(INRINGS) 1290 C GUITAIN MIDPOINTS OF ANNULAR MINOS MAU(1) = DR/2, 1300 DU 101 J22+NRINGS 1310 RAD(J) = RAD(J-1)+DR 1320 CALL UNBAR (VPTBL.1,P,0.,TVAP,KK) 1340 CALL UNBAR (VPTBL.1,P,0.,TVAP,KK) 1340 CALL UNBAR (VPTBL.1,P,0.,TVAP,KK) 1360 HL = (TVAP-TF)*CF 1370 HV = HL+DELHV-DELHL 1380 - 075 T = I+1 1390 LIGVP = 0 1410 J = 0 1440 - 02 = 0, 1440 - 02 = 0, 1440 - 02 = 0, 1440 - 02 = 0, 1440 - 02 = 0, 1440 - 03 = 2 + 0 1440 - 04 = 0 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 1440 - 144$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 27                                     | FORMAT (111,222, POSITIONS AND TEMPERATURES AT FACH AXIAL STATION | 1270         |
| DR = RADIUS/FLOAT(NRINGS) 1290<br>C OUTAIN HIDPOINTS OF ANNULAR KINGS<br>NAU(1) = DR/2, 1300<br>D0 101 J=2+NRINGS - 1310<br>RAD(J) = RAD(J=1)+DR 1320<br>101 CONTINUE - 1370<br>CALL UNBAR (VPTBL.1,P,0,,TVAP,KK) 1340<br>CALL UNBAR (VPTBL.1,P,0,,TVAP,KK) 1350<br>CALL UNBAR (UNVST.1,TVAP,0,,DELHV,KK) 1360<br>HL = (TVAP-TF)+CF 1370<br>HV = HL+DELHV-DELHL 1380<br>- 075 I = I+1 1390<br>LIGVP = 0 1400<br>J = 0. 1410<br>Z = 0, 1410<br>CAL UNBAR (DI)+F(I)*Z0(I) 1450<br>GAT20(I) = GU(I)+F(I)*Z0(I) 1460<br>- 02 = -0, 1440<br>- 02 = -0, 1440<br>- 02 = -0, 1440<br>- 1410<br>C = 0, 1440<br>- 1410<br>- 02 = -0, 1440<br>- 1410<br>- 1440<br>- 1440 |                                        | X LIQUID AND LIQUID-VAPOR REGIONS()                               | 1280         |
| C       OBTAIN MIDPOINTS OF ANNULAR KINGS       1200         NAU(1) = DR/2,       1300         NAU(1) = DR/2,       1310         RAU(1) = RAU(J-1)+DR       1320         101 CONTINUE       1330         CALL UNBAR (VPTBL,1,P,0.,TVAP,KK)       1340         CALL UNBAR (VPTBL,1,P,0.,TVAP,KK)       1350         CALL UNBAR (DHVST,1TVAP,0.,DELHL,KK)       1360         - H. = (TVAP-FF)*CF       1370         HW = HL+DELHV-DELHL       1380         - #05 I = I+1       1390         L10VF = 0       1440         - #02 = 0       1440         - #1+2       1490         - #02 = 0       1440         - #1+3       1490         - #02 = 0       1440         - #1+3       1490         - #02 = 0       1440         - #1+3       1490         - #1+4       1440         - #1+5       1440         - #1+4       1440         - #1+4       1440         - #1+4       1440         - #1+4       1490         - #1+4       1490         - #1+4       1490         - #1+4       1500         - #1+4       1510                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        | DR = RADIUS/FLOAT(NRINGS)                                         | 1290         |
| RAU(1) = DR/2.       1300         U0 101 U=2*RRINGS       1310         RAU(J) = RAU(J=1)+DR       1320         101 CONTINUE       1330         CALL UNBAR (VPTBL,1,P,0,,TVAP,6K)       1350         CALL UNBAR (DHUST,1TVAP,0,JDLHVVKK)       1350         CALL UNBAR (DHUST,1TVAP,0,JDLHVVKK)       1350         CALL UNBAR (DHUST,1TVAP,0,JDLHVKK)       1360         - #150       1370         HV = HL+DELHV-DELHL       1380         - #0.       1400         J = 0.       14400         J = 0.       14400         HI+ = HF       1490         GAT20(1) = GU(1)+F(1)*Z0(1)       1440         H440       H440         H440       1440         H1+ = HF       1440         GAT20(1) = J       1440                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                        | BTAIN MIDPOINTS OF ANNULAR KINGS                                  |              |
| b0 101 J=2rNRING5       1310         RAD(J) = RAD(J=1)+DR       1320         101 CONTINUE       1330         CALL UNBAR (VPTUL,1P,0,,TVAP,0,VDELHV,KK)       1340         CALL UNBAR (DHUST:TTVAP,0,VDELHV,KK)       1360                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        | RAD(1) = DR/2                                                     | 1300         |
| RAD(J) = RAD(J=1)+DR       1320         101       CONTINUE       1330         CALL UNBAR (VPTBL,1,P,0,,TVAP,KK)       1340         CALL UNBAR (DHVST;1,TVAP,0,,DELHV;KK)       1350         CALL UNBAR (DHVST;1,TVAP,0,,DELHL;KK)       1360         HL = (TVAP-TF)*CF       1370         HV = HL+DELHV-DELHL       1380         - 075 I = -I+1       1390         L10VP = 0       1400         - 02 = 0,       1420         - 02 = 0,       1440         - H11 = HF       1440         GAT20(I) = G0(I)+F(I)*20(I)       1440         - H11 = HF       1440         GAT20(I) = G0(I)+F(I)*20(I)       1440         - H11 = HF       1490         C - STORE CURRENT Z IN OUTPUT BLOCK       1480         Z(I,J) = Z       1490         - C - CHECK IF WE MAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         34 & G = GAT20(I)       34,35       1500         550 G       G TO 78       1540         - 78 T = T+t+(H11)+HF)/CF       1550       1550         C CHECK IF WE MAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         C CHECK IF WE MAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         C CHECK IF WE MAVE REACHED LIQUID-LIQUID VAP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        | HO 101 JE2INRINGS                                                 | 1310         |
| 101       CONTINUE-       1330         CALL       UNBAR       (VPTBL,1,P,0,,TVAP,6,CBLHVVKK)       1340         CALL       UNBAR       (OHLVST,1,TVAP,0,DELHVVKK)       1350         CALL       UNBAR       (OHLVST,1,TVAP,0,DELHVVKK)       1360         HL       (TVAP-TF)*CF       1370         HV       HL+DELHV-DELHL       1380         - 675       I = -1+1       1390         L10VP = 0       1400         J = 0       1400         J = 0       1400         J = 0       1400         DERIV = 0.       1440         H11) = HF       1440         GAT20(1) = G0(1)+F(1)*20(1)       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1490         - 0.       1490                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        | RAD(J) = RAD(J-1)+DR                                              | 1320         |
| CALL UNBAR (VPTBL,1,P,0,,TVAP,6,TVAP,KK)       1340         CALL UNBAR (DHV5T,1,TVAP,0,TDELHVYKK)       1350         CALL UNBAR (DHV5T,1,TVAP,0,TDELHVYKK)       1360         HL = (TVAP-TF)*CF       1370         HV = HL+DELHU-DELHL       1380         - 675 I = :I+1       1390         LIQVP = 0       1410         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1440         - 0.       1490         - 0.       1490                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | - 101                                  | CONTINUE -                                                        | 1330         |
| CALL UNBAR (DHVST.1.TVAP.0DELHV.KK)       1350         CALL UNBAR (DHLVST.1.TVAP.0DELHV.KK)       1360         HL = (TVAP-TF)+CF       1370         HV = HL+DELHV-DELHL       1380         -875 I = :+1       1390         LIGVP = 0       1400         J = 0       1410         Z = 0.       1440         -W2 = -0.       1440         U2 = 0.       1440         W2 = 0.       1440         W2 = 0.       1440         W2 = 0.       1440         W4 = HF       1440         W2 = 0.       1440         W4 = HF       1450         GAT20(1) = GU(1)+F(1)*20(1)       1440         W4 = HF       1440         W3 = J+1       1450         GAT20(1) = J       1440         C - STORE CURRENT 2 IN OUTPUT BLOCK       1480         Z1(1.J) = Z       1490         -C - CHECK IF #E HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         GG TO 78       1520         -35 G = GAT20(1)       1530         F(1) = 0.       1540         -78 T = TF+(H(1)+HF)/CF       1560         C CHECK IF WE HAVE REACHED LIQUID-LIGUID VAPOR INTERFACE       1560                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        | CALL UNBAR (VPTBL+1+P+0++TVAP+KK)                                 | 1340         |
| CALL UNBAR (DHLVST,1,TVAP,0,,DELHL,KK)       1360         HL = (TVAP-TF)*CF       1370         HV = HL+DELHV-DELHL       1380         - 075 I = I+1       1390         L1QVP = 0       1410         J = 0       1410         J = 0       1410         J = 0       1440         UQ2 = -0,       1440         DERIV = 0.       1440         H(I) = HF       1440         GAT20(I) = GU(I)+F(I)*Z0(I)       1440         H(I) = HF       1440         GAT20(I) = GU(I)+F(I)*Z0(I)       1440         H(I) = HF       1440         GAT20(I) = GU(I)+F(I)*Z0(I)       1440         H(I) = GU(I)+F(I)*Z0(I)       1440         GAT20(I) = ZUD2       1440         J = J+1       1480         C - STORE-CURRENT Z IN OUTPUT BLOCK       1490         Z2(Ir,J) = Z       1510         GO TO 78       1520         34 G = GAT20(I) = 34,355       1500         G = GAT20(I) = 0,       1520         -70 T = TF+(H(I)+HF)+CF       1550         C STORE CURRENT TEMP IN OUTPUT BLOCK       1540         -71 T = T+(H(I) = HF)+CF       1550         C C HECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        | CALL UNBAR (DHVST/1/TVAPIO: DELHV/KK)                             |              |
| HL = (TVAP-TF)*CF       1370         HV = HL+DELHV-DELHL       1380         - 675 I = 1+1       1390         L1QVP = 0       1400 $J = 0$ 1400 $M(I) = 0$ 1400 $M(I) = 0$ 1400 $M(I) = 0$ 1400 $M(I) = 0$ 1440 $M(I) = 0$ 1440 $M(I) = 0$ 1440 $M(I) = 2 = 2402$ 1440 $J = J+1$ 1460 $C = 570RE CURRENT / 2 IN OUTPUT BLOCK       1440         Z(I,J) = Z       1490         -C = CHECK IF wE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         G = 0AT20(I) = 34, 34, 35       1500         G = 6AT20(I) = 0,       1510         F(I) = 0,       1540         -70 T = TF+(H(I)=HF) / CF       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1550         C       CHECK$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                        | CALL UNBAR (DHLVST, 1, TVAP, 0, DELHL, KK)                        | 1360         |
| HV = HL+DELHV-DELHL       1380         -675       I = -I+1       1390         L1@VP = 0       1400         J = 0       1410         Z = 0,       1420         DZ = -0,       1420         DZ = -0,       1420         DZ = -0,       1420         DERIV = 0,       1440                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>.</b>                               |                                                                   | 1370         |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        | HV = HL+DELHV-DELHL                                               | 1380         |
| $ \begin{array}{c} L10VP = 0 & 1400 \\ \hline d = 0 & 1410 \\ \hline Z = 0, & 1420 \\ \hline 02 = 0 & 1420 \\ \hline 02 = 0 & 1420 \\ \hline 02 = 0 & 1430 \\ \hline 0ERIV = 0, & 1430 \\ \hline 0ERIV = 0, & 1440 \\ \hline 0570 = 2 = 2402 & 1440 \\ \hline 1460 & 570RE CURRENT 2 IN OUTPUT BLOCK & 1460 \\ \hline 0579 = 2 = 2402 & 1470 \\ \hline 1 = 0, & 1490 \\ \hline 22(1i, j) = 2 & 141 & 1480 \\ \hline 0 = 0 & 102 & 1440 \\ \hline 1 F (2-20(1)) 34; 34; 35 & 1500 \\ \hline 34 & 6 = 60(1)+f(1)+2 & 1500 \\ \hline 0 & 60 & 10 & 78 & 1520 \\ \hline 35 & 6 = 6AT20(1) & 1510 \\ \hline 1510 & 1520 \\ \hline 550 & C & STORE CURRENT TEMP IN OUTPUT BLOCK & 1550 \\ \hline C & STORE CURRENT TEMP IN OUTPUT BLOCK & 1550 \\ \hline C & STORE CURRENT TEMP IN OUTPUT BLOCK & 1550 \\ \hline C & STORE CURRENT TEMP IN OUTPUT BLOCK & 1550 \\ \hline C & C & CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE & 1570 \\ \hline C & C & CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE & 1570 \\ \hline C & C & CALL UNBAR (H4TBL; 1; 7; 0, H4; KK) & 1580 \\ \hline C & C & CALL UNBAR (AVSZ; 1; 2; RAD(1); A; KK) & 1600 \\ \hline & C & UNBAR (AVSZ; 1; 2; RAD(1); A; KK) & 1610 \\ \hline & C & 4 = VPR \\ \hline \end{array}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        | ·I = ·I+1 -                                                       | 1390         |
| $ \begin{array}{c} J = 0 & 1410 \\ Z = 0, & 1420 \\ 02 = -0, & 1420 \\ 02 = -0, & 1430 \\ 0EKIV = 0, & 1440 \\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        | LIQVP = 0                                                         | 1400         |
| $ \begin{array}{c} Z = 0, & 1420 \\ DZ = -0, & 1430 \\ DERIV = 0. & 1440 \\ H(1) = HF & 1450 \\ GAT20(1) = GU(1) + F(1) + ZU(1) & 1450 \\ GAT20(1) = GU(1) + F(1) + ZU(1) & 1460 \\ \hline 0 & 779 & Z = 2 + 02 & 1479 \\ J = J + 1 & 1460 \\ \hline 0 & 779 & Z = 2 + 02 & 1479 \\ J = J + 1 & 1480 \\ \hline C & STORE - CURRENT - Z IN OUTPUT BLOCK & 1490 \\ \hline C & STORE - CURRENT - Z IN OUTPUT BLOCK & 1490 \\ \hline -C & CHEGK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING \\ IF (Z - 20(1)) 34, 34, 35 & 1500 \\ \hline 34 & 6 = 60 + 13 + 13 + 35 & 1510 \\ GO TO 78 & 1520 \\ \hline -79 & T = TF + (H(1) - HF) + CF & 1550 \\ \hline C & STORE CURRENT TEMP IN OUTPUT BLOCK \\ \hline TT(1, J) = T & 1500 \\ \hline C & CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE & 1560 \\ \hline C & CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE & 1570 \\ \hline C & CALL UNBAR (TBLVP 1, T, 0, , VPR, KK) & 1580 \\ \hline C & CALL UNBAR (AVSZ, 1, 2, RAD(1), A, KK) & 1600 \\ \hline & CALL UNBAR (AVSZ, 1, 2, RAD(1), A, KK) & 1620 \\ \hline & C & 4 = VPR + M(2)(4/(R^{+1}) & 1620) \\ \hline \end{array}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        |                                                                   |              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        | $\mathbf{Z} = 0$ ,                                                | 1420         |
| DERIV = 0.       1440         H(1) = HF       1450         GAT20(1) = GU(1)+F(1)*20(1)       1460         GA79 = 2+02       1470         J = J+1       1460         -C = STORE CURRENT 2 IN OUTPUT BLOCK       1480         -C = CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1490         -C = CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         34 = G = GO(1)+F(1)+2       1510         GO TO 78       1520         -78 = TF+(H(1)-HF)/CF       1530         C = STORE CURRENT TEMP IN OUTPUT BLOCK       1540         -78 T = TF+(H(1)-HF)/CF       1550         C STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C C CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1560         C C ALL UNBAR (TBLVP,1,T,0,,VPR,KK)       1580         CALL UNBAR (TBLVP,1,T,0,,VPR,KK)       1580         CALL UNBAR (AVSZ,1,2,RAD(1),A,KK)       1600         CALL UNBAR (AVSZ,1,2,RAD(1),A,KK)       1600         C ALL UNBAR (AVSZ,1,Z,RAD(1),A,KK)       1600         C CALL UNBAR (AVSZ,1,Z,RAD(1),A,KK)       1600         C CALL UNBAR (AVSZ,1,Z,RAD(1),A,KK)       1600         C CALL UNBAR (AVSZ,1,Z,RAD(1),A,KK)       1600 <td>••••••••••••••••••••••••••••••••••••••</td> <td></td> <td>1430</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | •••••••••••••••••••••••••••••••••••••• |                                                                   | 1430         |
| H(I) = HF       1450         GAT20(I) = GU(I)+F(I)*2U(I)       1460         879       2 = 2+02       1470         J = J+1       1480         C - STORE CURRENT 2 IN OUTPUT BLOCK       1490         Z2(I,J) = Z       1490         -C - CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         34       G = GO(I)+F(I)*Z       1510         GO TO 78       1520         -35       G = GAT20(I)       1520         F(I) = 0,       1530         F(I) = 0,       1540         -78       T = TF+(H(I)-HF)/CF       1550         C STORE CURRENT TEMP IN OUTPUT BLOCK       1550         C G HECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1560         C CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         C CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         C ALL UNBAR (TBLVP:1,T,0,,VPR;KK)       1580         C ALL UNBAR (H4TBL:1;T,0,,H4;KK)       1590         C ALL UNBAR (AVSZ:1;Z;RAD(I);A;KK)       1600         C ALL UNBAR (AVSZ:1;Z;RAD(I);A;KK)       1600         C ALL UNBAR (AVSZ:1;Z;RAD(I);A;KK)       1610         C C HECK IF VPR+MN2)HZ/(R*T)       1622 <td></td> <td>DERIV = 0.</td> <td>1440</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        | DERIV = 0.                                                        | 1440         |
| GAT20(1) = GU(1)+F(1)*ZU(1)       1460         879 2 = 2+02       1479         J = J+1       1480         C STORE CURRENT 2 IN OUTPUT BLOCK       1490         Z2(1,J) = Z       1490         -C CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         34 6 = 60411+F(1)*2       1510         GO TO 78       1520         35 6 = GATZO(1)       1540         F(1) = 0,       1540         -78 T = TF+(H(1)-HF)/CF       1550         C STORE CURRENT TEMP IN OUTPUT BLOCK       1550         C CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1560         C CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         C ALL UNBAR (TBUP)1, T, 0., VPR, KK)       1580         C ALL UNBAR (H4TBL+1, T, 0, H4+KK)       1590         C ALL UNBAR (H4TBL+1, T, 0, H4+KK)       1590         C ALL UNBAR (H4TBL+1, T, 0, H4+KK)       1600         C ALL UNBAR (H4TBL+1, T, 0, H4+KK)       1610     <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        |                                                                   | 1450         |
| 879       2 = 2+D2       1479         J = J+1       1480         C       STORE CURRENT 2 IN OUTPUT BLOCK       1490         Z2(I,J) = Z       1490         -C       CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1490         -C       CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         -C       CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         -G       GO TO 78       1510         GO TO 78       1520         -78       T = TF+(H(I)+F)/CF       1530         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1540         TT(I,J) = T       T       1560         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1560         C ALL UNBAR (TBLVP.1),T,0.,VPR,KK)       1580       1580         CALL UNBAR (H4TBL:1:T,0.,H4+KK)       1590       1590         CALL UNBAR (AVSZ.1:Z:RAD(I),A:KK)       1600       1600         C4 = VPR*MN214/(R*T)       1620       1610                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        | GATZO(I) = GO(I) + F(I) + ZO(I)                                   | 1460         |
| J = J+1       1480         -C       STORE CURRENT 2 IN OUTPUT BLOCK       1490         -C       CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         -C       CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         -G       CONTON       1500         -G       CONTON       1500         -G       CONTON       1500         -GO TO 78       1500         -GO TO 78       1520         -GO TO 78       1530         -F(I) = 0.       1540         -78       T = TF+(H(I)-HF)/CF       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1550         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         C ALL UNBAR (TBLVP:1;T,0,VPR;KK)       1580       1580         CALL UNBAR (H4TBL:1;T;0,H4+KK)       1590       1590         CALL UNBAR (AVSZ:1:2;RAD(I);A+KK)       1600       1610         C4 = VPR*MN2:N4/(R*T)       1620       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        | -2-2-2+02                                                         |              |
| C       STORE CURRENT 2 IN OUTPUT BLOCK       1490         -C       CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         IF (2-20(I)) 34,34,35       1500         34       G = GA(1)+F(1)+2       1510         G0 TO 78       1520         -55       G = GAT20(I)       1540         F(I) = 0,       1540         -78       T = TF+(H(I)-HF)/CF       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         C CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         CALL UNBAR (TBLVP,I,T,0,,VPR/KK)       1580         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1600         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1600         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1610         C4 = VPR*MN214/(R*T)       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        | J = J+1                                                           | 1480         |
| ZZ(I,J) = Z       1490         -C CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING       1500         IF (Z-Z0(I)) 34,34,35       1500         34       G = GO(I)+F(I)+Z       1510         GO TO 78       1520         35       G = GATZO(I)       1530         F(I) = 0,       1530         F(I) = 0,       1540         -78       T = TF+(H(I)-HF)/CF       1550         C STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1560         C CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         C ALL UNBAR (TBLVP:1), T, 0, VPR:KK)       1580         CALL UNBAR (H4TBL:1;T,0, H4:KK)       1590         CALL UNBAR (AVSZ:1;Z:RAD(I):A:KK)       1600         CALL UNBAR (APVSZ:1;Z:RAD(I):A:KK)       1600         CALL UNBAR (APVSZ:1:Z:RAD(I):A:KK)       1610         C4 = VPR*MN214/(R*T)       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>G</b> §                             | STORE-CURRENT Z IN OUTPUT BLOCK                                   |              |
| -C       CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING         IF (2-20(I)) 34,34,35       1500         34       G = GA(1)+F(1)+2       1510         GO TO 78       1520         35       G = GAT20(I)       1530         F(I) = 0.       1540         -78       T = TF+(H(1)-HF)/CF       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         C ALL UNBAR (TBLVP.1,T,0.,VPR,KK)       1580       1580         CALL UNBAR (H4TBL.1,T,0.,H4+KK)       1590       1590         CALL UNBAR (AVSZ.1,2,RAD(I),A+KK)       1600       1610         C4 = VPR*MN214/(R*T)       1620       1610                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        | $ZZ(I_{i}J) = Z$                                                  | 1490         |
| IF (2-20(I)) 34,34,35       1500         34       6 = 60(I)+F(I)+2       1510         GO TO 78       1520         35       6 = 6AT20(I)       1530         F(I) = 0,       1540         -78       T = TF+(H(I)-HF)/CF       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         CALL UNBAR (TBLVP:1,T,0.,VPR,KK)       1580       1590         CALL UNBAR (H4TBL:1:T,0.,H4+KK)       1590       1600         CALL UNBAR (AVSZ:1.2;RAD(I);A+KK)       1600       1610         C4 = VPR*MN2144/(R*T)       1620       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>C</b>                               | CHECK IF WE HAVE REACHED THE END OF THE INJECTOR FOR THIS RING    |              |
| 34       G = GR(I)+F(I)+Z       1510         GO TO 78       1520         35       G = GATZO(I)       1530         F(I) = 0,       1540         -78       T = TF+(H(I)-HF)/CF       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         CALL UNBAR (TBLVP,1),T,0,,VPR,KK)       1580       1580         CALL UNBAR (H4TBL+1),T,0,,VPR,KK)       1590       1600         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1600       1610         C4 = VPR*MN214/(R*T)       1620       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        | IF (2-20(I)) 34,34,35                                             | 1500         |
| G0 T0 78       1520         35       G = GAT20(I)       1530         F(I) = 0,       1540         -78       T = TF+(H(I)-HF)/CF       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         CALL UNBAR (TBLVP,1)T,0.,VPR,KK)       1580       1580         CALL UNBAR (H4TBL,1)T,0.,H4+KK)       1590       1600         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1600       1600         C4 = VPR*MN2:14/(R*T)       1620       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        | <del>- 6 = 60(1)+F(1)+Z</del>                                     |              |
| 35       G = GAT20(I)       1530         F(I) = 0,       1540         -78       T = TF+(H(I)-HF)/CF       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         CALL UNBAR (TBLVP,1)T,0.,VPR,KK)       1580       1580         CALL UNBAR (H4TBL,1)T,0.,VPR,KK)       1590       1590         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1600       1600         C4 = VPR*MN2H4/(R*T)       1620       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        | GO TO 78                                                          | 1520         |
| F(I) = 0.       1540         T = TF+(H(I)-HF)/CF       1550         C STORE CURRENT TEMP IN OUTPUT BLOCK       1560         TT(I,J) = T       1560         C CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         CALL UNBAR (TBLVP,1+T,0.,VPR,KK)       1580         CALL UNBAR (H4TBL,1+T,0.,VPR,KK)       1590         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1600         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1610         C4 = VPR*MN2:H4/(R*T)       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        | G = GAT2O(I) · ·                                                  | 1530         |
| -78       T = TF+(H(I)-HF)/CF       1550         C       STORE CURRENT TEMP IN OUTPUT BLOCK       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE       1570         CALL UNBAR (TBLVP,1+T,0.,VPR,KK)       1580         CALL UNBAR (H4TBL+1+T,0.,VPR,KK)       1590         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1600         CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)       1610         C4 = VPR+MN2144/(R*T)       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                        | F(I) = 0.                                                         | 1540         |
| CSTORE CURRENT TEMP IN OUTPUT BLOCK1560CCHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE1570IF (LIGVP,EG.1) GO TO 1021570CALL UNBAR (TBLVP,1)T,0.,VPR,KK)1580CALL UNBAR (H4TBL,1)T,0.,H4,KK)1590CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)1600CALL UNBAR (AVSZ,1,2,RAD(I),A,KK)1610CALL UNBAR (APVSZ,1,2,RAD(I),AP,KK)1610C4 = VPR+MN2144/(R*T)1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        | T = TF+(H(I)-HF)/CF                                               | 1550         |
| TT(1,J) = T       1560         C       CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE         IF (LIQVP,EQ.1) G0 TO 102       1570         CALL UNBAR (TBLVP,1)T,0.,VPR,KK)       1580         CALL UNBAR (H4TBL,1)T,0.,H4,KK)       1590         CALL UNBAR (AVSZ,1,Z,RAD(I),A,KK)       1600         CALL UNBAR (AVSZ,1,Z,RAD(I),A,KK)       1610         C4 = VPR+MN2:H4/(R*T)       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | C S                                    | STORE CURRENT TEMP IN OUTPUT BLOCK                                |              |
| CCHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACEIF (LIQVP,EQ.1) GO TO 1021570CALL UNBAR (TBLVP,1)T,0.,VPR,KK)1580CALL UNBAR (H4TBL,1)T,0.,H4,KK)1590CALL UNBAR (AVSZ,1)Z,RAD(I),A,KK)1600CALL UNBAR (AVSZ,1)Z,RAD(I),A,KK)1610CALL UNBAR (APVSZ,1)Z,RAD(I),AP,KK)1610C4 = VPR+MN2(14/(R*T))1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <del></del>                            |                                                                   |              |
| IF (LIVP;EQ.1) GO TO 102       1570         CALL UNBAR (TBLVP;1;T;0.;VPR;KK)       1580         CALL UNBAR (H4TBL;1;T;0.;H4;KK)       1590         CALL UNBAR (AVSZ;1;Z;RAD(I);A;KK)       1600         CALL UNBAR (AVSZ;1;Z;RAD(I);A;KK)       1610         CALL UNBAR (APVSZ;1;Z;RAD(I);AP;KK)       1610         C4 = VPR*MN2:14/(R*T)       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | C                                      | CHECK IF WE HAVE REACHED LIQUID-LIQUID VAPOR INTERFACE            |              |
| CALL UNBAR (TBLVP+1+T+0+VPR+KK)       1580         CALL UNBAR (H4TBL+1+T+0+H4+KK)       1590         CALL UNBAR (AVSZ+1+Z+RAD(I)+A+KK)       1600         CALL UNBAR (AVSZ+1+Z+RAD(I)+A+KK)       1610         CALL UNBAR (APVSZ+1+Z+RAD(I)+A+KK)       1610         C4 = VPR+MN2(14/(R*T))       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | •                                      | IF (LIOVP, EQ.1) 60 TO 102                                        | 1570         |
| CALL UNBAR (H4TBL+1+T+0+++KK)       1590         CALL UNBAR (AVSZ+1+Z+RAD(I)+A+KK)       1600         CALL UNBAR (AVSZ+1+Z+RAD(I)+A+KK)       1600         C4 = VPR+MN2(14/(R*T))       1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        | CALL UNBAR (TBLVP+1+T+0.,VPR+KK)                                  | 1580         |
| CALL UNBAR (AVSZ,1,Z,RAD(I),A,KK)         1600           CALL UNBAR (APVSZ,1,Z,RAD(I),AP,KK)         1610           C4 = VPR+MN214/(R*T)         1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        | CALL UNBAR (H4TBL+1+T+0++H4+KK)                                   | 1590         |
| CALL UNBAR (APV5Z+1+Z+RAD(1)+AP+KK) 1610<br>C4 = VPR+MN2114/(R*T) 1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        | CALL UNBAR (AVSZ,1,Z,RAD(I),A,KK)                                 | 1600         |
| C4 = VPR * MN2 (R * T) 1620                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | •                                      | -CALL UNBAR (APV52+1+2+RAD(1)+AP+KK)                              | <u>-1610</u> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        | C4 = VPR+MN2(14/(R*T)                                             | 1620         |

