SCHOOL OF ENGINEERING OLD DOMINION UNIVERSITY NORFOLK, VIRGINIA

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### THE INTERACTION BETWEEN A SOLID BODY AND VISCOUS FLUID BY MARKER-AND-CELL METHOD

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By

Robert Y.K. Cheng

A Technical Report

Prepared for the National Aeronautics and Space Administration Langley Research Center Hampton, Virginia

Under Grant NGL 47-003-012





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#### THE INTERACTION BETWEEN A SOLID BODY AND VISCOUS FLUID BY MARKER-AND-CELL METHOD

By

Robert Y.K. Cheng<sup>1</sup>

#### SUMMARY

A computational method for solving nonlinear problems relating to impact and penetration of a rigid body into a fluid-type medium is presented. The numerical technique, based on the Marker-and-Cell method, gives the pressure and velocity of the flow field. An important feature in this method is that the force and displacement of the rigid body interacting with the fluid during the impact and sinking phases are evaluated from the boundary stresses imposed by the fluid on the rigid body.

A sample problem of low velocity penetration of a rigid block into still water is solved by this method. The computed time histories of the acceleration, pressure, and displacement of the block show good agreement with experimental measurements. A sample problem of high velocity impact of a rigid block into soft clay is also presented. The constitutive relationships of the clay is represented as a very viscous non-Newtonian fluid.

Professor of Civil Engineering, School of Engineering, Old Dominion University, Norfolk, Virginia 23508.

#### INTRODUCTION

There is a need to develop an analytical method of studying the problem of aircraft landing impact on soil runways. Since deep ruts are created by the tires on unpaved runways, the drag forces on the landing, gear can be large enough to endanger the safe operation of the aircraft.

Many studies have been performed (refs. 1, 2, 3, and 4) to study the soil-tire interactions at ground speeds associated with aircraft operations. The methods used in those studies are based on either empirical modeling techniques or on soil strengths obtained by static tests. Although the rut depth and drag forces will depend on many factors other than the soil strength, a rational method for predicting the landing-impact problem must take into account the dynamic soil properties, the interface-stress distribution between the tire and soil, and the large movement of soil masses.

As a first step in a program to provide an analytic method as an engineering tool for studying the landing-impact problem, a computational method is presented for solving the problem of large displacements of fluid-acting media when interacting with a solid body. An important feature in this method is that the force and displacement of the rigid body during the impact and sinking phases are derived from the fluid field.

#### LIST OF SYMBOLS

С	wave	speed
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D divergence of fluid medium

E energy

e strain-rate

e strain-rate tensor

f force component contributed by a single cell.

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F	force component acting on rigid body
F	force vector
ğ	gravitational acceleration vector
g	gravitational acceleration
h	depth of fluid field measured from the base of rigid body
Ī	unity dyadic
L	length of fluid field
М	mass of rigid body
m	direction cosine of unit tangential vector
n	direction cosine of unit normal vector
р	hydrostatic pressure
q	velocity vector
R	source term of Poisson's equation for calculating $\phi$
t	time
u	velocity component in x-direction
v	velocity component in y-direction
x,y	cartesian coordinates (also used as subscripts)
Δt	time increment
Δx, Δy	width and height, respectively, of all cells
ε	strain
<del>π</del> ε	strain tensor
σ	normal stress
σ	stress tensor
τ	shear stress
Ŧ	deviatoric stress tensor
$\nabla$	del operator

∆ dilation

μ	modulus of rigidity
к	bulk modulus
η	non-Newtonian viscosity
η <sub>app</sub>	apparent viscosity
ν	kinematic viscosity
φ	ratio of pressure to mass density of fluid
ρ	mass density of fluid
λ	convergence criterion
$\lambda_{f}$	force tolerance for iterative scheme
Subscript	5

# 11,22;22 diagonal elements of stress tensor e identifies trial value for rigid body i,j denotes x and y direction, respectively o initial impact velocity w identifies rigid body a externally applied pressure

#### Superscripts

- " spherical stress tensor
- deviatoric stress tensor
- n time cycle
- m order of recycle
- s order of iteration

#### SOIL PROPERTIES AND CONSTITUTIVE RELATIONSHIPS

A valid solution in continuum mechanics requires that the solution satisfies the equations of conservation of mass and of energy, equations of motion, and the equation of state of the material. When the tire of an aircraft landing at relatively high speed strikes the free surface of the soil, a strain-rate which depends upon the landing velocity is imposed on the wheel and the soil. Assuming the deformation will be large, the momentum (or energy) of the aircraft will be dissipated by the soil in the The elastic deforform of elastic deformations and plastic flow. mations can be expressed as a function of elastic stresses whereas the plastic flow can be expressed as functions of shear (or viscous) stresses with magnitudes depending on the rate of strain. The yield stress will be defined as the transition point from the elastic to the plastic state. Plastic flow will appear only when the stresses exceed a certain limit indicated by the yield stress. For materials exhibiting distinct yield points, there is no ambiguity in establishing this limit. The stress-strain behavior of most soils seldom indicate any distinct point that may be identified as a yield point. Therefore, in this paper the yield stress will be defined as the transition point from the linear stress-strain behavior to the non-linear stress-strain behavior. Below the yield point, the stress-strain relationship is not rate dependent.