| •               | GANMA = AGM/T                                                        | 1630   |
|-----------------|----------------------------------------------------------------------|--------|
|                 | $K = \Lambda LPHA1 * EXP(-GAMMA)$                                    | 1640   |
|                 | DPA = DUN2H4*(T/492.)**1.832*14.7/P*(1.=EXP(=.067*P*492./            | 1650   |
|                 | X (14.7*T)))                                                         | 1660   |
| ·               |                                                                      | 1570   |
|                 | DERIVO = DERIV                                                       | 1680   |
|                 | CALL SLUPE (DERIV)                                                   | 1690   |
|                 | IF (MI.GT.20) DERIVEDERIVO                                           | 1700   |
|                 | UHUZ = -(H4+DPA+AP+DERIV+F(I)+(H(I)-HF))/G                           | 1710   |
|                 | DZ = -H4/(NMAX1 + DHDZ)                                              | 1720   |
|                 | H(1) = H(1) + DHDZ + DZ                                              | 1730   |
|                 | IF (H(I)-HL) 879,877,878                                             | 1740   |
| C               | WE HAVE EXCEEDED LIQUID -LIQUID VAPOR INTERFACE FOR THIS RING        | ••••   |
| Č               | JACKSTEP TO L-LV BOUNDARY                                            |        |
| 878             | $\theta Z = fHt = H(1) + 0H\theta Z$                                 | 1750   |
| 4.0             | H(1) = HL                                                            | 1760   |
|                 | <u>\. T. FI-60. THE THE THE FORT ACE HAS REFN BEACHER</u>            |        |
| 477             | I LAUD - 4                                                           | 1770   |
|                 | $c_1 = c_1$                                                          | 1780   |
| C               | OU TO GIT STATUS THE FIGHTONITO VADOD INTEDEACE FOR THIS DING        | 1100   |
| 140             | THAT REACHED THE LIGUID-LIGUID VAFOR INTERFALE FOR THIS RING         | 1700   |
| 102             | 16(1) = 1                                                            | 1790   |
|                 |                                                                      | 1800   |
|                 |                                                                      | 1810   |
|                 | LV(1)  = 1                                                           | 1820   |
|                 |                                                                      | 1830   |
| ~               | JZ(1) = J                                                            | 1840   |
| E I             | CHECK IF ALL RINGS HAVE BEEN PROCESSED                               |        |
|                 | IF (I-NRINGS) 8/5,8/0,8/0                                            | 1850   |
|                 |                                                                      | 1860   |
|                 | J[n] = JZ(I)                                                         | 1870   |
|                 |                                                                      | 1880   |
|                 | $\forall RITE (0,26) (22(1,J), (T(1,J), J=1, JN))$                   | 1890   |
| 25              | CONTINUE                                                             | 1900   |
| 26              | FORMA1 (92, 2, 12, 1, 4(12, 2, 12, T) / (12, 10, 13, 5))             | 1910   |
|                 | -FORMAT 4//05Kr*REVG*rE5                                             | 1920   |
|                 |                                                                      | 1930   |
| - 613           | FORMAT (1H1,27%,75H++++++++++++++++++++++++++++++++++++              | 1940   |
|                 | X ************************************                               | 1950   |
|                 | LAST = 0R1065-7                                                      | 1960   |
| Ŭ<br>C          | IF THERE IS LESS THAN A ONE PERCENT DIFFERENCE IN INTERFACE 2 VALUES |        |
|                 | TUN ANT TWO HINGS I THEN SET THESE INTERFACE VALUES LOUAL            |        |
|                 | DU /UU 151/LASI                                                      | 1970   |
|                 | IF (AU5(ZL(1)=2L(1+1)).LT01=2L(1)) ZL(1+1)=2L(1)                     | 1980   |
| <b>-</b>        | IF (ABS(ZLV(1)=2LV(I+1)).LTU1#2LV(I)) ZLV(I+1)=ZLV(I)                | 1990   |
| - 700           | CONTINUE                                                             | 2000   |
| <b>.</b> .      | WRITE (6,88) (1,2L(1),RAD(1),TL(1),I=1,NRINGS)                       | 2010   |
|                 |                                                                      |        |
|                 | XNTERFACE FOR EACH ANNULAR REGIONY /                                 | 2030   |
|                 | X 30X+57H RING AXIAL PUSITION RADIAL POSITION TEMPERA                | 2040   |
|                 |                                                                      | 2050   |
|                 | X {38X/12/0X/E32.5/0X/E12.5/4X/E32.5/ }                              | 2060   |
| * *             | WRITE (0,90)                                                         | 2070   |
| <del>9</del> 9- | FORMAT                                                               | 2080 - |
|                 | X                                                                    | 2090   |
| •               | WRITE (0,8°) (I,ZLV(I),RAD(I),TLV(I),I=1,NRINGS)                     | 2100   |
| 89              | FORMAT (//24X, POSITION AND TEMPERATURE AT LIQUID VAPOR - VAPOR IN   | 2110   |
|                 | ATERFACE FOR EACH ANNULAR REGION! /                                  | 2120   |
|                 | X 36X/57H RING AXIAL POSITION RADIAL POSITION TEMPERA                | 2130   |
|                 | XFUKE- /                                                             | 2140   |
|                 | X (38X,12,6X,E12.5,6X,E12.5,4X,E12.5) )                              | 2150   |

.

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| C PI       | COCEED ON TO VAPOR REGION<br>CALL VAPOR (ALPHA3,2LV,TLV)<br>KOUNT = KOUNT+1<br>IF (KOUNT.LE.NCASE) GO TO 705                                         | 216<br>217<br>218        |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 107        | WRITE (6,107)<br>FURMAT (////48X,35H***** OPERATIONS COMPLETE ****** )<br>STUP<br>END                                                                | 219<br>220<br>221<br>222 |
|            |                                                                                                                                                      |                          |
| T D<br>C ປ | SUBROUTINE LOVP (I,J,DERIV,T,G,Z,ZZ,TT,DZ)<br>HIS ROUTINE HANDLES REACTOR CALCULATIONS FOR LIQUID VAPOR REGIONS<br>F EACH ANNULAR RING<br>REAL MMAX2 | 1                        |

| X NMAX2, ALPHA1, ALPHA2, BETA, AGM, BGM, P, ZEND, MH2, MN2, MNH3, MN2114                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4 C             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| COMMON /BLOK3/K+KN+KP+KC3+KC4+HF+HL+HV+TF+CF+CFBAR+GAMMA+C4+NRINGS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 50              |
| COMMON /BVTBLS/AVSZ(234),APVSZ(234),BELVSZ(234)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 60              |
| COMMON /CCC/H4TBL(40),H3TBL(40)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 70              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 86              |
| C ASSUME TEMPERATURE CONSTANT IN LIQUID VAPOR REGION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |
| CALL UNBAR (H4TBE+1-T+0., H4+KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 96              |
| 182 CALL UNBAR (APVSZ+1+Z+RAD(1)+AP+KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 100             |
| DPA = UNN2H4+(T/492.)**1.832*14.7/P*{1EXP(067*P*492./                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 110             |
| <b>Χ</b> (14.7 <b>≭</b> T)))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 120             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |
| DZ = -H4/(NMAX2*DHDZ)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 140             |
| 2 = 2 + 02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 150             |
| J = J + 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 160             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |
| ZZ(1,J) = Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 170             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <del>18</del> € |
| C CHECK IF WE HAVE REACHED THE INJECTOR TIP FOR THIS RING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                 |
| $1F \left(\frac{2}{2} + \frac{2}{3} + \frac{3}{3} +$ | 190             |
| 34 G = GO(I) + F(I) + Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 200             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 210             |
| 35  G = GAT2O(I)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 220             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <del>23</del> € |
| 78 $H(I) = H(I) + DHDZ + DZ$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 240             |
| IF (H(I)-HV) 182,195,184                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 250             |
| C WE HAVE EXCEEDED LIQUID VAPOR-VAPOR INTERFACE FOR THIS RING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |
| 184  DZ = (HV - H(I)) / DHUZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 260             |
| 2 = 2+02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |
| ZZ(1,J) = Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 280             |
| ·····································                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 290             |
| 195 RETURN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 300             |
| END -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 310             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 |

| • • |              | -                                                                                     |    |
|-----|--------------|---------------------------------------------------------------------------------------|----|
|     | SUBROUTINE   | VAPOR (ALPHA3,ZLV,TLV)                                                                | (  |
| - C | THIS ROUTINE | HANDLES REACTOR CALCULATIONS FOR VAPOR REGION OF EACH                                 |    |
| С   | ANNULAR RING |                                                                                       |    |
|     |              | <del>A + NR1 + NRR1 + NR2 + NRR2 + NR3 + NRR3 + NRR4 + KC4 + MH2 + MN2 + MNH3 +</del> |    |
|     |              |                                                                                       |    |
|     | X MN2F       | 4 # MBAR                                                                              | 2( |

| INTEGER VAPOR, VP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| COMMON /BLOK1/F(25),H(25),RAD(25),GATZ0(25),G0(25),Z0(25)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ĺ              |
| COMMON /BLOKZ/A+AP+DELTA+DR+DPA+DON2H4+DONH3+R+CGM+RADIUS+NMAX1+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | . *            |
| X NMAX2 + ALPHA1 + ALPHA2 + BETA + AGM + BGM + P + ZEND + MH2 + MH2 + MH13 + MH1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ,<br>)HL 6     |
| COMMON /BLOKS/KIKOIKFIKCSIKCS/HFINLINVITFICFICFRERIGEMMAICESIKT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>ICS</b> - 7 |
| COMMON /RVTRI S/AVS7(234). APVS7(234). AFI VC7(234)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1000<br>1      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | e<br>e         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 11             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |
| KIIO22377KHOM(2577122577240(25)71PN(25)7MIX11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 177 13         |
| A G(25)+22(25)+F1(25)+F3(25)+F3(25)+F3D(25)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 14             |
| UIMENSION  II(23) (2(23)) (3(23)) (5(23)) (GR(25)) (GR(25)) (GR(25)))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 15             |
| X CK4 (25), DPDZ (25), ZOO (25), NZO (25)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 16             |
| VAPOR = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 17             |
| IFFLG = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 18             |
| VP = VAPOR+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 19             |
| M = 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 21             |
| N = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 21             |
| NM1 = NRINGS-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 22             |
| WR17E (6,598)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 21             |
| 598 FORMAT (111,29X, ************************************                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ** 24          |
| <del></del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 25             |
| C CALCULATE CONCENTRATIONS AT INTERFACES FOR EACH RING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |
| DO 37 I=1+NRINGS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 26             |
| CALL UNBAR (H4TBL+1+TLV(T)+0.+HH4(I)+KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 27             |
| XY(I) = (HF - H(I))/HH4(I)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 28             |
| $x_1 = (1 - x_1 + x_2 + x_3 + x_4)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 20             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |
| $\partial c = -\partial (\partial c + i) \partial c + i \partial (i + i) \partial c + i \partial c + i \partial (i + i) \partial$ | 21             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |
| $ \begin{array}{c} \forall \mathbf{i} \mathbf{i} \mathbf{i} \mathbf{i} \\ (\mathbf{i} \mathbf{i} \mathbf{i} \mathbf{i}) = \mathbf{i} \mathbf{i} \mathbf{i} \mathbf{i} \mathbf{i} \mathbf{i} \mathbf{i} \mathbf{i}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 32             |
| $\nabla I C \Lambda I I = 0 D T C ( T T T T T T T T T T T T T T T T T$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 33             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 34             |
| $\nabla \mathbf{I} \mathbf{V} = \mathbf{\Gamma} \mathbf{V} \mathbf{I} \mathbf{I} \mathbf{V} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} I$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ः ः ः <b>ः</b> |
| RHUM(1) = ALCHAG*C14(1)+EAC(=CGM/1EV(1))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 37             |
| TAIT TEVELI<br>C. Set initial and or decide and the product                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 38             |
| C SEI INITIAL VAPUR REGIUN VALUES FUR G                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |
| - IF (SEA(1)) 20012001201                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 59             |
| 590  G(1) = G(1) + F(1) + 2LV(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ų(             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |
| 571 G(1) = GA120(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 42             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 43             |
| 37 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 44             |
| WRITE (6,38)-CI4(1),CI3(1),CI2(1),CI1(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 45             |
| 38 FORMAT (//43x, CONCENTRATIONS AT LIQUID VAPOR - VAPOR INTERFACE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 7 46           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 147            |
| SUM = CI1(1)/MH2+CI2(1)/MN2+CI3(1)/MNH3+CI4(1)/MN2H4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4E             |
| FRAC1 = CI1(1)/(MH2 + SUM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 49             |
| FRAC2 = CI2(1)/(MN2*SUM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 50             |
| FRAC3 = CI3(1)/(MNH3 + SUM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 51             |
| FRAC4 = CI4(1)/(MN2H4*SUM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 52             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5:             |
| WRITE (6,39) FRAC1,FRAC2,FRAC3,FRAC4,FRAC3D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 54             |
| - 39 FORMAT (///40X, *MFRAC1*, 6X, *MFRAC2* 6X, *MFRAC3' 6X, *MFRAC4* 6X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5              |
| A 'FRAC3D' / 35X,5E12.5 )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 56             |
| OPBOZ = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 57             |
| C SUBROUTINE ORDER STORES INTERFACE AXIAL STATIONS IN ASCENDING ORDE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | R S.           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |
| THE UNDER ILETTETY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |

| UNDER VEUTEUVI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 60                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| C SET N (20 INDICATOR) TO IGNORE INJECTOR TIPS IF LESS THAN SMALLEST ZV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | AP                                                                                                                                          |
| IF (200(NRINGS).LT.ZVO(1)) N=NRINGS+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 61                                                                                                                                          |
| C FIND AND LABEL ALL DISTINCT INTERFACES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                             |
| J = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 62                                                                                                                                          |
| IFACF = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 63                                                                                                                                          |
| F(r(1) = 1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 60                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 60                                                                                                                                          |
| IF (2V0(J)=2V0(I)) /2,/3,/2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 66                                                                                                                                          |
| 75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 67                                                                                                                                          |
| GU TU 74                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 68                                                                                                                                          |
| 72  J = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 69                                                                                                                                          |
| C IFACE = TOTAL NUMBER OF DISTINCT INTERFACES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                             |
| IFACE = IFACE+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 70                                                                                                                                          |
| I = I = I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 71                                                                                                                                          |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1 6.                                                                                                                                        |
| C FIND AND LADEL ALL DISTINCT 20'S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                             |
| J = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 73                                                                                                                                          |
| NUZU = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 74                                                                                                                                          |
| N20(1) = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 75                                                                                                                                          |
| DU 227 I=2, NRINGS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 76                                                                                                                                          |
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| 229 J = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 78                                                                                                                                          |
| 60 TU 227                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 70                                                                                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | н н<br>н н                                                                                                                                  |
| c NO70 - TOTAL MUMEED OF DISTINCT 7015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <u>.</u>                                                                                                                                    |
| Under Norder of Distinct 20.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                             |
| NOZU = NOZU+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81                                                                                                                                          |
| ₩20(₩020) = J                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 821                                                                                                                                         |
| 227 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 83                                                                                                                                          |
| C IF INTERFACE AXIAL POSITIONS FOR ALL RINGS ARE IDENTICAL (IFACE=1),                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                             |
| C THER SET VAPOR=1 TO INDICATE ENTRANCE INTO ALL-VAPOR REGION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                             |
| - 78 IF (IFACE-1) 23,22,23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 841                                                                                                                                         |
| 78 	 IF (IFACE-1) 	 23, 22, 23 	 22 	 VAPOR = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 84)<br>85)                                                                                                                                  |
| 78 	 IF (IFACE-1) 	 23,22,23 	 22 	 VAPOR = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 84)<br>85)<br>                                                                                                                              |
| $78  \text{IF (IFACE-1) } 23+22+23 \\ 22  \text{VAPUR = 1} \\ \hline VP = VP+1 \\ CALL  \text{OFLIAZ (CL1+CL2+CL3+CL4+T+G+PHO+PHOM+CK4+GP+T+P+2+1)z)} $                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 84<br>85<br>                                                                                                                                |
| 78 IF (IFACE-1) 23,22,23<br>22 VAPOR = 1<br>VP = VP+1<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>60 July 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>                                                                                                                                |
| 78 IF (IFACE-1) 23,22,23<br>22 VAPOR = 1<br>VP = VP+1<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO B<br>C USE CONTAINED A VALUE FOR INITIAL DOUTIONS OF VARON USECTOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 84<br>85<br>                                                                                                                                |
| 78 IF (IFACE-1) 23,22,23<br>22 VAPOR = 1<br>VP = VP+1<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO B<br>C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 84<br>85<br>86<br>87<br>88                                                                                                                  |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1 VP = VP+1 CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ) GO TO B C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION 23 DZZ = (ZVO(NRINGS)-ZVO(1))/25.</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 84<br>85<br>                                                                                                                                |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1 VP = VP+1 CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ) GO TO B C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION 23 DZZ = (2VO(NRINGS)-ZVO(1))/25. UZ = DZZ</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 84<br>85<br>86<br>87<br>88<br>88<br>89<br>90                                                                                                |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1 VP = VP+1 CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ) GO TO B C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION 23 DZZ = (ZVO(NRINGS)-ZVO(1))/25. DZ = DZZ 8 - ZP = 2</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>90                                                                                                |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>90<br>91<br>92                                                                                    |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>90<br>91<br>92<br>93                                                                              |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>90<br>91<br>92<br>93<br>94                                                                        |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>90<br>91<br>92<br>93<br>94<br>95                                                                  |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>93<br>94<br>95                                                                  |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>90<br>90<br>91<br>92<br>93<br>94<br>95<br>96                                                                  |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>96<br>                                                              |
| 78 IF (IFACE-1) $23, 22, 23$<br>22 VAPOR = 1<br>WP = VP+1<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO B<br>C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = ( $240(NRINGS)-2V0(1))/25$ .<br>DZ = DZZ<br>8 $2P = 2$<br>IF (VAPOR.EQ.1) GO TO 15<br>IF (IFFEG-1) 40,42,40<br>40 IF (DZ.LT.DZZ) DZ=DZZ<br>GO 10 15<br>42 DZ = DELZ<br>IFFEG = 0<br>15 Z = $2+DZ$                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>94<br>95<br>96<br><del>97</del><br>98                               |
| 78 IF (IFACE-1) $23, 22, 23$<br>22 VAPOR = 1<br>WP = VP+1<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO 8<br>C USE CGNSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = (ZVO(NRINGS)-ZVO(1))/25.<br>DZ = DZZ<br>8 $ZP = 2$<br>IF (VAPOR.EQ.1) GO TO 15<br>IF (IFFEG-1) 40,42,40<br>40 IF (UZ.LT.DZZ) DZ=DZZ<br>GO TO 15<br>42 DZ = DELZ<br>IFFEG = 0<br>15 Z = Z+DZ<br>C TEST IF WE HAVE REACHED THE END OF THE REACTOR                                                                                                                                                                                                                                                                                                                       | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>94<br>95<br>96<br><del>97</del><br>98                               |
| 78 IF (IFACE-1) $23, 22, 23$<br>22 VAPOR = 1<br>VP = VP+1<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO B<br>C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = (240(NRINGS)-ZVO(1))/25.<br>DZ = DZZ<br>8 $-2P = -2$<br>IF (VAPOR.E0.1) GO TO 15<br>IF (IFFLG=1) 40,42,40<br>40 IF (UZ,LT.DZZ) DZ=DZZ<br>GO TO 15<br>42 DZ = DELZ<br>IFFLG = 0<br>15 Z = Z+DZ<br>C TEST IF WE HAVE REACHED THE END OF THE REACTOR<br>IF (Z-ZEND) 43,43,44                                                                                                                                                                                                                                                                                             | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>94<br>95<br>96<br>97<br>98<br>99                                    |
| 78 IF (IFACE-1) $23, 22, 23$<br>22 VAPOR = 1<br>VP = VP+1<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,UZ)<br>GO TO 8<br>C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = (240(NRINGS)-ZVO(1))/25.<br>UZ = DZZ<br>8 $-2P = 2$<br>IF (VAPOR.EQ.1) GO TO 15<br>IF (IFFEG-1) 40,42,40<br>40 IF (UZ.LT.DZZ) DZ=DZZ<br>GO TO 15<br>42 DZ = DELZ<br>IFFEG = 0<br>15 Z = Z+DZ<br>C TEST IF WE HAVE REACHED THE END OF THE REACTOR<br>IF (Z-ZEND) 43,43,44<br>44 Z = ZEND                                                                                                                                                                                                                                                                               | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>94<br>95<br>96<br>97<br>98<br>99<br>98                              |
| 78 IF (IFACE-1) 23,22,23<br>22 VAPOR = 1<br>VP = VP+1<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO 8<br>C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = ( $2400(NRINGS)-2V0(1))/25$ ,<br>DZ = DZZ<br>8 $-2P = -2$<br>IF (VAPOR.EQ.1) GO TO 15<br>IF ( $1FFLG=1$ ) 40,42,40<br>40 IF ( $10Z$ ,LT.DZZ) DZ=DZZ<br>GO TO 15<br>42 DZ = DELZ<br>IFFLG = 0<br>15 Z = Z+DZ<br>C TEST IF WE HAVE REACHED THE END OF THE REACTOR<br>IF ( $2-ZEND$ ) 43,43,44<br>44 Z = ZEND<br>DZ = ZEND-ZP                                                                                                                                                                                                                                                | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>95<br>96<br>97<br>98<br>99<br>100<br>101                            |
| 78 IF (IFACE-1) 23,22,23<br>22 VAPOR = 1<br>VP = VP+1<br>CALL JELTAZ (CI1,CI2,CI3,CI4,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO 8<br>C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = (2VO(NRINGS)-ZVO(1))/25.<br>UZ = DZZ<br>8 $ZP = 2$<br>IF (VAPOR.EQ.1) GO TO 15<br>IF (IFFLG=1) 40,42,40<br>40 IF (UZ.LT.DZZ) DZ=DZZ<br>GO TO 15<br>42 DZ = DELZ<br>IFFLG = 0<br>15 Z = Z+DZ<br>C TEST IF WE HAVE REACHED THE END OF THE REACTOR<br>IF (Z-ZEND) 43,43,44<br>44 Z = ZEND-ZP<br>G TEST IF ALL INTERFACES HAVE WEEN ENCOUNTERED                                                                                                                                                                                                                               | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>94<br>95<br>96<br>97<br>98<br>99<br>100<br>101                      |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>96<br>97<br>98<br>99<br>100<br>101                                  |
| 78 IF (IFACE-1) $23, 22, 23$<br>22 VAPGR = 1<br>VP = VP+1<br>CALL DELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO 8<br>C USE CONSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = (2VO(NRINGS)-ZVO(1))/25.<br>UZ = DZZ<br>8 ZP = 2<br>IF (VAPOR.EQ.1) GO TO 15<br>IF (IFFLG=1) 40,42,40<br>40 IF (UZ.LT.DZZ) DZ=DZZ<br>GO TO 15<br>42 DZ = DELZ<br>IFFLG = 0<br>15 Z = Z+DZ<br>C TEST IF WE HAVE REACHED THE END OF THE REACTOR<br>IF (Z-ZEND) 43,43,44<br>44 Z = ZEND<br>UZ = ZEND-ZP<br>C TEST IF ALL INTERFACES HAVE BEEN ENCOUNTERED<br>43 IF (VAPOR-1) 28,33,28<br>C STILL # JILLIN BEGION OF VAPOULS ANNULAD INTERFACES === NOW 2015T TEST                                                                                                        | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>96<br>97<br>98<br>99<br>100<br>101                                  |
| 78 IF (IFACE-1) 23,22,23<br>22 VAPGR = 1<br>VP = VP+1<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO 8<br>C USE CGNSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = (2V0(NRINGS)-ZV0(1))/25.<br>UZ = DZZ<br>8 $ZP = 2$<br>IF (VAPOR.EQ.1) GO TO 15<br>IF (IFFLG=1) 40,42,40<br>40 IF (UZ.T.DZZ) DZ=DZZ<br>GO TO 15<br>42 DZ = DELZ<br>IFFLG = 0<br>15 Z = Z+DZ<br>C TEST IF WE HAVE REACHED THE END OF THE REACTOR<br>IF (Z-ZEND) 43,43,44<br>44 Z = ZEND<br>DZ = ZEND-ZP<br>C TEST IF ALL INTERFACES HAVE BEEN ENCOUNTERED<br>43 IF (VAPOR-1) 28,33,28<br>C STILL WITHIN REGION OF VARIOUS ANNULAR INTERFACES NOW MUST TEST                                                                                                                  | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>96<br>97<br>98<br>99<br>100<br>101                                  |
| 78 IF (IFACE-1) 23,22,23<br>22 VAPGR = 1<br>WP = VP41<br>CALL JELTAZ (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)<br>GO TO 8<br>C USE CGNSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = ( $240(NRIN65)-ZVO(1))/25$ .<br>DZ = DZZ<br>8 $ZP = 2$<br>IF (VAPOR.EQ.1) GO TO 15<br>IF (IFFLG=1) 40,42,40<br>40 IF (UZ.LT.DZZ) DZ=DZZ<br>GO TO 15<br>42 DZ = DELZ<br>IFFLG = 0<br>15 Z = 2+DZ<br>C TEST IF WE HAVE REACHED THE END OF THE REACTOR<br>IF ( $2-2END$ ) 43,43,44<br>44 Z = ZEND<br>DZ = ZEND-ZP<br>C TEST IF WE INTERFACES HAVE BEEN ENCOUNTERED<br>43 IF (VAPOR-1) 28,33,28<br>C STILL WITHIN REGION OF VARIOUS ANNULAR INTERFACES NOW MUST TEST<br>C FOR CURRENT Z EXCEEDING NEXT INTERFACE POSITION                                                     | 84<br>85<br>86<br>87<br>88<br>89<br>90<br>91<br>92<br>93<br>94<br>95<br>95<br>96<br>97<br>98<br>99<br>100<br>101                            |
| <pre>78 IF (IFACE-1) 23,22,23 22 VAPOR = 1 WP = VP+1 CALL JELTA2 (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,U2) G0 TO 8 C USE CGNSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION 23 DZZ = (2V0(NRINGS)-ZV0(1))/25. UZ = DZZ 8 ZP = -2 IF (VAPOR.EQ.1) GO TO 15 IF (IFFEG-1) 40,42,40 40 IF (UZ,LT.DZZ) DZ=DZZ G0 TO 15 42 DZ = DELZ IFFEG = 0 15 Z = Z+DZ C TEST IF WE HAVE REACHED THE END OF THE REACTOR IF (Z-ZEND) 43,43,44 44 Z = ZEND UZ = ZEND UZ = ZEND-ZP C TEST IF ALL INTERFACES HAVE DEEN ENCOUNTERED 43 IF (VAPOR-1) 28,33,28 C STILL WITHIN REGION OF VARIOUS ANNULAR INTERFACES NOW MUST TEST C FOR CURRENT Z EXCEEDING NEXT INTERFACE POSITION 28 MM = IFN(M) </pre>                                                                                             | 84<br>85<br>86<br>87<br>88<br>90<br>90<br>90<br>91<br>92<br>93<br>94<br>95<br>96<br>97<br>98<br>99<br>100<br>101<br>102                     |
| 78 IF (IFACE-1) $23, 22, 23$<br>22 VAPGR = 1<br>WP = VP+1<br>CALL JELTA2 (C11,C12,C13,C14,T,G,RHO,RHOM,CK4,GR,TGR,Z,U2)<br>GO TO 8<br>C USE CGNSTANT DZ VALUE FOR INITIAL PORTIONS OF VAPOR REGION<br>23 DZZ = (240(NRING5)-ZV0(1))/25.<br>UZ = DZZ<br>8 $2P = 2$<br>IF (VAPOR.EQ.1) GO TO 15<br>IF (UAPOR.EQ.1) GO TO 15<br>IF (UAPOR.EQ.1) GO TO 15<br>IF (UZ,LT.DZZ) DZ=DZZ<br>GO TO 15<br>42 DZ = DELZ<br>IFFLC = 0<br>15 Z = Z+DZ<br>C TEST IF WE HAVE REACHED THE END OF THE REACTOR<br>IF (Z-ZEND) 43,43,44<br>44 Z = ZENO<br>DZ = ZEND-2P<br>C TEST IF ALL INTERFACES HAVE DEEN ENCOUNTERED<br>43 IF (VAPOR-1) 28,33,28<br>C STILL WITHIN REGION OF VARIOUS ANNULAR INTERFACES NOW MUST TEST<br>C FOR CURRENT Z EXCEEDING NEXT INTERFACE POSITION<br>IF (Z-ZV0(MM)) 30,30,31 | 84<br>85<br>86<br>87<br>88<br>90<br>90<br>90<br>91<br>92<br>93<br>93<br>94<br>95<br>96<br>97<br>98<br>99<br>100<br>101<br>102<br>103<br>104 |