The various phenomena which are generated by the landing impact of an aircraft may be treated as follows:

a. In the extremely "close-in region" in the neighborhood of the impact in which the stresses are very large, with resulting large displacements and velocities of the material, the medium will be in a state of plastic flow. The impact momentum is primarily dissipated by the shear resistance of the material. The phenomenon is of a deviatoric nature.

b. As the magnitude of stresses decreases from the zone of loading, there is a transition region in which the medium undergoes

a transition from the plastic flow state to the elastic state. The momentum dissipation in this region is relatively small in comparison with the flow state. The stresses and displacements can be evaluated by the elastic constants of the "solid" material.

c. As the moving load moves away from the "close-in region", the applied load is released, and the flow state reverts to an elastic state. The elastic rebound is a rather common phenomenon observed upon unloading in many simple compression (or tension) tests. It must be noted that the material, after being subjected to plastic flow, reverts to a solid but with elastic and flow properties which may be drastically different from its virgin state.

Some of the physical variables of sandy and clayey soils influencing mass behavior are: air and water content, grain size distribution, and density. The environmental variables affecting the mass behavior are confining pressures, stress history, rate of loading, and duration of loading. The elastic and flow properties of soils are all influenced by these variables. The state in which the soil remains elastic is highly dependent upon the confining pressure.

The state of stress at a point will be described by a stress tensor  $\overline{\sigma}$ , as:

$$\overline{\overline{\sigma}} = \begin{bmatrix} \sigma_{11} & \sigma_{12} & \sigma_{13} \\ \sigma_{21} & \sigma_{22} & \sigma_{23} \\ \sigma_{31} & \sigma_{32} & \sigma_{33} \end{bmatrix}$$

The strain tensor  $\overline{\epsilon}$  is given as:

$$\overline{\overline{\varepsilon}} = \begin{bmatrix} \varepsilon_{11} & \varepsilon_{12} & \varepsilon_{13} \\ \varepsilon_{21} & \varepsilon_{22} & \varepsilon_{23} \\ \varepsilon_{31} & \varepsilon_{32} & \varepsilon_{33} \end{bmatrix}$$

The strain-rate tensor  $\overline{e}$  is related to strain tensor as:

$$\frac{1}{e} = \frac{de}{dt}$$

It is to be noted that the above relationship is valid only where the strains are small, so that higher order products of strains and rates of strains may be neglected. For a small incremental stress-strain relationship, as will be the case considered in this formulation, the relationship will be valid.

The velocity of a material particle at some point and at time t is given by the vector  $\overline{q}$  which is completely described by time rate of change of the displacement functions. The strain rate tensor defined in terms of displacement functions is:

$$\overline{\overline{e}} = \frac{1}{2} (\overline{x}\overline{q} + \overline{q}\overline{v})$$

The total deformation in a soil mass may be decomposed into (a) volumetric deformation caused by hydrostatic (or spherical) stress components, and (b) deviatoric deformation caused by deviatoric stress components. The stress, stain, and strain-rate tensors may be decomposed into hydrostatic and deviatoric parts given as:

$$\vec{\sigma} = \vec{\sigma}'' + \vec{\sigma}'$$

$$\vec{\epsilon} = \vec{\epsilon}'' + \vec{\epsilon}'$$

$$\vec{e} = \vec{e}'' + \vec{e}'$$
(1)

The deviatoric tensor has the property that the first invariant is zero. Generally the stress-strain behavior of a medium for the hydrostatic stress field is linear.