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| <b>G910461-30</b>                                                                                                                         |                       |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 31 DELZ = Z=ZVO(MM)                                                                                                                       | 105                   |
| DZ = ZVO(MM) - ZP                                                                                                                         | 106                   |
| Z = ZVO(MM) -                                                                                                                             | 107                   |
| IFFLG = 1                                                                                                                                 | 108                   |
| M = M+1                                                                                                                                   | 109                   |
| C WAS ZVO(MM) THE LAST INTERFACE                                                                                                          |                       |
| C TES ALL RINGS ARE VAPOR FROM NOW ON SO SET VAPOR=1                                                                                      |                       |
| 15 INU PRULELU<br>15 IM-15AFEL 30,30,30                                                                                                   |                       |
| $\frac{1}{32} = \frac{1}{12}$                                                                                                             | 111                   |
| C SET UP MIXTNG TERM INDICATOR FOR EACH OFING AT THIS AXIAL STATION                                                                       | 111<br>               |
| 30 DO 10 J=1/NRINGS                                                                                                                       | 112                   |
| C MIX IS STATUS INDICATOR FOR RING J                                                                                                      | •                     |
| C MIX = 1 NO RADIAL MIXING                                                                                                                |                       |
| C MIX = 2 INNER AUJACENT RADIAL MIXING                                                                                                    |                       |
| C MIX = 3 OUTER ADJACENT RADIAL MIXING                                                                                                    |                       |
| C MIX = 4 BOTH INNER & OUTER ADJACENT RADIAL MIXING                                                                                       |                       |
| MIX(J) = 1                                                                                                                                | 113                   |
| VEDITE WEAKEIN FIKOLUK LASI KINU                                                                                                          |                       |
| 1 1 (U-3) 101001<br>1 1 (U-3) 101001                                                                                                      | 114                   |
| C IF 262VAP FOR THIS RING THEN WE ARE STILL IN LIGHTN AREA                                                                                | 110                   |
| 2 IF (7-2LV(J)) 10,10,110 HEARE STEE IN EIGOD AREA                                                                                        |                       |
| 16 IF $(2-2LV(J-1))$ 3,3,4                                                                                                                | 117                   |
| 4  MIX(J) = 2                                                                                                                             | 118                   |
| 3 IF (Z-ZLV(J+1)) 10,10,5                                                                                                                 | 119                   |
| 5 IF (MIX(J)-2) 6,7,6                                                                                                                     | 120                   |
| 6  MIX(J) = 3                                                                                                                             | 121                   |
| <del>80 TO 10</del>                                                                                                                       |                       |
| 7  MIA(J) = 4                                                                                                                             | 123                   |
| 60 TO 10                                                                                                                                  | 124                   |
| C FIRST AND LAST RINGS ARE SPECIAL CASES                                                                                                  | 105                   |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$                                                                                      | 125                   |
|                                                                                                                                           | 140                   |
| 12 IF (Z-ZLV(NRINGS-1)) 10+10+14                                                                                                          | 128                   |
| 14  MIX(J) = 2                                                                                                                            | 129                   |
| 10 CONTINUE                                                                                                                               | 130                   |
| 33 IF (N.GT.NO20) GO TU 225                                                                                                               | 131                   |
| NII = NZO(N)                                                                                                                              | 132                   |
| C IF SMALLEST CURRENT 20 IS ZERO MOVE ON TO PROGRAM CALC'S                                                                                |                       |
| IF (Z00(NN)) 225,225,230                                                                                                                  | 133                   |
| C TEST IF CUNNENT Z EXCEEDS SMALLEST REMAINING ZO                                                                                         |                       |
| 230 IE /7-200(NAL) 225-225-225                                                                                                            | 1 7/1                 |
| $226  D_2 = 2 - 200 (MH)$                                                                                                                 | 134                   |
|                                                                                                                                           |                       |
| N = N+1                                                                                                                                   | 137                   |
| G SET UP CALCULATIONS FOR TEMP AND CONCENTRATION                                                                                          |                       |
| 225 DO 20 J=J+NRINGS                                                                                                                      | 138                   |
| C TEST IF WE ARE PRECISELY AT LAST INTERPACE                                                                                              |                       |
| IF (Z-2VO(NRINGS)) 41,41,77                                                                                                               | 139                   |
| C YES NOT YET IN ALL-VAPOR REGION                                                                                                         |                       |
| NO VP INDICATOR HANDLES CASES WHERE Z IS GREATER                                                                                          |                       |
|                                                                                                                                           | 140                   |
| WE ARE IN THE ALL-VAPUR REGION OF THE REACTOR MIX PARAMETER NOW                                                                           |                       |
| $\mathbf{v} = \mathbf{r} \mathbf{x} \mathbf{r} \mathbf{v} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{x} \mathbf{x} x$ | 144                   |
|                                                                                                                                           | 141<br><del>044</del> |
| 00 9 1=2.NM1                                                                                                                              | 143                   |
| ···                                                                                                                                       | TAN                   |

| <b>G910461-3</b> 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| MIX(1) = 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1440         |
| 9 CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1450         |
| C INCREMENT VP TO AVOID REDUNDANT SETTINGS OF 'MIX'                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |
| $\frac{VP = VP+1}{2}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1460         |
| C COMPARE CURRENT Z WITH INTERFACE Z FOR THIS RING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1470         |
| C Z <zvap move="" next="" on="" ring<="" td="" to=""><td></td></zvap>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |
| C 2>2VAP CONTINUE ON WITH CALCULATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |
| 41 1F $(2-2LV(J))$ 96,96,27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1480         |
| C SET UP PRELIMINARY CALCULATIONS FOR DWDZ TERMS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4400         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1490         |
| CALL UNBAR (DELVSZIIZEVRADICI) - DELTA-KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1510         |
| CALL UNDAR ( $H4TBL$ , 1, T(J), 0, $H4$ , KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1520         |
| CALL UNBAR (CFTBL4,1,T(J),0.,CF4,KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1530         |
| CALL UNBAR (CFTBL3,1,T(J),0,,CF3,KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1540         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1550         |
| CALL UNBAR (CFTBL1:1:T(J):0.:CF1:KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1560.        |
| C TEST IF Z MAS EXCEPTED INJECTOR TIP FOR THIS KING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1570         |
| 34 G(J) = G(J)+F(J)*2P                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1580         |
| GU TO 63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1590         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |
| F(J) = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1610         |
| 63  CFHAR = (CF1*CI1(J)+CF2*CI2(J)+CF3*CI3(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J)+CF4*CI4(J))/(CI1(J))/(CI1(J)+CF4*CI4(J))/(CI1(J))/(CI1(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1620         |
| X = (12(0)+(13(0)+(14(0)))<br>PHOM(1) = AIPHA3+(14(1)+(1)+(1))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1630         |
| $EP_{SLN} = -A*G(J)/(5,*RHO(J)*DELTA)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1650         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1660         |
| MX = MIX(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1670         |
| GO TO (56,57,58,59), MX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>1</b> 680 |
| C STATEMENT 56 NO MIXING TERMS USED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |
| 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1690         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | +7+0         |
| NR4 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1720         |
| $\Theta R1 = 0.$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1730         |
| QRN = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1740         |
| NRR1 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1750         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1760.        |
| $\frac{1}{1} = \frac{1}{1} = \frac{1}$ | 1780         |
| $ \Theta RR1 = 0.$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1790         |
| GO TO 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1800         |
| - C STATEMENT 57 INWARD MIXING ONLY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |
| 57 NR1 = $EPSLN*(CI1(J)-CI1P)/DR$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1810         |
| $\frac{1}{1000} = \frac{1}{1000} = 1$                                                                                                                                                                                                   | 1620         |
| NR4 = EPSEN*(C14(J)-C14P)/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1840         |
| $\Im R1 = LAMDA * (T(J) - TP) / DR$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1850         |
| QRN = (HR1*CF1+HR2*CF2+NR3*CF3+NR4*CF4)*(T(J)-TP)/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1860         |
| NRR1 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1870         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |
| $\frac{W(K) - U_{\bullet}}{W(K) + 1}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 100r         |
| QRR1 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1910         |
| 60 TO 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1920         |
| C STATEMENT 58 OUTWARD MIXING ONLY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <u>193</u> € |
| NKZ # U.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1940,        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | - m          |
| 120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |

| <b>G91</b> 04 | 61-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                              |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 105                          |
| *             | NR4 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1950                         |
|               | QK1 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1970                         |
| 4             | GRN = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1980                         |
| 550           | NRK1 = EPSLN*(CI1(J+1)-CI1(J))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1990                         |
|               | NRK2 = EPSLII*(CI2(J+1)-CI2(J))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2000                         |
|               | NRR3 = EPSLN*(CI3(J+1)-CI3(J))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2010                         |
| 1             | NKR4 = LPSLN*(CI4(J+1)-CI4(J))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2020                         |
| 1             | Q(R) = LAMUA*(1(J+1)+I(J))/UR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2030                         |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5040                         |
| 59            | NR1 = FPSLN*(CI1(J)-CIP)/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2050                         |
|               | k   = EPSLN + (C12(J) - C12P) / DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 205                          |
| 3             | $\Pi K3 = LPSLN*(CI3(J)-CI3P)/DR$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2070                         |
| 2             | MR4 = EPSLN*(C14(J)-C14P)/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2080                         |
| ≠<br>`\<br>≹  | $\forall R_2 = LAMDA * (T(J) - TP) / DR$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2090                         |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2100                         |
| 223           | $\operatorname{MKK1} = \operatorname{LPSLN} (\operatorname{CI1}(J+1) - \operatorname{CI1}(J)) / \operatorname{DR}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 211(                         |
|               | MRR2 = EP5LN*(C1?(J+1)-C12(J))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 5150                         |
|               | NRR3 = EPSLN*(CI3(J+1)-CI3(J))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2130                         |
|               | NKKY EPELY*(CI4(0+1)*CI4(0))/DK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2140                         |
| Í <u>-c</u>   | CANDATING TO THE AREA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2150                         |
| 60            | $11  (2-2V_1)(MRIN(S)) = 1+b1+62$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2160                         |
| C             | YES SKIP CALL TO SUBROUTINE SGRAD (THIS WAS DONE IN DELTAZ)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>21</b> 00                 |
| С             | NO CUNTINUE AS BLFORE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                              |
| 61            | CALL SURAD (CI1(J)+C12(J)+CI3(J)+CI4(J)+G(J)+T(J)+GRAD+TGRAD+J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2170                         |
|               | 50 TU 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2180                         |
| -62-          | - 6KAL! = 6K(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2190                         |
|               | TGRAU = TGR(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2200                         |
| <u> </u>      | KC4 = CK4(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2210                         |
| 04            | $a_{1} = c_{1}(c_{1}) c_{0}(c_{1})$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2220                         |
|               | $x_2 = C(2(0)/Rh0(0))$<br>$x_3 = C(3(0)/Rh0(0))$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2200                         |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2240                         |
|               | Uw1U2 = (.5+0H2/MH2H4+(RHOM(J)+DELTA+AP+KC4+CI4(J))+1.5+AP+GRAD+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2260                         |
|               | A MH2/WNH3+(NR1-WRR1) *DELTA/UR-NRR1*DELTA/RAU(J)-F(J)*W1)/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2270                         |
|               | x G(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2280                         |
|               | UWPUZ = (.5*MN2/MN2H4*(RHOM(J)*DELTA+AP*KC4*CI4(J))+.5*AP*GRAD*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2290                         |
|               | X MIN2/MINH3+(INR2-MRR2)*DELTA/DR-NRR2*DELTA/RAD(J)-F(J)*W2)/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2300                         |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2310                         |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2320                         |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2330                         |
|               | しかかした。 ― ()(し)=KTIU */ し) * ULL I A=AF */ しりぞく I 4 (し) * ( NK4=NKK4) *ULL I A/UK=<br>メーニーー                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2340                         |
| C +           | CAUY PROGRAM FOR TEMP.CONCENTRATION CALCULATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2000                         |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |
|               | <pre>X CI3(J)/MNH3+CI4(J)/MN2H4)</pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2370                         |
|               | WM5M = w1/MH2+w2/MN2+W3/MNH3+W4/MN2H4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2380                         |
|               | UMDZ = -MEAR/WMSM*(DW1JZ/MH2+DW2DZ/MN2+DW3DZ/MNH3+DW4DZ/MN2H4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2390                         |
|               | DHU2 = -(F(J)*(H(J)-HF)+AP*TGRAD+DELTA*(H4*RHOM(J)-(QR1-QRR1)/DR)+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2400                         |
|               | X JRK1+DELTA/RAD(J)+QRN*DELTA)/G(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2410                         |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |
|               | していした。                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2430                         |
|               | $\frac{1}{100} \frac{1}{100} = \frac{1}{100} $ | 244U<br>2460                 |
|               | DC3DZ = RH0(J) * DW3DZ + W3*DR0DZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2400                         |
|               | UC4DZ = RHO(J) * JW4DZ+W4*DRODZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2400                         |
| <del></del>   | FURE TEMP CUNCENTRATIONS FOR INWARD RADIAL MIX CALCS IN NEXT RING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ۲۲۷ مو<br>د دادهاست - د مو ۱ |
|               | CI1P = CI1(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2480                         |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |

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| C15h = C15(f)                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2490                                              |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| C13P = C13(J)                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2500                                              |
| $C1\mu P = C14(J)$                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2410                                              |
| $1P \equiv T(A)$                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2010                                              |
|                                                   | 11AAD 4.10 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2020                                              |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2000                                              |
| 012107 - 0121777<br>0121 0121114                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2540                                              |
|                                                   | DC3DA+UZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2550                                              |
| CI4(J) = CI4(J) +                                 | DC4DZ+UZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2560                                              |
| IF (C11(J).ET.0.                                  | ) CI1(J)=0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2570                                              |
| IF (CI2(J).LT.0.                                  | ) CI2(J)=U.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2580                                              |
| IF (C:3(J).LT.0.                                  | + CI3(J)=0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2590                                              |
| 1F (C14(J).LT.0.                                  | ) CT4(J)=0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2600                                              |
| T(J) = T(J)+0TU2                                  | (a)))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24.10                                             |
| TE (T(.)) LT(.))                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2010                                              |
| −−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2020                                              |
| ΠΙΟΙ Η ΕΙΙΟΙΤΟΠΟΑ<br>Ο ΕΙΟΙΕ Ο ΈΞΝΟ ΑΝΟ Γ         | THE AND A CONTRACT OF A CONTRACT OF A DESCRIPTION OF A DE | 2650                                              |
| C STUKE ZITEMPTANU U                              | ONCENTRATIONS IN OUTPUT BLOCK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | · · •                                             |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2640                                              |
| TT(J) = T(J)                                      | ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2650                                              |
| C1(J) = CI1(J)                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2660                                              |
| $C_{2}(J) = C_{12}(J)$                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2670                                              |
| C3(J) = CI3(J)                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2680                                              |
| C5(J) = CI4(J)                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2690                                              |
|                                                   | LCT-21-11- MN94CT-21-11- MNH34PT4 (-11- MN9H4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <u>といい。</u><br>                                   |
| IF (CTU(.1)   T.O.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6100<br>0710                                      |
| 15 1017 (9790) 900 (900)<br>15 1017 (91) 11 17 0. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2710                                              |
| エピー ししょうしり★ビ★★ 0 ★<br>ビジョクキーサークエキノ 1) ノノ          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2720                                              |
| FKAUL = UII(U)/(                                  | MH2*SUM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2730                                              |
|                                                   | MN2*SUM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2740                                              |
| FRACS = C13(J)/T                                  | MNH3*SUM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2750                                              |
| FRAC4-= CI4(J)/(                                  | MN2H4+5UM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ~2 <del>760</del>                                 |
| FRAC3D = (FRAC1/                                  | FRAC2-1.)/(3FRAC1/FRAC2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2770                                              |
| F1(J) = FRAC1                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2780                                              |
| F2(J) = FRAC2                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2790                                              |
| F3(J) = FRAC3                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2800                                              |
| F4(J) = FRAC4                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2810                                              |
| E30(1) = FHAC30-                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ~~ <del>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</del> |
| 60 TO 20                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 142020                                            |
|                                                   | TOUR FOLLAW FOR THE DENC TERA AUT AUTRUT DENCK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2000                                              |
| AND MORTHER ORECOLD                               | TIONS FULLOW FUR THIS KING ZERU UUT UUTFUT DEVEN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                   |
| C AND MOVE ON TO NEA                              | TRING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | _                                                 |
| -96 ZZ(J) = 0.                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2840                                              |
| TT(J) = 0.                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2850                                              |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -21'                                              |
| C2(J) = 0.                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2 - 41 - 7                                        |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 281.3                                             |
| C5(J) = 0.                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 28-0                                              |
| ·· -···                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2010                                              |
| 527.11 = 0.                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0010                                              |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5310                                              |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2920                                              |
| F4(J) = U.                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2930                                              |
| F3U(J)-=-U                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2940                                              |
| 20 CONTINUE                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2950                                              |
|                                                   | .44.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2960                                              |
| IF (P.LT.0.) GO                                   | TO 94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2970                                              |
| -CCALCULATE DPDZ FOR                              | PRESSURF CHANGES IN EACH RING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |
| SUMP = 0.                                         | THE CONE CONTRACTOR BIT MILLER CONTRACTOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2000                                              |
|                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2200                                              |
| CALL HURAR (VISV                                  | INT A THAN OF ANTO AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2770                                              |
| CALL UNDAN TIGT                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3000                                              |
| CALL UNDAR "TAYSE                                 | 11172+RAU(J)+A+KK+-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3010                                              |
| LALL UNDAR LUCLY                                  | SZ/1/Z/RAD(J)/DELTA/KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3020                                              |
|                                                   | <del>CI2(J)+CI3(J)+CI4(J)</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                   |
| RHUM(J) = ALPHA3                                  | j*CI4(J)*EXP(→CGM/T(J))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3040                                              |

•

|         | 1)//////// =//// TA1/DF+TA++++ 75+75 -+//FE+/4                                              | <u> ኣ</u> ሰፍ |
|---------|---------------------------------------------------------------------------------------------|--------------|
|         | - いっいとていう ー ~((()=)(()=)(())()()()()()()()()()()()()                                        | 000<br>304   |
|         | SUMP = SUMP+DPDZ(J)*RAD(J)                                                                  | 307          |
| 75      | CONTINUE                                                                                    | 308          |
|         | UPBDZ = 2. +DH+SUMP/RADIUS++2                                                               | 309          |
|         | WRITE (6,599)                                                                               | 310          |
| 599     | FORMAT ( /// 28X#*PING*,11X)*Z*#10X)*TEMP*/8X,*N2H4*/9X,*NH3*/                              | 311          |
|         | A SX/1N21/10X/1H21 )                                                                        | 312          |
|         | WRITE (6,600) (J,ZZ(J),TT(J),C5(J),C3(J),C2(J),C1(J),J=1,NRINGS)                            | 313          |
| 600     | FORMAT (29X, 12, 5X, 6E12.5)                                                                | 314          |
| 07      | WRITE (0/9/) F<br>CONWAT (//SUY, 1005CCUDE -1.512 5)                                        | 315          |
| 71      | WRITE (5,36) (FILL) FOLLINFS() FRESSORE - TELES                                             | 317          |
| 36      | FORMAT (//86X+'EQUIVALENT' / 40X+'MFRAC1'+6X+'MFRAC2'+6X+'MFRAC3'+                          | 318          |
|         | $X = 6X_1 + MFRAC4 + 16X_1 + FRAC3D^{1} / (35X_1 + 5E12_{15})$                              | 319          |
|         | WRITE (6,606)                                                                               | 320          |
| 606     | <del>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</del>                                            | 321          |
|         | X * * * * * * * * * * * * * * * * * * *                                                     | 3220         |
|         | UU 108 J=1,NRINGS                                                                           | 323          |
|         | IF (TT(J).LT.TLV(J)) GO TO 106                                                              | 324          |
| 108     | CONTINUE                                                                                    | 355          |
|         | TELN IF WE HAVE REACHED THE END OF THE REACTOR                                              | 2000         |
| C (     | TE VERENUT TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT                                              | 3263         |
| 17      | IF (Z=ZVO(NRINGS)) A+21+21                                                                  | 3271         |
| ςΥ      | ES CALL DELTAZ TO CALCULATE A NEW DZ                                                        | 0410         |
| 21      | CALL DELTAZ (CI1,C12,CI3,CI4,T,G,RHO,RHOM,CK4,GR,TGR,Z,DZ)                                  | 3280         |
|         | VAPOR = 1                                                                                   | 3290         |
|         | VP = VP+j                                                                                   | 330          |
|         | IF (VP.GT.3) VP=3                                                                           | 331          |
| <b></b> | GO TO B                                                                                     | 3320         |
| 94      | WRITE (6,95)<br>ROUMAT ///JON ATUS DEOCRAM HAR CALCULATED A MERATENE DOCOSTOR               | 3330         |
| 70      | PURMAI 1773UATTIME PRUGRAM MAS CALCULATED A NEGATIVE PRESSURE                               | 275          |
|         |                                                                                             | 3330<br>4361 |
| 98      | WRITE (6.103) J                                                                             | 337          |
| 103     | FORMAT (//23X, THE PROGRAM HAS CALCULATED A NEGATIVE TEMPERATURE I                          | 338          |
|         | XI RING +13, RETURN AND TERMINATE )                                                         | 339          |
|         | 60 TO 8                                                                                     | 3408         |
| 106     | WRITE (6,107) J                                                                             | 3410         |
| -107-   | FORMAT 1// 7X, THERE IS A PUDDLE OF COLD HYDRAZINE AT THE LIQUID-V                          |              |
|         | XAPUR/VAPOR INTERTACE IN RING 131 TRY USING A LARGER VALUE FO                               | 3430         |
| 00      | AR DUTI<br>DA TLICA:                                                                        | 344          |
| フワ      |                                                                                             | 3430<br>3460 |
|         |                                                                                             | 3400         |
| ·       |                                                                                             |              |
|         | `                                                                                           |              |
|         |                                                                                             |              |
|         | SUBROUTINE URDER (2V, ZVO)                                                                  | (            |
|         | THIS HOUTINE PLACES THE NUMBERS OF THE FIRST ARGUMENT ARRAY IN                              |              |
|         | ASCENDING ORDER AND STORES THEM IN THE SECOND ARGUMENT ARRAY                                |              |
| ••••••  | <del>·····COMMON··/BLOK3/K+K++K++K++KC3+KC4+HF+HL+HV+TF+CF+CFBAR+GAMMA+C4+NRINGS</del> ···· | 1            |
|         | $DIMENSION = ZV(100) \neq ZVO(100)$                                                         | 20           |
|         | LADI = NRINUS II                                                                            | <u>ن</u> ان  |
|         | 200(1) = 20(1)<br>200(1) = 20(1)                                                            | 4 U<br>5 L   |
|         |                                                                                             | ູ່ວເ         |
| 10      |                                                                                             | 61           |
| 10      |                                                                                             | 60<br>       |

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|             | 1F (2V0(1)-2V0(1+1)) 15,15,4                                                | 90          |
|-------------|-----------------------------------------------------------------------------|-------------|
| 4           | 1EMP = ZVO(1)                                                               | 100         |
|             | Zvu(1) = 2vu(1+1)                                                           | 110         |
|             | 2VO(1+1) = TEMP                                                             | 120         |
| -15-        | CONFINUE                                                                    |             |
| 50          | CONTINUE                                                                    | 140         |
|             | KE TUPN                                                                     | 150         |
|             | EIID                                                                        | 160         |
|             |                                                                             |             |
|             |                                                                             |             |
|             |                                                                             |             |
|             |                                                                             |             |
|             | SUMMOUTTOE OF TAT LOTA. CTA. CTA. CTA. T. C. DUG. DUGH. CVA. CD. TCD. 7. D7 | Û           |
| c           | SUBROUTINE DELTAZ (CIIVCIZ/CIJ/CI4/I/SURRU/RRU/RRU/RC/4/SR/I/SR/Z/DZ)       | G           |
| č           | THIS RUDINE CALCULATES A SUITABLE BY INCREMENT FOR THE ALL-VAPOR            |             |
| C           | FURTION OF THE REACTOR                                                      |             |
|             | REAL LAMDA, JIKI , NRI, NRZ, NRJ, NR, KC4, MHZ, MNZ, MNH3, MNZH4            | 10          |
|             | CUMMON 78LUK17F(25);H(25);KAU(25);GATZ0(25);C0(25);20(25)                   | 20          |
|             | COMPON /HEOK2/A, AP, DELTA, DR, DPA, DON2H4, DONH3, R, CGM, RALIUS, NMAX1,  | 30          |
|             | X NMAX2, ALPHA1, ALPHA2, BETA, AGM, BGM, P, ZEND, MH2, MN2, MNH3, MN2H4     | 40          |
|             | COMMON /BLOK3/K+KI+KP+KC3+KC4+HF+HL+HV+TF+CF+CFBAR+GAMMA+C4+NRINGS          | 50          |
|             | CUMMUN /BVTHLS/AV52(234), APVSZ(234), BELVSZ(234)                           | 60          |
|             | COMMON /CCC/H4TBL(40),H3TBL(40)                                             | 70          |
| ~ <u> </u>  |                                                                             | 80          |
|             | DIMENSION T(25),CI1(25),CI2(25),CI3(25),CI4(25),G(25),RH0(25),              | 90          |
|             | A PHOM(25); DWDZ(25); DWDZO(25); DTDZ(25); DTDZO(25); GR(25);               | 100         |
|             | $\vec{x}$ iGR(25)+CK4(25)                                                   | 110         |
|             | 00 20 J=1 + NRINSS                                                          | 120         |
|             | CALL UNDAR (AVSZ+1+Z+RAD(J)+A+KK)                                           | 130         |
|             | CALL UHBAR (APV57+1+7+RAD(U)+AP+KK)                                         |             |
|             | CALL UNBAR (DELVSZ-1-Z-RAD(J)+DELTA-KK)                                     | 150         |
|             | CALL UNBAR (H4TBL+1+T(J)+ $\partial_{x}$ +H4+KK)                            | 160         |
|             | CALL UNBAR (CETBI 4+1+T(.))+0.+CE4+KK)                                      | 170         |
|             | CALL HismAR (GETH 3.1.T(.1).n. CE3.KK)                                      | 180         |
|             | CALL UNBAR (CETBL 2.1.T(.1).0(E2.KK))                                       | 190         |
|             |                                                                             |             |
| C           | CHECK CHRRENT Z WITH INJECTOR TIP FOR FACH RING                             | 200         |
|             | IE (2-20/1) 11/12/12                                                        | 210 .       |
| - 11        |                                                                             | 210 -       |
| 11          |                                                                             | 220         |
| 4.0         |                                                                             | 230         |
| 12          | G(J) = GATZO(J)                                                             | 240         |
|             |                                                                             | 250         |
| 15          | UFDAR = (LF1*L11(J)+CF2*C12(J)+CF5*C13(J)+CF4*C14(J)}/(C11(J)+              | 260         |
|             |                                                                             | 270         |
|             | EMSLIN = -A*G(J)/(D+KHU(J)*UELIA)                                           | 280         |
|             | LAMUA = -A+CFBAR+6(J)/(5.+DELTA)                                            | 290         |
| C           | FIRST AND LAST RINGS ARE SPECIAL CASES                                      |             |
|             |                                                                             |             |
| 1           | IF (J-NRINGS) 3,4,3                                                         | <b>31</b> 0 |
| <b>G</b>    | STANDARD MODE BUTH INWARD AND OUTWARD MIXING                                |             |
| - 3         | iik1 = EPSLN*(CI1(J)-CI1(J-1))/DR                                           | 320         |
|             | NR2 = EPSLN*(CI2(J)-CI2(J-1))/DR                                            | 330         |
|             | NR3 = EPSLN*(CI3(J)-CI3(J-1))/DR                                            | 340         |
|             |                                                                             |             |
|             | QR1 = LAMDA*(T(J)-T(J-1))/DR                                                | 360         |
|             | &kN = (NR1+CF1+NR2+CF2+NR3+CF3+NR4+CF4)+(T(J)-T(J-1))/DR                    | 370         |
|             | NKR1 = EPSLN*(CI1(J+1)-CI1(J))/DR                                           | 380         |
|             | QRR1 = LAMDA + (T(J+1) - T(J)) / D                                          | 390         |
|             | 60 TU 10                                                                    | 400         |
| _ <b>\$</b> | FIRST HING OUTWARD MIXING ONLY                                              |             |
| 2           | NR1 = 0.                                                                    | 410         |
| <b>.</b>    |                                                                             |             |

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410 \*

| <b>G</b> 910461-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |
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| "NR3 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 430        |
| tiR4 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 440        |
| QR1 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 450        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | - 460      |
| $\frac{1}{3} \qquad (NRK1 = EPSLN*(CI1(J+1)-CI1(J))/UR$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 470        |
| $\mathcal{C}_{\mathcal{C}} = \mathcal{C}_{\mathcal{C}} = $ | 489        |
| C LAST RING INWARD MIXING ONLY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 440        |
| $4 \qquad \text{NR1} = \text{EPSLN} * (\text{CI1}(J) - \text{CI1}(J-1)) / \text{DR}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 540        |
| NK2 = EPSLN*(C12(J)-C12(J-1))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | - 510      |
| NR3 = EPSLN*(C13(J)-C13(J-1))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 520        |
| iik = EPSLM * (C1+(J)-CI+(J-1))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 530        |
| uk1 = LAMDA*(T(J)-T(J-1))/UR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 540        |
| QRiv = (NR1 + CF1 + NR2 + CF2 + NR3 + CF3 + NR4 + CF4) + (T(J) - T(J-1))/DR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 550        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 560        |
| $\frac{10}{10} = \frac{10}{10} = 10$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 579        |
| $\frac{1}{6} = \frac{1}{6} = \frac{1}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 500        |
| $T_{GRAD} = T_{GRAD}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 590        |
| CK+(J) = KC+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 610        |
| w1 = CI1(J)/RHO(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 020        |
| UWUZ(U) = (.5+MH2/MN2H4+(RHOM(J)+DELTA+AP+KC4+CI4(J))+1.5+AP+GRAD*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 630        |
| MH2/MNH3+(NR1-NRR1)*DELTA/DR-NRR1*DELTA/RAD(J)-F(J)*W1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | n40        |
| X /G(J)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 650        |
| UHUZ = -(F(J)*(H(J)-HF)+AP*TGRAD+DELTA*(H4*RHOM(J)-(GR1-GRR1)/DR)+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 660        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 670        |
| 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 500<br>600 |
| C FILD LARGEST OF DWDZIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.90       |
| CALL ORDER (DWDZ, DWDZO)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 700        |
| C FILL LARGEST OF DTD215                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |
| CALL ORDER (DTDZ, DTDZO)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 710        |
| C CALCULATE NEW UZ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ~ 720      |
| $JZ2 = 50 \cdot 70 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 1$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 730        |
| 02 = AM101(021,022)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 740        |
| RETURN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 740        |
| END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 760        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |
| SUBROUFINE SLOPE (RATE)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0          |
| KLAL K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10         |
| Y NMAY2AAI DHA1AAI DUA2AFTAAAAA AA DHA1AAI DUA2AFTAAAAAA AA AAAAAAAAAAAAAAAAAAAAAAAAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 20         |
| COMMON ZHEOK3ZEKOAKPAKC3AKCAAHFAHIAHVATEACEACHADAGAMMAACAANDTAGG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 50         |
| COMMON ZMMMZMI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 50         |
| DIMENSION K(1), GMMA(1), BETA(1), DPA(1), CG(1), S(210), FST(210).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 60         |
| ISLC(210),D(210),CPA(210),CPB(210),E(210),A(1),TERM1(210),                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 70         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |

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| X NMAX2, ALPHA1, ALPHA2, BETA, AGM, BGM, P, ZEND, MH2, MN2, MNH3, MN2H4 | 30  |
|-------------------------------------------------------------------------|-----|
| COMMON /HLOK3/1. KO,KP,KC3,KC4,HF,HL,HV,TF,CF,CFBAR,GAMMA,C4,NRINGS     | 40  |
| CUMMON /MMM/MI                                                          | 50  |
| DIMENSION K(1), GMMA(1), BETA(1), DPA(1), CG(1), S(210), FST(210),      | 60  |
| ISLC(210),D(210),CPA(210),CPB(210),E(210),A(1),TERM1(210),              | 70  |
| <br>                                                                    |     |
| CG(1)=C4                                                                | 90  |
| GMMA(1)=GAMMA                                                           | 100 |
| PRES=P                                                                  | 110 |
| E012=1                                                                  | 120 |
| 0IFF=00i42H4                                                            | 130 |
| <br>IFLAGEO                                                             |     |
| JFLAG = 0                                                               | 150 |

.

|          |                                                                   | 160                |
|----------|-------------------------------------------------------------------|--------------------|
| 10       |                                                                   | 170                |
| 21       |                                                                   | 180                |
| 702      |                                                                   | 190                |
|          | NOTEN                                                             |                    |
|          | AD1V=100.                                                         | 210                |
|          | BD1A=100.                                                         | 220                |
|          | TuL=•01                                                           | 230                |
|          | STURE=1.0                                                         | 240                |
|          | KJ=0                                                              | 250                |
|          |                                                                   | 260                |
|          | N1=0                                                              | 270                |
| 13       | M1=0                                                              | 280 .              |
|          | 17=0                                                              | 290                |
|          | 1K=0                                                              | 300                |
|          |                                                                   | 310                |
|          |                                                                   | 320                |
|          | F=0.5                                                             | 330                |
| 20       | MM=MM+1                                                           | 300                |
|          |                                                                   | 350                |
|          |                                                                   | 320                |
|          |                                                                   | 370                |
|          |                                                                   | 370                |
|          | TETADLY $TETADLY$                                                 | 380                |
|          |                                                                   | 390                |
| 15       |                                                                   | 400                |
| 10       |                                                                   | 410                |
|          |                                                                   | 420                |
|          |                                                                   | 430                |
| 14       |                                                                   | 441)               |
| 10       |                                                                   | 450                |
|          |                                                                   | 460                |
| 4        |                                                                   | 470                |
| 14.      | · 大学校会社                                                           | 480                |
|          | DO 40 IJEI, MAAX                                                  | 490                |
| *        | 1-113-01-5-1-11-00-10-49                                          |                    |
|          |                                                                   | 510                |
|          |                                                                   | 520                |
| 49       |                                                                   | 530                |
|          | X=B+FLOAT(KMJ)+BDK                                                | 540                |
| 25       | CP=CG(I) * X / (A(I) - B) - (B / (A(I) - B)) * CG(I)              | 550                |
| ~        |                                                                   | <del>560 -</del> , |
|          | THIS IS THE GENERAL EQUATION FOR A LINE WITH NEGATIVE Y-INTERCEPT | ۲.<br>۲            |
| 24       | FACT1=K(-1) + (CG(1)) + (1 - EN12) + (CP) + EN12                  | 570                |
|          | EFAC1=GMMA(1)*BETA(1)*(1,-CP/CG(1))/(1.+BETA(1)*(1CP/CG(1)))      | 580                |
| ···· · · | IF(EFACT.GT.88.)EFAC1=88.                                         | 5 <del>9</del> 0   |
|          | FACT2=EXP(EFACT)                                                  | 600                |
|          | - IF { X } - 37,40,37                                             | <del>610</del>     |
| 37       | RCP=FACT1*FACT2                                                   | 620                |
| 35       | S{IU}={1,/X-1,/A(I))*X*x*RCP                                      | 630 `              |
| 40       | CONTINUE                                                          | 640                |
| 50       | SUM=0.0                                                           | 650                |
|          | SUMA=0.0                                                          | 660                |
|          | - DO ++0-1L=2vMAX                                                 | 670                |
|          | IF(1L.GT.MINT) GO TO 61                                           | 680                |
|          | SUM=SUM+S(IL)                                                     | 690                |
|          | GO TU 60                                                          | 700                |
| 61       | SUMA=SUMA+S(1L)                                                   | 710                |
| 60       | CONTINUE                                                          | 720                |
|          | - <del>5(1) =0,</del>                                             | 730                |
|          | SGMA=(5(1)+2.*SUM)*(ADR/(2.*DPA(1)))+(5(MMAX)+2.*SUMA)*(ADR/(2.   | 740                |
|          |                                                                   |                    |

| G91046          | 51-30                                                                   |            |
|-----------------|-------------------------------------------------------------------------|------------|
|                 | 10*UPA(1);;                                                             | 750        |
| *               | U2=SGMA-FRAC*CG(I)                                                      | 760        |
| *<br>-1         | TOT=D2+TOL*CG(1)                                                        | 770        |
| 4               | IF(MM-1) 110,110,112                                                    | 780        |
| <del>~112</del> | 1F(02)1v1v2                                                             | - 790      |
| 1               | IF(TOT)2,230,230                                                        | 800        |
| 2               | 60 10 115                                                               | 810        |
| - 110           | IF(IFLAG.EQ.1)GO TO 115                                                 | 850        |
|                 | 1F(D2)150/115/115                                                       | 630        |
| 115             | $1F(M^{+}+1) = 20,120,140$                                              | 840        |
| 120             |                                                                         | 850        |
| ic.             |                                                                         | 860        |
|                 | HE EQUATION OF TELINE                                                   | <b>7</b> 0 |
| 1               | 60 TO 20                                                                | 670<br>88C |
| C               | USE PRECEDING RESULTS TO ESTIMATE & FOR NEW LINE                        | 0.00       |
| 140             |                                                                         | 208        |
|                 | MI=MI+1                                                                 | aug        |
|                 | 5=5+(02/(02=01))+(X0LD-5)                                               | 910        |
| 1741            | XULDETUMP                                                               | 920        |
|                 | 01=02                                                                   | 930        |
| `143            | IF(m1-20) 145,145,147                                                   | 940        |
| -145            | - 10 TV 20                                                              | 950        |
| 147             | IF (JFLAG.EG.1) GO TO 230                                               | 960        |
|                 | B = .9 * A(I)                                                           | 970        |
|                 | JFLAG = 1                                                               | 980        |
| ~               | 60 TO 702                                                               | 990        |
| 1.              | INITIAL CHOICE THRU ORIGIN IS SATISFACTORY                              |            |
| 130             |                                                                         |            |
|                 |                                                                         | 1010       |
| C               | A-U.<br>Calcidate the Maine of the the Anterdale for all do that dother | 1050       |
| C .             | DO 170 1121-MMAY                                                        | 1030       |
|                 |                                                                         | 1000       |
|                 | <u>CP=CG(I)+X/(A(I)-H)-(H/(A(I)-H))+CG(I)</u>                           |            |
|                 | ГЕКИ1(II)=K(I)*(CG(I))**(1EN12)*(CP)**EN12                              | 1060       |
| -               | TERM2(II)=EXP(GMMA(I)+BETA(I)+(1CP/CG(I))/(1.+BETA(I)+(1CP/CG(          | 1070       |
|                 | 11))))                                                                  | 1080       |
|                 | XXx(II)=X                                                               | 1090       |
|                 | XOA(1I)=XXX(II)/A(I)                                                    | 1100       |
|                 | - <del>KCP = FERM1(II)+TERM2(II)</del>                                  | 1110       |
|                 | FST(II)=X*X*RCP                                                         | 1120       |
|                 | 1+(X) 165/170/165                                                       | 1130       |
| 165             | SEC(11)=(1./X-1./A(1))*X*X*RCP                                          | 1140       |
| 170             | LUNTINUL<br>TRADUZATUAL DULE TÉ UELD TA EMALUATE DATU INTEGRALE         | 1150       |
| 172             | THE TRAPLEVIUAL RULE IS USED TO EVALUATE BUTH INTEGRALS                 |            |
| 173             | DO 175 LE2.MMAY                                                         | 1170       |
| # I U           | IF (JJ, ST, MINE) 60 TO 176                                             | 1180       |
|                 | C(JJ) = C(JJ-1) + (FST(JJ) + FST(JJ-1)) * (ADRZ(2.*DPA(I)))             | 1190       |
|                 | GO TO 175                                                               | 1200       |
| 176             | C(JJ)=C(JJ-1)+(FST(JJ)+FST(JJ-1))*(BDR/(2.0+DPA(I)))                    | 1210       |
| -175-           |                                                                         |            |
|                 | SEC(1)=0.                                                               | 1230       |
|                 | $D(1) = 0_{\bullet}$                                                    | 1240       |
|                 | DO 130 KK=2+MMAX                                                        | 1250       |
|                 | IF (KK.GT.MINT) 60 TO 179                                               | 1260       |
|                 | U(KK)=U(KK-1)+(SEC(KK-1)+SEC(KK))*(ADR/(2.*DPA(I)))                     | 1270       |
|                 | <del>60 TO 180</del>                                                    |            |
| 179             | D(KK)=D(KK-1)+(SEC(KK-1)+SEC(KK))+(BOR/(2.0+DPA(I)))                    | 1290       |

| 180        | CONTINUE                                                       | <b>1</b> 300 |
|------------|----------------------------------------------------------------|--------------|
| C          | THE VALUE OF CP AT X=0 IS CG -D(101)                           | 1210         |
| 186        | CPA(1)=0.0                                                     | 1320         |
| - <u>e</u> | NEGATIVE VALUES OF CPA(1)=CP(0) CANNOT BE USED                 |              |
| С<br>1 А Ц | STURE THE CPA(1) VALUE IN CASE A NEW F FACTOR MUST BE USED     | 1 231        |
| 104        | 1F(KJ.EQ.1) GO TO 185                                          | 1340         |
|            | IF(1H.EQ.0) 60 TO 185                                          | 1350         |
| 405        | 1F(N1,EN,1) GO TO 368                                          | 136          |
|            | 38M=11+11                                                      | 1375         |
|            | IF (LL.GT.MINT) GO TO 188                                      | 139(         |
|            | E(LL)=E(LL-1)-(SEC(LL)+SEC(LL-1))*(DR/(2.*DPA(I)))             | 1466         |
|            | SAM=FLOAT(LL-1)*AUR                                            | 1410         |
|            |                                                                | 1420         |
| 108        |                                                                | 1440         |
| 189        | CPA(LL)=CG(I)-((1./SAM)-(1./A(I)))*C(LL)-E(LL)                 | 1450         |
|            | IF(LL.LT.MINT) CPA(LL)=0.0                                     | <b>1</b> 460 |
| 100        | IF(CPA(LL).LT.0.0) CPA(LL)=0.0                                 | 1470         |
|            |                                                                | 1480         |
|            | X=0.                                                           | 1500         |
|            | IF(1H.EQ.0) GO TO 250                                          | 1510         |
|            | IK=1                                                           | 1520         |
| C          | THE NEXT ITERATION USES THE VALUES OF CP JUST CALCULATED       | 1530         |
|            | TE(1)                                                          | 1540<br>1550 |
|            | X=FLOAT(LI-1)+ADR                                              | 1560         |
|            | GO TU 199                                                      | 1570         |
| 195        | KLK=LI-HINT                                                    | 1580         |
| 100        | X=B+FLOAT(KLK)*BDR                                             | 1590         |
| 1.77       | TERM1(LI)=K(I)+(CG(I))++(1,-EN12)+(CPA(LI))++EN12              | 1610         |
|            | TERM2(LI)= EXP(GMMA(I)+UETA(I)+(1CPA(LI)/CG(I))/(1.+UETA(I)+(1 | 1620         |
|            | 1CPA(LI)/CG(I))))                                              | 1630         |
|            |                                                                | 1640         |
|            | -RCP=TF0M1(L1)-XAX(L1)                                         | 1000         |
|            | FST(LI)=X*X*RCP                                                | 1670         |
| <i></i> .  | IF(X) 200+200+193                                              | 1680         |
| 193        | SEC(LI)=(1./X-1./A(I))*X*X*RCP                                 | 1690         |
| - 500      | GU TO 172                                                      | 1700         |
|            | THIS IS FOR THE CASE WHERE THE INITIAL-GUESS WAS TOO LARGE     |              |
| 230        | IF(U.GT995*A(I))DERIF=2.6*CG(I)/(A(I)-B)                       | 1720         |
| · · ·      | IF(B.GT998+A(I)) GU TO 322                                     | 1730         |
| ()<br>     | THE RANGE OF X FROM ZERO TO A IS USED                          | 1740         |
| - 201      | NI=1                                                           | 1750         |
|            | -DU-248-NN=1.7MMAX                                             | 176          |
|            | IF(NN.GT.MINT) GO TO 246                                       | 1770         |
|            | X=FLOAT(NN-1)+ADR                                              | 178(         |
| 246        | UU IU 334<br>KJK=NN-MINT                                       | 1790         |
| 240        | X=b+FLOAT(KJK) *BDR                                            | 181(         |
|            | -IF(IM.GE.1) 60 TO 353                                         |              |
| 238        | $CP_{D}(NN) = CG(I) * X/(A(I)-B) - (B/(A(I)-B)) * CG(I)$       | 183(         |
|            | 108                                                            | 1 (ata)      |
|            | LEO                                                            | ž            |

|             | 1F(CPB(NN).LT.0.0) CPB(NN)=0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1849   |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 353         | TERM1(NN)=K(I)*(CG(I))**(1EN12)*(CPB(NN))**EN12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1850   |
| 2 · · ·     | TERM2(NN)= EXP(GMMA(I)+BETA(I)+(1CPB(NN)/CG(I))/(1.+BETA(I)+(1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1860   |
|             | 1CPU(NN)/CG(I)))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1070   |
| ÷           | XXX (NH) =X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1880   |
| 5           | xoa(nn)=xxx(nn)/a(I)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1890   |
| 2           | RCP = TERM1 (NN) *TERM2 (NN)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1900   |
|             | FST(NN)=X*X*RCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1910   |
| `<br>       | IF(X) 240+240+247                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1920   |
| 247         | SEC(NN) = (1./X-1./A(I)) * X * X * RCP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1930   |
| 240         | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | - 1940 |
| *<br>* **** |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1950   |
| 300         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1960   |
| :           | CPB(RL)=CPA(RL)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1970   |
| 370         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1980   |
| 050         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10.3   |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 50.10  |
| 252         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2010   |
| 260         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2020   |
|             | INFU<br>The manifest of V at a two measured a and incertain the tradition to the international                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2030   |
|             | HE VALUES OF X AT A AND NEAREST A ARE USED IN FINDING THE DERIVATIVE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2000   |
| 280         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2040   |
|             | THETHY!                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2050   |
|             | $\frac{1}{1} \frac{1}{1} \frac{1}$ | 2000   |
| 710         | 1F(1M,01,77)00 10 328                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2070   |
| 510         | 1F (KU+EQ+1)  K=1<br>1/(ADC/DCD1E-HOLD)-ALL(NH+DED1E)7-7-70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2080   |
| 2           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2090   |
| 3           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 210    |
| JEI         | $150 \times 150 \times 100 \times 100$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5130   |
|             | $\frac{1}{12} \frac{1}{12} \frac$                                                                                                                 | 2120   |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2140   |
| 100         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2150   |
| 777         | $E = (R_1 GT_1, QQR \pm A(T)) = GO_TO_327$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2160   |
| 307         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | - 2179 |
| 308         | DEPC-LARCINEDIE-HOLDI/DEPTEI±100-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2180   |
| 520         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2190   |
|             | 60 TO 322                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2200   |
| C           | SIMPLIEIED VERSION DOES NOT PICONVERGEPT IN 99 ITERATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |
| č           | SET BE- 000001#A AND START OVER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |
|             | HE 000001+4(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | - 2216 |
| • · · · T   | WRITE (6.700)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2220   |
| 700         | FORMAT ( / ANH INITIAL CHOICE THRU ORIGIN SEEMINGLY OK. BUT RESULTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2230   |
| 100         | X ROTTEN AFTER 99 ITERATIONS/48H SET YOT. DOODAT A AND USE MORE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2240   |
|             | XREFINED TECHNIQUE /)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2250   |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2260   |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |
|             | MMAX=INIT+JINT+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2280   |
|             | MINT=INIT+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2290   |
|             | MAX=MMAX-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2300   |
|             | 1M=0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2310   |
|             | KJ=0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2320   |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2330   |
|             | END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2340   |
|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |

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| C                                      | OF THE LOCAL CATALYST PARTICLES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|                                        | REAL KO.KP.KC3.KC4.MU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1   |
|                                        | COMMON /AAAA/DP3,X0,X0A,CPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 21  |
|                                        | CUMMUN /BLOK1/F(25),H(25),HAD(25),GATZ0(25),GO(25),ZO(25)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3   |
| <del>-</del>                           | COMMUN /BLUK2/A/AP/DELTA, DK, DPA, DON2H4, DONH3, R, CGM, RADIUS, NMAX1,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 41  |
|                                        | A NMAX2+ALPHA1+ALPHA2+BETA+AGM+BGM+P+ZEND+MH2+MN2+MN13+MN2H4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 50  |
|                                        | CUMMUN /HLOK3/K+KP+KC3+KC4+HF+HL+HV+TF+CF+CFBAR+GAMMA+C4+NRINGS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6   |
|                                        | COMMON ZAAAZVISVST(30)+TBLVP(68)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 7   |
|                                        | COMPON /CCC/HATBI (40) . H3TBI (40)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | R   |
| •                                      | CIMENSION = CPOX(101) + PCPOX(101) + DY(101) + CPY(101) + PUET(101)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0   |
|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.0 |
| С                                      | DEFINE OP EUNCTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10  |
| •                                      | $\frac{1}{10} \frac{1}{10} \frac$ | 110 |
|                                        | Y (1 ( T+Y)) ( 1 ( T+Y) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 2 |
| r                                      | n it. (t.))<br>NETINE RE Elibertica                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 12. |
| Ū                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1 7 |
|                                        | Rer(A,D(C,D(E)) = O(T(A)) = O(A)) = O(T(A)) = O(A)) = O(O(A)) = O(O(A)) = O(                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 13  |
| - C                                    | ANALITIC INTEGRATION FUNCTIONS FROM INTEGRAL EQUATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |
|                                        | EVALIA(A)B = B + 5/2 - A + 3/2 - A + 5/2 - A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 140 |
|                                        | EVAL 2(A+B) = B**2/2 - A**2/2 - A**2/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 15  |
|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 16  |
|                                        | $\mathbf{x}0 = 0$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 170 |
|                                        | WAF1 = .B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 18  |
|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |
| 1                                      | LTFLG = 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 201 |
|                                        | ALPH2 = ALPHA2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 21  |
|                                        | DOS = DONHS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 22  |
|                                        | D04 = D0N2H4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 231 |
|                                        | TPSP = n.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 24' |
|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |
|                                        | NPART = 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 26  |
|                                        | LP1 = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 27  |
|                                        | RHU = C11+C12+C13+C14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 28  |
|                                        | ÚI3 = Ú <del>03*1</del> 4.7/P#(T/492.)**1.823                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 29  |
|                                        | DI4 = D04*14.7/P*(7/492.)**1.823                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30  |
|                                        | CALL UNBAR (VISVST+1+T+0.+MU+KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |     |
|                                        | KC3 = KCF(G,RHO,MU,D13,AP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 32  |
|                                        | KC4 = KCF(G+RHO+MU+DI4+AP)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 33  |
|                                        | HC = .74*G*CFBAR*(G/(AP*MU)) ****.41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 34  |
| - C                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | •   |
| C                                      | LOCATE SUITABLE XI)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |     |
| È                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |
| -                                      | DP3 = DP3F(T, 003, P)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 35  |
| 3                                      | CHOOSE STARTING VALUE FOR CPS TO BE = GT3/2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 00  |
| -                                      | CPS = C13/2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 36  |
|                                        | CMUPN = CI3-CPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 20  |
|                                        | $\frac{\partial (\partial f)}{\partial f} = \sqrt{3} \sqrt{2} \sqrt{3} \sqrt{13} \sqrt{2} \sqrt{3} \sqrt{3} \sqrt{3} \sqrt{3} \sqrt{3} \sqrt{3} \sqrt{3} 3$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 30  |
| c                                      | JE CONSTANT COD FACE POINT A THIE DOUTING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50  |
| C C                                    | HE WADTER WITH TEMP AT EACH ITEDATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |
|                                        | CALL HUDAD ALINT TEMP AT EACH TICKATTON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 70  |
| • • • •                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 55  |
|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 40  |
|                                        | TO THE ALWAIT OUTLY D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 41  |
| 40                                     | $\frac{1}{2}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 42  |
|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |
| 6                                      | 1P5 = I=(H4*KC4*C14+H3*DP3*DCPDX)/HC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 41  |
| -                                      | 1+ (++5.L1.0.) TPS#1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 45  |
| 8                                      | CALL UNBAR (H3TBL+1+TPS+0.+H3+KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4€  |
|                                        | DP3 = DP3F(TPS, D03, P)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 47  |
|                                        | DP3P = UP3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 48  |
| ************************************** |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |     |
|                                        | TMTPN = T-TPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 5(  |

| <b>G91</b> 0  | 461-30                                                                                         |             |
|---------------|------------------------------------------------------------------------------------------------|-------------|
| 61            | GAMMA = BGM/TPS                                                                                | 510         |
|               | HETA = -CPS+H3+DP3/(KP+TPS)                                                                    | 520         |
|               | $\kappa \vartheta = ALPH2 * EXP(-GAMMA)/CI1 * 1:6$                                             | 530         |
| C             | LINEAR EXTRAPOLATION USED TO GUESS AT XO                                                       | 4           |
|               |                                                                                                | 540         |
|               | XU = A - CPS/DCPDX                                                                             | 550         |
|               |                                                                                                | 560         |
|               | ΧΟΑ                                                                                            | D/0<br>570  |
| 11            |                                                                                                | 500         |
| 11            |                                                                                                | 590<br>500  |
| l             | CPS = C[3/(0P3/(A*KC3)+1.)]                                                                    | 610         |
|               | DCPDX = CI3/A                                                                                  | 620         |
|               | TPS = T-(H4*KC4*CI4+H3*DP3*DCPDX)/HC                                                           | 630         |
|               | IF (TPS.LT.U.) TPS=1.                                                                          | 640         |
|               | CALL UNBAR (H3TBL+1+TPS+0++H3+KK)                                                              | 650         |
|               | UP3 = UP3F(TPSvD03vP)                                                                          | 660         |
|               | DP3P = DP3                                                                                     | 670         |
|               | H3P = H3                                                                                       | 680         |
|               | TMIPN = T - TPS                                                                                | 699         |
|               | GAMMA = BGM/TPS                                                                                | 700         |
|               | BETA = -CPS * H3 * UP37 (KP * TPS)                                                             | /10         |
|               | NU = AETHEATATION ATTE                                                                         | 720         |
| . 1 70        | WRITE (01132) EFTITION<br>- CODMAT (22237), AME HAVE CALCULATED A MEGATINE VO DUDING ITEDATION | 7.00        |
| 1.52          | TO TATE AND CONTINUE AND CALCOLATED A NEGATIVE AU DURING THERATION                             | 740         |
|               | X 1) X X Y SET KU = 0. V CRECCEATE IPS = VEILADV V AND CONTINUE                                | 76.0        |
|               | 60 TO 131                                                                                      | 700         |
| <del>c</del>  | INTEGRATE FOR CP EQUATION                                                                      |             |
| 12            | CALL TRAPP (XOA, 1,, NPART, RIESUM, CI3)                                                       | <b>7</b> 80 |
| C             | CALCULATE HEW CPS                                                                              |             |
|               | CPSP = CPS                                                                                     | 790         |
|               | CACPU = CACPN                                                                                  | 800         |
|               | CPS = C13-A*KIESUM/KC3                                                                         | 810         |
|               | IF (LTFLG-1) 80v84v80                                                                          | 820         |
| 80            | IF (CPS-(.25*CI3)) d1,01,87                                                                    | 830         |
| . <b>91</b> . | LIFLG = 1                                                                                      | 840<br>550  |
|               |                                                                                                | 000         |
| - 04          | TE (CPS) 89.47.87                                                                              | 870         |
|               |                                                                                                |             |
|               | 60 TO 46                                                                                       | 890         |
| - 87          | CMUPN = CI3-CPS                                                                                | 900         |
| C             | CALCULATE NEW TP                                                                               |             |
| · 13          | DCPDX = KC3/DP3+(CI3-CP5)                                                                      | 910         |
|               | GRAD = DCPDX+DP3                                                                               | 920         |
|               | TGRAD = HC+(T-TPS)                                                                             | 930         |
|               | TPSPP = TPSP                                                                                   | 940         |
|               |                                                                                                | 950         |
| <b>E</b> 4    | IMIPO = IMIPN                                                                                  | 960         |
| - 91          | 123 # 1-119#RC9#C1#TNJFUCTURJFNC<br>15 /TDC   T 0   TDC-1.                                     | 970         |
|               | AF (1804E14141 180-14<br>                                                                      | 900<br>     |
| K.            |                                                                                                | 1000        |
|               | TMTPN = THTPS                                                                                  | 1010        |
|               | GAMMA = RGM/TPS                                                                                | 1020        |
|               | BETA = -CPS+H3+DP3/(KP+TPS)                                                                    | 1030        |
|               | $\kappa_0 = ALPH2 * EXP(-GAMMA)/CI1 * *1.6$                                                    | 1040        |
| -             | TELT TEMD CONCENTRATION FOR 5% LIMIT                                                           |             |
| <b>G</b>      | -IEST IEMITEOREENTRATSON TOR SA EIMIT                                                          |             |

| 41<br>כ       | IF (ABS(CMCPO+CMCPN)/CMCPN05) 131,131,43<br>TEST FOR TEMPERATURE LOOP COMPARE LAST 3 TEMPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 106                   |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| 43<br>60      | ΪΕ (ΑΜΙΝ1(ΤΡS;TPSP;TPSP) - <b>TP</b> 5P) 60;71;60<br>ΙΕ (ΑΜΑΧ1(TPS;TPSP;TPSP) - TPSP) 46;71;46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $107 \\ 108$          |
|               | FEMPERATURE HAS FLUCTUATED TAKE AVERAGE AND RECALCULATE CPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |
| 71            | TPSPP = TPSP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 109                   |
|               | $\frac{1}{1}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 110                   |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 111                   |
|               | (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) = (1) | 112                   |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 113                   |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 114                   |
|               | THIPN = T-FPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | - 110<br>- 116        |
|               | 0CPDX = (HC*(T-TPS)-H4*KC4*CT4)/(H3*0P3)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 117                   |
|               | CPSP = CPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 118                   |
|               | CMCPG = CMCPN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 119                   |
|               | CPS = CI3-DP3/KC3+DCPDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 120                   |
|               | IF (CPS.LT.0.) CPS=0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 121                   |
|               | CMCPH = CI3-CPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 122                   |
|               | LP1 = LP1+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 123                   |
|               | L = L+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 124                   |
| -             | IF (LP1-25) 61+61+44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 125                   |
| 6+            | NO CONVERGENCE YET AVERAGE THE CPSIS FOR LAST TWO CALCIS AND REPEAT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -                     |
| り・            | $CPS = .2 \times CPS + .8 \times CPSP$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 126                   |
|               | GO TO 53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 127                   |
|               | CALCULATE WEIGHTED AVERAGE OF PRESENT AND PREVIOUS X0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |
| - 22          | _ XUU = WAF1*XUP+WAF2*XU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 128                   |
| <b>E 1</b>    | UPS = UIS/(1 + UPS/(KUS*A - KUS*XUU))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 129                   |
|               | $Cha(b) = CI_CDC$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ~130                  |
|               | UMUPN - UIJ=UPS<br>HX - HXD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 131                   |
| 112           | · DJ - DJ<br>· DJ - , DJJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 132                   |
| 46            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 130                   |
|               | ΤΕ () D1=05) μη_μη_μη                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 175                   |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 100                   |
| - <b>T</b> 1  | IF (WAF1.GT95) GO TO 99                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 137                   |
| - · · ·       | WAF2 = 1WAF1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 138                   |
| C 1           | NO CUNVERGENCE WITH PRESENT WEIGHTED AVERAGE FACTORS FOR XI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 100                   |
| 1             | REPEAT ITERATION PROCEDURE WITH NEW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       |
|               | GO TO 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 139                   |
| <del>99</del> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 140                   |
|               | WRITE (6,98)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 141                   |
| 98            | FORMAT (///20X+ UNABLE TO FIND SUITAL ER FOUR TRIES OF 25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 142                   |
|               | XITERATIONS EACH PROGRAM STOP FOLLU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 143                   |
|               | WRITE (0,96) (XUBLOK(I), I=1, LM1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 144                   |
| 96            | FORMAT (//52X/XO VALUES CALCULATED IN SGRADY / (10E13.5))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 145                   |
| ~             | - CALL DUMP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -146                  |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                       |
|               | DATISPACTURI AU MAS DEEN FUUNU<br>Calculate odauteat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |
| . C. (        | CALCULATE GRADIENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |
| 131           | 100 - 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1/17                  |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 171<br><del>444</del> |
|               | NX1 = NX+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 140                   |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 150                   |
| 291           | XOA = XO/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 151                   |
|               | VNU = -KC3/UP3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 152                   |
|               | INT1 = 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 152                   |
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -154                  |
|               | R1 = 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 155                   |

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**G910461-3**0

| ÷.             |                                                                        |           |
|----------------|------------------------------------------------------------------------|-----------|
| ្លំរ           | 0461-30                                                                |           |
|                |                                                                        | 1550      |
| , i            | PS1 = 0                                                                | 1570      |
| 8.<br>5.       | PS2 = 0.                                                               | 1580      |
|                | DLLX0A = (1, -X0A)/FLOAT(NX)                                           | 1590      |
| 1_             | CALCULATE PROFILE CURVES FOR INTEGRAND PUNCTIONS                       | <b>.</b>  |
|                | XA = XOA                                                               | 1600      |
|                | DO 770 I=1,NX1                                                         | 1610      |
| 3              | CP(X/A) IS A LINEAR PROFILE DURING FIRST APPROXIMATION                 |           |
|                | 1F (LP2.GT.1) 60 TO 664                                                | 1620      |
|                | CPx(1) = (XA-XOA)/(1XOA) * CPS                                         | 1630      |
| <del>.</del> 6 | + KHET(I) = K0+CI3++(1-N)+CPX(I)++N+EXP(GAMMA+BETA+(1,-CPX(I)/CI3)/    | 1640      |
| 1              | K (1.+BETA*(1CPX(I)/CI3)))                                             | 1650      |
| -              | DX(1) = XA                                                             | 1660      |
|                | XA = XA+DELXOA                                                         | 1670      |
| - ]7           | 0 CONTINUE                                                             | 1680      |
|                | TAKE INTERVAL FUNCTIN MIDPTS AS CONSTANT VALUE FOR CP(X/A) AND RHET    |           |
| .1             |                                                                        | 1690      |
|                | CrX(1) = (CrX(1)+CrX(1+1))/2,                                          | 1709      |
|                | $KRE(1) = (KRE(1) + KRE(1+1))/2, \qquad \otimes$                       | 1710      |
| 11             |                                                                        | 1720      |
| -              |                                                                        | 1730      |
| Ĺ              |                                                                        | 1740      |
|                | CONTROLE GOATION POLLONS                                               |           |
|                | EXI = YAA                                                              | 1760      |
|                | DXU = DXI + DFI XOA                                                    | 1750      |
|                | RH1 = 0.                                                               | 1770      |
|                | DO 377 1=1.NX                                                          | 1780      |
|                |                                                                        |           |
|                | DXL = DXU                                                              | 1800      |
|                | DXU = DXU + DELXOA                                                     | 1810      |
| `₿7            | 7 CONTINUE                                                             | 1620      |
|                | CPOX(1) = C13-A*A/DP3*KR1                                              | 1830      |
|                | IF (CPUX(1).LT.0.) CPOX(1)=0.                                          | 1840      |
| ŀ              | SOLVE GENERAL EQUATION OF TWO INTEGRALS FOR CP(X/A)                    | · · · · · |
| - pe           | 9 JU 772 I=1, INT1                                                     | 1850      |
| 1              | R1 = R1+RHET(I) *EVAL1(XOA,XA)                                         | 1860      |
| - [            | XOA = XA                                                               | 1870      |
|                |                                                                        | 1880      |
| 17             |                                                                        | 1890      |
| Г              |                                                                        | 1900      |
|                |                                                                        | 1910      |
| 1              | 大月                                                                     | 1920      |
|                | DE 1 - DE ALMERTITA ANDERAL ALMA, VADA                                 | 1930      |
| 1              | POI → POITKRET(111)+EVAL2(AA)XAD)<br>POI → POITKRET(111)+EVAL2(AA)XAD) | 1940      |
|                | F32 - F327KHLILL+1J#EVALI(AAIAAU)                                      | 1950      |
|                | $x_{AO} = x_{AO} + OFL x_{OA}$                                         | 1070      |
| - 77           | 3 CONTINUE                                                             | 1980      |
| . [            | R2 = PS1 - CTRM * PS2                                                  | 1990      |
| }              | INTT = INTT+T                                                          | 2000      |
| 9<br>\$        | CPUX(L) = CI3-A*A/UP3*(R1+R2)                                          | 2010      |
| <u>.</u>       |                                                                        | -2020     |
| •              | XOA = XO/A                                                             | 2030      |
| 1              | XA = XOA+DELXOA                                                        | 2040      |
| ł              | L = L+1                                                                | 2050      |
| 2              | R1 = 0.                                                                | 2060      |
| ļ              | R2 = 0.                                                                | 2070      |
| 1-             |                                                                        | -2080-    |
| ter i ter      | P52 = 0.                                                               | 2090      |

3

Installet in it

•

| <b>G91</b> 04     | 61-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
|                   | IF (L.LE.NX) 60 TO 769                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2100           |
| C C               | POX(IX1) IS SPECIAL CASE X=A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                |
|                   | DXL = XOA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2110           |
|                   | DXU = DXL+DELXCA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2120           |
|                   | DO 378 1=1.NX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 21/10          |
|                   | RR2 = RR2 + RHET(I) + EVAL1(DXL, DXU)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2150           |
|                   | DXL = DXU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2160           |
|                   | DXU = <del>DXU+DELXUA</del>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2170           |
| 378               | CONTINUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2180           |
|                   | $\frac{CFUX(NX1) = CIO - A*A/UPJ*(1 CTRM)*RR2}{CFUX(NX1) = CIO - A*A/UPJ*(1 CTRM)*RR2}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | - <b>21</b> 90 |
| C (               | ALCOLATE A NEW TRE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>2</b> 200   |
| • •               | DCPDX = KC3/DP3*(C13-CPOX(NX1))                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2210           |
|                   | H3P = H3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2220           |
|                   | DP3P = DP3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2230           |
|                   | TPS = T-(H4*KC4*CI4+H3*DP3*DCPDX)/HC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2240           |
|                   | $\frac{11}{100} (110.1) \frac{1100}{100} \frac{1100}{10$                                                                                                                                                                                                                                                                                         | 2250           |
|                   | OP3 = OP3F(TP5+D03,P)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2260           |
|                   | TMTPO = TMTPN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2270           |
|                   | TATPIN = T-TPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2290           |
| -61               | W PASSES NEEDED BEFORE CHECK ON TEMPICONE CAN BE MADE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ·····          |
| 33                | IF (LP2.EU.1) GO TO 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2300           |
|                   | CMCPO = CMCPN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2310           |
|                   | $IE (ABS/TMTPO_TMTPN)/TMTPN = 05) 26.06.07$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2320           |
| 26                | $\frac{11}{15} \frac{1}{100} \frac{1}$                                                                                         | 2330           |
| - <del>CC</del> A | LEULATE NEW CPX(I) PROFILE FOR NEXT-PASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2040           |
| 27                | DO 55 I=1+NX1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2350           |
|                   | IF (MOD(LP2,5)) 34,57,34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2360           |
|                   | LCULATE WEIGHTED AVERAGE OF OLD AVERAGED AND CALCULATED PROFILES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |
| 34                | - CFA(1)/ → 3 <del>075FCFA(1)/ </del> 275FUA(1)<br>GU TO KN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2370           |
|                   | ENALE PRESENT AND PAST-CALCULATED PROFILES EVERY-STH PASS-TO SMOOTH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2360           |
| 57                | CPX(I) = (CPOX(I) + PCPOX(I))/2.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2390           |
| C 51              | URE PRESENT CALCULATED PROFILE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | È              |
| 56                | PCPUX(I) = CPOX(I)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2400           |
| 55                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2410           |
|                   | $-\frac{1}{1000} - \frac{1}{1000} - $                                                                                                                                                                                                                                                                                           | 2420           |
|                   | TPS = T - (H4 * KC4 * CI4 + H3P * DP3P * DCPDX) / HC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2430           |
|                   | IF (TPS.LT.0%) TPS=1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2450           |
|                   | CALL UNBAR (HSTBL, 1, TPS, 0., H3, KK)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2460           |
|                   | $\frac{0}{10} = \frac{0}{10} \frac{1}{10}  | 2470.          |
|                   | IMIPU = IMIPU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2480           |
|                   | LP2 = LP2+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2470           |
|                   | IF (LP2-50) 29+29+30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2510           |
| 30                | WRITE (6,18) CPOX(NX1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2520           |
| 18                | FURMAT + + / / 31X+52HUNABLE TO CONVERGE ON CPS IN 50 TRIES CP (X/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2530           |
|                   | $\begin{array}{c} XA \\ = F = E E C A C \\ = C C A C \\ = C C C A C \\ = C C C C C C C C$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2540           |
| 522               | FORMAT (51% (C13-CPC) -1.512 5 / 544.1404(T_TPC) -1.512 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2050           |
| <b>€</b> €        | 60 TO 28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2570           |
| 29                | GAMMA = BGM/TPS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2580           |
|                   | HETA = -CPX(NX1)*H3*DP3/(KP*TP5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2590           |
|                   | K0 = ALPH2+EXP(-GAMMA)/CI1++1.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2600           |
| <u>د بر</u>       | 60410 - DCPDV+DD3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |
| 47                | VNAU - UCRAADEU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2020           |
|                   | וכ ר                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1              |
|                   | +C+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                |

| 6910        | 461-30                                                                                                |             |
|-------------|-------------------------------------------------------------------------------------------------------|-------------|
|             | TGRAD = HC+(T-TPS)                                                                                    | 2630        |
| 28          | RETURN                                                                                                | 264(        |
|             | END                                                                                                   | 2650        |
|             | - ·                                                                                                   |             |
|             | SUBROUTINE TRAPP (U,W,NPART,RIESUM,CI3)                                                               | ſ           |
| C           | NUMERICAL INTEGRATION USING TPAPEZOIDAL METHOD                                                        |             |
| t<br>t      |                                                                                                       | 1<br>21     |
|             | COMMON /BLOK2/A, AP, DELTA, DR, DPA, DON2H4, DONH3, R, CGM, RADIUS, NMAX1,                            | 3(          |
| 1           | X NMAX2+ALPHA1+ALPHA2+BETA+AGM+BGM+P+ZEND+MH2+MN2+MNH3+MN2H                                           | 4 40        |
|             | COMMON /BLOK3/K,KO,KP,KC3,KC4,HF,HL,HV,TF,CF,CFBAR,GAMMA,C4,NRING                                     | S 50        |
|             | DEFINE RHEI FOR VARIABLE CPICPSIP<br>RHETF(A+B+C+C+C+N) = E+A++(1-N)+B++N+EXP(C+D+(1,-B/A)/(1,+D+(1,- | 6(          |
|             |                                                                                                       | 79          |
| I C         | FUNCTIONS DEFINING INTEGRANDS                                                                         |             |
| c           | FUNCTION DEFINING CP(X) FOR RHET FUNCTION                                                             | 80          |
| Ċ           | CP(X) IS ASSUMED TO VARY LINEARLY WITH X                                                              |             |
|             | $CP_{AF}(X,Y,2)=(X-Y)/(1,-Y)*Z$                                                                       | 9(          |
| ]           |                                                                                                       | 100         |
|             | PARI-NEARI<br>N=(w-i)/PANT                                                                            | 110         |
| č<br>7      |                                                                                                       | 130         |
|             | 5UM=0.                                                                                                | 14(         |
|             | CPX1=CPXF(U+XOA+CPS)                                                                                  | 150         |
|             |                                                                                                       | 160         |
|             | RHET2=RHETF(CI3/CFX2/GAMMA/BETA/RU/I)                                                                 | 17:         |
| С           | CALCULATE FIRST, LAST TERMS OF RIEMANN SUM FIRST                                                      |             |
| 4           | TRM1=FOX21(U,RHET1)/2.                                                                                | 190         |
|             | TRM2=FOX11(WORHET2)/2.                                                                                | 200         |
| 0           | CPA=CPAF (UPH+XOA+CPS)                                                                                | 228         |
|             | RHET = RHETF(CI3,CPX,GAMMA,BETA,KO,1)                                                                 | 230         |
|             | SUM=SUM+FOXI1(UPH+RHET)                                                                               | 240         |
| Å           | UPH=UPH+D<br>CONTINUE                                                                                 | 250         |
| <u>ŏ</u>    |                                                                                                       | 200<br>     |
| 99          | RETURN                                                                                                | 280         |
|             | ENU                                                                                                   | <b>5</b> 90 |
|             | <i>,</i>                                                                                              |             |
|             | SUBROUTINE UNBAR(T, IK, XIN, YIN, ZZ, KK)                                                             | <br>(       |
|             | UIMENSION T(1),X(6),Y(6),A(b)                                                                         | 10          |
| C           |                                                                                                       | UNBAROUS    |
| č           |                                                                                                       | UNBARUU4    |
| <del></del> | TO DO GUADRATIC AND LINEAR INTERPOLATION ALSO                                                         | UNBAROUE    |
| С           |                                                                                                       | UNBAROU7    |
|             | II = IK+1                                                                                             | 20          |
|             | 0 I N<br>0 - 9                                                                                        | 30          |
|             | IF $(T(11)-3.)$ 700, 701, 702                                                                         | 40<br>50    |
|             | ) IF (f(II)+0.) 60+701+704                                                                            |             |
| 704         | F IF (T(II)-2.) 705,706,701                                                                           | 70          |

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| <b>G91</b> 0461 | L-30                                  |           |
|-----------------|---------------------------------------|-----------|
| 705             | N = 1                                 | 80        |
|                 | GU TO 707                             | 90        |
| 706             |                                       | 100       |
| <del>701</del>  | N2- 1<br>                             | 110       |
| 702             | N1 = N + 1                            | 130       |
|                 | $bb 5\theta E = II I I$               | 140       |
| 60              | IF(T(L) + 0.) = 00,60,51              | 150       |
| DU              | $\mathbf{K}\mathbf{K} = -\mathbf{i}$  | 160       |
|                 |                                       | 180       |
| 51              | NX = T(L)                             | 190       |
|                 | IF(T(L+1) + 0.) 60,52,50              | 200       |
| 52              | NY 2 0<br>                            | 210       |
| 50              | NY = T(L+1)                           | 230       |
| 53              | CONTINUE                              | 240~      |
|                 | <b>KK</b> = 0                         | 250       |
|                 |                                       | 260       |
|                 | AA = AIA                              | 270       |
|                 | J1 = II+2                             | 290       |
|                 | J2 -= +X+II+1                         | ·····3uti |
| 400             | IF(XX-T(J1))301,306,407               | 310       |
| 400             | IF (XX-T(4)) 304,304,302              | 330       |
| 302             | CONTINUE                              | 340       |
| 309             | KK = 2                                | 350 🦻     |
| 309             |                                       |           |
|                 | $60 \ T0 \ 305$                       | 380       |
| 301             | KK = 1                                | 390       |
|                 | $X\lambda = T(J1)$                    | 400       |
| 306             | JXI = JI                              | 410       |
| 304             | IF (J=J1=1) 301+306+307               | 430       |
| 307             | IF (J-J2) 303,308,309                 | 440       |
| 303             | Jx1 = J-N2                            | 450       |
|                 | CONTINUE                              | 460       |
| at 77 ag agt    | $x_{111} = x_{x}$                     | 470<br>   |
| <b>150</b> 0    | D0 1599 L=1,N1                        | 490       |
|                 | -X(L) = T(JXL)                        | 500       |
|                 | LY = JX1 + NX                         | 510       |
| 1599            | F(L) = 1(LT)<br>JX1 = JX1+1           | 520       |
|                 |                                       |           |
|                 | GO TO 54                              | 550 🕴     |
| - 3000          |                                       | 560       |
| •               | JZ = JZ+NY<br>TF(YY+T1-11)311.316.401 | 570       |
| 401             | D0 312 $J=J1, J2$                     | 590       |
|                 |                                       |           |
| 312             | CONTINUE                              | 610       |
| ~ 319           | RT ≡ 0 ·<br>YY = T(.12)               | 620       |
| 318             | JY1 = J2 - N                          | 640       |
|                 | GU TO 315                             | 650       |
|                 |                                       |           |
|                 | YY = F(J1)                            | 670       |

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| <b>3</b> 910461    | -30                                                |           |
|--------------------|----------------------------------------------------|-----------|
| 316                | JY1 = J1                                           | 6         |
| 314                | GU 10 315<br>IF (Juji=1) 311+316+317               | 6<br>7    |
| 317                | IF (J-J2) 313,318,319                              | 7         |
| 315<br>315         | CONTINUE                                           | 7         |
|                    | JX2 = JX1                                          | 7         |
|                    | $\Gamma X_{1} = P X_{1} + P X_{2} (Y S_{1} V_{2})$ | 7         |
|                    | DJ 3099 L=1,N1                                     | 7         |
|                    | X(L) = T(LX2)                                      | 7         |
|                    | LY1 = LY1+NY                                       | 8         |
| 3094               | JX2 = JX2+1                                        | 8         |
|                    | GO TO 54                                           | 6.        |
| <del>-3090</del> - | 7(1) = 22                                          |           |
|                    | LY1 = LY+I                                         | 8.<br>8   |
|                    | Y(1+1) = 0,<br>(10) (1050) MM=1 (11)               | ຢ         |
|                    | Y(1+1) = Y(1+1) + T(LY1) * X(MM)                   | ප<br>ප    |
| 4050<br>4400       |                                                    | 9I        |
| 4400               | 00 4199 L=1+N1                                     | 9         |
| 4100               | X(L) = T(JY1)                                      | 9.        |
| 4177               | XIWI = XY                                          | 9         |
| 50                 |                                                    |           |
| V7                 | X(N+2) = X(1)                                      | 91        |
|                    | X(N+3) = X(2)                                      | 90        |
|                    | A(J+1) = X(J+1) - X(J)                             | 100       |
|                    | TPAL1 = XINT - X(J)<br>IF ( TPAL1 ) 57.54.57       | 10        |
| <del>58</del>      | 2Z = Y (J)                                         | 104       |
|                    | X(1) = 0.<br>X(2) = 0.                             | 10        |
|                    | x(3) = 0.                                          | 10        |
|                    | - <del>X(4) - □ 0.</del><br>X(J) = 1.0             | 10/       |
|                    | 60 TO 54                                           | 11        |
| 57                 | U = U * TPAL1<br>GO TO (711)712-713) +N            | 11        |
| 711                | X(J) = TPAL1/A(J+1)                                | 11        |
| 712                | x(J) = -TPAL1                                      | <u>11</u> |
|                    | GU TO 55                                           | 11        |
| 713<br>55          | X(J) = (X(J+2)-X(J))*TPAL1<br>CONTINUE             | 11        |
| _,                 | A(1) = A(N+2)                                      | 110       |
|                    | 22 = 0.                                            |           |
|                    | $\chi(J) = D/(A(J) * A(J+1) * X(J))$               | 122       |
| 56                 | ZZ = ZZ + Y(J) * X(J) CONTINUE                     | 12:       |
| 59                 | IF (1) 3098,3098,9999                              | 125       |
| 9999               | <u>₩K = KK+KY</u><br>RFTURN                        | 120       |
|                    |                                                    | 121       |

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| -                               | DATA (VISVST(1), I=1,30) / 0., 1., 13., 0.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2         |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| C                               | TEMPERATURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
|                                 | X 1620. / 1800. / 1980. / 2160. / 2340. / 2520. /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | э<br>4    |
| £                               | VISCUSITIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |
|                                 | X.048 E-4,.070 E-4,.093 E-4,.117 E-4,.141 E-4,.164 E-4,.186 E-4,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5         |
| c                               | X.207 E-41.278 E-41.247 E-41.266 E-41.285 E-41.302 E-4 /<br>HUNCH DATA FOR VAROR DESCRIPT AS FUNCTION OF TEMPEDATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6         |
|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 7         |
| C                               | TEMPERATURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | •         |
|                                 | x 492. 1 519. 1 528.41 529.11 534.61 534.71 538.81 543.91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 8         |
|                                 | x 545.7, 560.2, 570.0, 579.3, 579.5, 595.3, 610.1, 614.1,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 9         |
|                                 | X 510,11 527,57 520,87 545,77 550,87 555,67 575,07 572,07 52,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5, 70,07 5,                                                                                       | 10        |
| <del>c</del>                    | VAPOR FRESSURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>۱۱</b> |
| -                               | X .052 / .148 / .201 / .207 / .240 / .282 / .292 / .354 /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 12        |
|                                 | X .545 + .737 + .973 + .982 + 1.51 + 2.20 + 2.46 + 2.74 +                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 13        |
|                                 | x 3.41 + 3.56 + 5.24 + 5.97 + 8.07 + 9.71 + 11.91 + 13.46 +                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 14        |
|                                 | X 14.70 + 33.80 + 73.48 + 147. + 382. + 823. + 1528. + 2131. /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 15        |
|                                 | END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 16        |
|                                 | BLUCK DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |
| C                               | BLUCK DATA<br>BLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |
| C                               | BLUCK DATA<br>BLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON JDDJ/CFTBL4(34)+CFTBL3(34)+CFTBL2(34)+CFTBL1(34)<br>DATA (CFTBL1(I)+I=1+34) / 0., 1., 15., 0.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |
| C<br>C                          | BLUCK DATA<br>BLUCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)<br>DATA (CFTBL1(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |
| с<br>С                          | BLUCK DATA<br>BLUCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)<br>DATA (CFTBL1(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
| C<br>C<br>C                     | BLUCK DATA<br>BLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br><u>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)</u><br>DATA (CFTBL1(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |
| C<br>G<br>C                     | BLUCK DATA<br>bLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br><u>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)</u><br>DATA (CFTBL1(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 540., 720., 900., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194. 3.4596. 3.4605. 3.4765. 3.4899. 3.5151. 3.5454. 3.5006.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |
| C<br>C<br>C                     | BLUCK DATA<br>bLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br><u>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)</u><br>DATA (CFTBL1(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194. 3.4596. 3.4685. 3.4765. 3.4899. 3.5151. 3.5454. 3.5006.<br>X 3.6208. 3.6654. 3.7150. 3.7696. 3.8291. 3.8802. 3.9288 /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |
| C<br>C<br>C                     | BLUCK DATA<br>BLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)<br>DATA (CFTBL1(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194. 3.4596. 3.4685. 3.4765. 3.4899. 3.5151. 3.5454. 3.5006.<br>X 3.6208. 3.6654. 3.7150. 3.7696. 3.8291. 3.8802. 3.9288 /<br>DATA (CFTBL2(I),I=1.34) / 0., 1., 15., 0.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
| C<br>C<br>C                     | BLUCK DATA<br>BLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br><u>COMMON /DDD/CFTBL4(34).CFTBL3(34).CFTBL2(34).CFTBL1(34)</u><br>DATA (CFTBL1(I).I=1.34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br><u>X 3.4194.3.4596.3.4685.3.4765.3.4899.3.5151.3.5454.3.5006.</u><br>X 3.6208.3.6654.3.7150.3.7696.3.8291.3.8802.3.9288 /<br><u>DATA</u> (CFTBL2(I).I=1.34) / 0., 1., 15., 0.,<br>TEMPERATURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |
| C<br>C<br>C                     | BLUCK DATA<br>BLUCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)<br>DATA (CFTBL1(1),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194., 3.4596., 3.4605., 3.4765., 3.4899., 3.5151., 3.5454., 3.5006.<br>X 3.6208., 3.6654., 3.7150., 3.7696., 3.8291., 3.8802., 3.9288 /<br>DATA (CFTBL2(I),I=1.34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
| G<br>G<br>C                     | BLUCK DATA         bLOCk DATA FOR SPECIFIC HEAT VS TEMPERATURE         COMMON /DDD/CFTBL4(34), CFTBL3(34), CFTBL2(34), CFTBL1(34)         DATA (CFTBL1(I), I=1, 34) / 0., 1., 15., 0.,         TEMPERATURES         X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,         X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,         SPECIFIC HEATS         X 3.6208, 3.6654, 3.7150, 3.7696, 3.8291, 3.8802, 3.9288 /         DATA (CFTBL2(I), I=1, 34) / 0., 1., 15., 0.,         TEMPERATURES         X - 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,         X - 540., 720., 900., 2340., 2520., 2700., 2880., 3060.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |
| C<br>C<br>C<br>C                | BLUCK DATA<br>bLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br><u>COMMON /DDD/CFTBL4(34).CFTBL3(34).CFTBL2(34).CFTBL1(34)</u><br>DATA (CFTBL1(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194. 3.4596. 3.4685. 3.4765. 3.4899. 3.5151. 3.5454. 3.5006.<br>X 3.6208. 3.6654. 3.7150. 3.7696. 3.8291. 3.8802. 3.9288 /<br>DATA (CFTBL2(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |
| c<br>c<br>c                     | BLUCK DATA<br>bLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34)+CFTBL3(34)+CFTBL2(34)+CFTBL1(34)<br>DATA (CFTBL1(1),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194. 3.4596. 3.4605. 3.4765. 3.4899. 3.5151. 3.5454. 3.5006.<br>X 3.6208. 3.6654. 3.7150. 3.7696. 3.8291. 3.8802. 3.9288 /<br>DATA (CFTBL2(1),I=1.34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X -540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SHORE STATES<br>X -540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SHECIFIC HEATS<br>X -2485., 2495., 2524., 2569., 2624., 2682., 2738., 2790.,<br>X -2485., 2495., 2514., 2914., 2946., 2974., 2998., 3019./                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1         |
| C<br>C<br>C                     | BLUCK DATA<br>BLUCK DATA<br>BLUCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br><u>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)</u><br>DATA (CFTBL1(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194., 3.4596., 3.4685., 3.4765., 3.4899., 3.5151., 3.5454., 3.5006.<br>X 3.6208., 3.6654., 3.7150., 3.7696., 3.8291., 3.8802., 3.9288 /<br>DATA (CFTBL2(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SHECIFIC HEATS<br>X .2485., 2495., .2524., .2569., .2624., .2682., .2738., .2790.,<br>X .2836., .878., .2914., .2946., .2974., .2998., .3019./<br>DATA (CFTBL3(I),I=1,34) / 0., 1., 15., 0.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1         |
|                                 | BLUCK DATA<br>BLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34).CFTBL3(34).CFTBL2(34).CFTBL1(34)<br>DATA (CFTBL1(1),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194. 3.4596. 3.4605. 3.4765. 3.4899. 3.5151. 3.5454. 3.5006.<br>X 3.6208. 3.6654. 3.7150. 3.7696. 3.8291. 3.8802. 3.9288 /<br>DATA (CFTBL2(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 960., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X .2485., 2495., 2524., 2569., 2624., 2682., 2738., 2790.,<br>X .2836., 2878., 2914., 2946., 2974., 2998., 3019./<br>DATA (CFTBL3(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1 1 1     |
| G                               | BLUCK DATA<br>BLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34), CFTBL3(34), CFTBL2(34), CFTBL1(34)<br>DATA (CFTBL1(1),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194. 3.4596. 3.4605. 3.4765. 3.4899. 3.5151. 3.5454. 3.5006.<br>X 3.6208. 3.6654. 3.7150. 3.7696. 3.8291. 3.8802. 3.9288 /<br>DATA (CFTBL2(1),I=1.34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X .540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X .2485 , .2495 , .2524 , .2569 , .2624 , .2682 , .2738 , .2790 ,<br>X .2836 , .2978 , .2914 , .2946 , .2974 , .2998 , .3019 /<br>DATA (CFTBL3(1),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X .2485 , .2495 , .2524 , .2669 , .2624 , .2682 , .2738 , .2790 ,<br>X .2836 , .2978 , .2914 , .2946 , .2974 , .2998 , .3019 /<br>DATA (CFTBL3(1),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X .540., 720., 900., 1080., 1260., 1440., 1620., 1800., 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1111111   |
|                                 | BLUCK DATA<br>bLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)<br>DATA (CFTBL1(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194. 3.4596. 3.4685. 3.4765. 3.4899. 3.5151. 3.5454. 3.5006.<br>X 3.6208. 3.6654. 3.7150. 3.7696. 3.8291. 3.8802. 3.9288 /<br>DATA (CFTBL2(I),I=1.34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X .2485., 2495., .2524., .2569., .2624., .2682., .2738., .2790.,<br>X .2836., .2678., .2914., .2946., .2974., .2998., .3019./<br>DATA (CFTBL3(I),I=1.34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X .2405., .2070., 900., 1080., 1260., 1440., 1620., 1800.,<br>X .2936., .2070., 2340., 2520., .2700., 2880., .3019./<br>DATA (CFTBL3(I),I=1.34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X .540., 720., 900., 1080., 1260., 1440., 1620., 1800., .<br>X .540., 720., 900., 2080., .200., .2000., .2000., .2000., .<br>X .2000., .2000., .2000., .2000., .2000., .2000., .2000., .<br>X .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .<br>X .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .<br>X .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .<br>X .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .<br>X .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000., .2000.,                            |           |
|                                 | BLUCK DATA<br>bLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br><u>COMMON /DDD/CFTBL4(34),CFTBL3(34),CFTBL2(34),CFTBL1(34)</u><br>DATA (CFTBL1(1),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194. 3.4596. 3.4605. 3.4765. 3.4899. 3.5151. 3.5454. 3.5006.<br>X 3.6208. 3.6654. 3.7150. 3.7696. 3.8291. 3.8802. 3.9288 /<br>— DATA (CFTBL2(1),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X .2485., 2495., 2524., 2569., 2624., 2682., 2738., 2790.,<br>X .2836., 2878., 2914., 2946., 2974., 2998., 3019 /<br>DATA (CFTBL3(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X .980., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800., 7<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800., 7<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800., 7<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800., 7<br>X 540., 720., 900., 1080., 7<br>X 540., 720., 720., 720., 720., 720., 720., 7200., |           |
| с<br>с<br>с<br>с                | BLUCK DATA         bLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE         COMMON /DDD/CFTBL4(34), CFTBL3(34), CFTBL2(34), CFTBL1(34)         DATA (CFTBL1(I), I=1, 34) / 0., 1., 15., 0.,         TEMPEHATURES         X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,         X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,         SPECIFIC HEATS         X 3.4194, 3.4596, 3.4685, 3.4765, 3.4899, 3.5151, 3.5454, 3.5006,         X 3.4194, 3.4596, 3.4685, 3.4765, 3.4899, 3.5151, 3.5454, 3.5006,         X 3.4194, 3.4596, 3.4685, 3.4765, 3.4899, 3.5151, 3.5454, 3.5006,         X 3.4194, 3.4596, 3.4685, 3.4765, 3.4899, 3.5151, 3.5454, 3.5006,         X 3.4194, 3.4596, 3.4685, 3.4765, 3.4809, 3.5151, 3.5454, 3.5006,         X 3.6208, 3.6654, 3.7150, 3.7696, 3.8291, 3.8802, 3.9288 /         DATA       (CFTBL2(I), I=1,34) / 0., 1., 15., 0.,         TEMPERATURES       ////////////////////////////////////                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |
| C<br>C<br>C<br>C<br>C<br>C<br>C | BLUCK DATA<br>bLOCK DATA FOR SPECIFIC HEAT VS TEMPERATURE<br>COMMON /DDD/CFTBL4(34).CFTBL3(34).CFTBL2(34).CFTBL1(34)<br>DATA (CFTBL1(1),I=1,34) / 0., 1., 15., 0.,<br>TEMPEHATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X 3.4194, 3.4596, 3.4605, 3.4765, 3.4999, 3.5151, 3.5454, 3.5006,<br>X 3.6208, 3.6654, 3.7150, 3.7696, 3.8291, 3.8802, 3.9288 /<br>DATA (CFTBL2(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X .2400., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 1980., 2160., 2340., 2520., 2700., 2880., 3060.,<br>SPECIFIC HEATS<br>X .2485 , 2495 , .2524 , .2569 , .2624 , .2682 , .2738 , .2790 ,<br>X .2836 , .2678 , .2914 , .2946 , .2974 , .2998 , .3019 /<br>DATA (CFTBL3(I),I=1,34) / 0., 1., 15., 0.,<br>TEMPERATURES<br>X 540., 720., 900., 1080., 1260., 1440., 1620., 1800.,<br>X 540., 720., 900., 1080., 1260., 1900., 3060.,<br>SPECIFIC HEATS<br>X 540., 720., 900., 1080., 1260., 1900., 3060.,<br>X 540., 720., 900., 1080., 1260., 900., 3060.,<br>X 540., 6541., 6823., 9075., 9304., 9512., 9697./<br>DATA (CFTBL4/1)., 15., 40./                                                                                               |           |
| , 15 Ge |                                                                   |     |
|---------|-------------------------------------------------------------------|-----|
|         |                                                                   |     |
| 4       |                                                                   |     |
|         | *<br>*/                                                           |     |
| 4<br>1  | SPECIFIC HEATS                                                    |     |
| í       | x .3804 + .4601 + .5261 + .5784 + .6212 + .6577 + .0899 + .7185 + | 200 |
| t at    | X .7442 + .7673 + .7879 + .8063 + .8226 + .8373 + .8503 /         | 210 |
| ÷.      |                                                                   | 220 |

internet and

1

|     | BLUCK DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | (    |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| ÷   | BLOCK DATA FOR HEAT OF REACTION VS TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |
| ý – | COMMON /CCC/H4TBL(40),H3TBL(40)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10   |
| :   | ĐAIA (H4TBL(I)+I=1+40) / Orr 1er 18er Orr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 20   |
| ļ   | TEMPERATURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |
| 3   | x 180. , 360. , 536.4 , 540. , 720. , 900. , 1080. ,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 30   |
| Ň   | X 1260 1440 1620 1800 1980 2160 2340                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | n.(  |
| 4   | x 2520                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50   |
|     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |
|     | 1451 02 - 1410 50 - +1806 04 - 1805 70 - +1805 55 - 1878 12 - 1270 46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6(   |
| ÷.  | x = 1.64 + 62 + 1.000 + 1000 + 0.000 + 0.000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 1000 + 10000 + 1000 + 1000 + 1000 + 10000 + 10000 + 10000 + 10000 + 10000 + 10000 + 10000 + 10000 + |      |
|     | x-1004.03/-1072.38/-13/1.94/-1312.68/-1324.63/-133/.54/-1950./4/                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 71   |
|     | X-1964•45•-1978•32•-1992•36•-2006•62 /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 80   |
| -   | UATA (H3TBL(I)/I=1/40) / 0., 1., 18,, 0.,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 90   |
| t,  | TEMPERATURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |
| 1   | <u>- X 180. 7 360. 7 536.4 7 540. 7 720. 7 900. 7 1080. 7</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 100  |
| 1   | x 1260. , 1440. , 1620. , 1800. , 1980. , 2160. , 2340. ,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 110  |
| 1   | x 2520                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 120  |
| Ł   | HEATS OF REACTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 120  |
| ſ   | 11055 57 1103 67 1150 35 1160 40 1913 46 1950 -4 1904 00 -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 20 |
| 1   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 100  |
| ļ   | x1324.11 11355.88 11315.51 11341.11 11402.52 11410.13 11414.57 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 140  |
| 1   | <u>- X1416.37 11416.05 11414.15 11410.56</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 150  |
| *   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | _    |

| BFOC        | CK DATA TABLE OF VAPOR PRESSURE VS TEMP (USED TO FIND TVAP) |  |
|-------------|-------------------------------------------------------------|--|
| DATA        | (VPTBL(I),I=1,44) / 0., 1., 20., 0.,                        |  |
| X           | 59. / 100. / 150. / 200. / 250. / 300. / 350. / 400. /      |  |
| X           | 450. / 500. / 550. / 600. / 650. / 700. / 750. / 800. /     |  |
| <del></del> |                                                             |  |
| X           | 770. / 820. / 855. / 880. / 905. / 925. / 945. / 965. /     |  |
| x           | 900. , 995. ,1010. ,1025. ,1035. ,1050. ,1060. ,1070. ,     |  |
| ••          |                                                             |  |

|                | BLUCK        | ΑΤΑΟ                                                           | 0   |
|----------------|--------------|----------------------------------------------------------------|-----|
| -              | сомно        | N /LIZTHL/DHVST(18),DHLVST(18)                                 | 10  |
| C              | BLUCK        | DATA TABLES FOR DELHV AND DELHL VS TEMP (USED TO FIND HV)      |     |
|                | OATA-        | -{\\\\\Si{1}+i=1+10} / 0., 1., 7., 0.,                         | 20  |
|                | X            | 180. • 360. • 534.6 • 540. • 720. • 900. • 1080. •             | 30  |
|                | *            | 1390.16 / 1332.82 / 1280.02 / 1279.12 / 1237.79 / 1208.80 /    | 40  |
|                | λ            | J139•76 /                                                      | ۴Ŋ  |
| •              | DATA         | (UHLVST(I),I=1,18) / 0., 1., 7., 0.,                           | 60  |
|                | X            | 180. / 360. / 534.6 / 540. / 720. / 900. / 1080. /             | 70  |
| - <del>.</del> | <del>X</del> | - 152.14 v 665.96 v 679.61 v 679.89 v 700.89 v 733.19 v 777.22 |     |
|                | X            | /                                                              | 90  |
|                | ENU          |                                                                | 100 |