From small incremental stress-strain theory, the volumetric strain is the dilation  $\Lambda$  given by:

 $\Delta = \nabla \circ \overline{\mathbf{q}} \quad .$ 

The hydrostatic stress tensor is the mean of the normal stress components given by:

$$\bar{\bar{\sigma}} = \begin{bmatrix} -p & 0 & 0 \\ 0 & -p & 0 \\ 0 & 0 & -p \end{bmatrix}$$

where

$$-p = \frac{1}{3} (\sigma_{11} + \sigma_{22} + \sigma_{33})$$

If the material is isotropic with a bulk modulus  $\kappa$  (not necessarily a constant), a constant rigidity modulus  $\mu$  in the elastic state, and a flow parameter  $\eta$  in the plastic flow state, the constitutive equations are:

$$p = \kappa \Delta$$
  
 $\overline{\sigma}' = 2\mu \overline{\epsilon}'$  (elastic region only)  
 $\overline{\tau}' = 2\eta \overline{\epsilon}'$  (plastic region only)

In comparison with plastic flow, the shear deformation is relatively small in the elastic region. The material behavior in the elastic region may be associated with the conservative (recoverable) part whereas in the plastic region it is associated with the dissipative (non-recoverable) part, in which the flow takes place at constant volume. In large displacement problems, the deformation due to the conservative part will be small in comparison with the dissipative part. Henceforth, conservative-part deformation will be tentatively neglected. For a cohesive soil such as clay, the flow parameter  $\eta$  is non-Newtonian and it is a function of the confining pressure and strain-rate. A convenient method to express the constitutive relationship for a non-Newtonian material is the use of an apparent viscosity,  $\eta_{app}$ , (ref. 5) as shown in figure 1. The constitutive relationships for the Mississippi Buckshot clay of various water contents is given in reference 6.

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The governing equations describing the motion of a continuous medium are:

$$\frac{d\rho}{dt} + \rho \nabla \cdot \vec{q} = 0 \qquad \text{Conservation of mass}$$

$$\rho \frac{d\vec{q}}{dt} = \rho \vec{g} + \nabla \cdot \vec{\sigma} \qquad \text{Conservation of motion}$$

$$\rho \frac{dE}{dt} = \vec{\sigma} \cdot \vec{e} - \nabla \cdot \vec{b} + c_{h} \qquad \text{Conservation of energy}$$

$$E = E(\rho, p) \qquad \text{Equation of state}$$

$$(3)$$

where  $\overline{b}$  and  $c_h$  are the heat flux vector and radiative heat term respectively.

For compressible flow, the equation of state is necessary to complete the system of equations for solving the unknowns  $\overline{q}$ ,  $\rho$ , p, and E. For incompressible flow, the governing equations are reduced to:

$$\nabla \cdot \overline{q} = 0$$

$$\rho \left(\frac{\partial}{\partial t} + \overline{q} \cdot \nabla\right) \overline{q} = \rho \overline{g} + \nabla \cdot \overline{\sigma}$$
(4)

Imposing the stress strain relationship expressed in terms of displacement functions, the set of governing equations may be solved and the solution is given by these displacement functions in time derivative form.

For reasons given previously, large deformation is attributed to plastic flow so that volumetric deformation due to hydrostatic stresses will be neglected. The soil system is considered to flow under constant volume under the conditions of soil-tire interaction due to a moving wheel of an aircraft. In the plastic flow state, the constitutive equation of the soil system is:

$$\overline{\sigma} = \overline{\sigma}^{n} + \overline{\tau}^{l} = -p\overline{\overline{I}} + 2n\overline{\overline{e}}^{l}$$

The deviatoric strain-rate tensor expressed in terms of displacement functions is:

$$\overline{\overline{e}}' = \overline{\overline{e}} - \overline{\overline{e}}'' \equiv \frac{1}{2} (\nabla \overline{q} + \overline{q} \nabla) - \frac{1}{3} (\nabla \cdot \overline{q}) \overline{\overline{1}}$$

The constitutive equation becomes:

$$\overline{\overline{\sigma}} = -p\overline{\overline{I}} + \eta \left( \nabla \overline{q} + \overline{q} \nabla \right) - \frac{2}{3} \eta \left( \nabla \cdot \overline{q} \right) \overline{\overline{I}}$$
(5)

Substituting the constitutive equation into Eq. (4), the equation of motion becomes:

$$\rho\left(\frac{\partial}{\partial t} + \overline{q} \cdot \nabla\right) \overline{q} = \rho \overline{g} - \nabla p + \eta \left[\frac{1}{3} \nabla (\nabla \cdot \overline{q}) + \nabla^2 \overline{q}\right]$$

$$+ (\nabla \eta) \cdot (\nabla \overline{q} + \overline{q} \nabla) - \frac{2}{3} (\nabla \cdot \overline{q}) (\nabla \eta)$$
(6)

Imposing the condition of incompressibility, the governing equations describing the motion of a medium are:

$$\nabla \cdot \overline{q} = 0$$

$$\rho \left(\frac{\partial}{\partial t} + \overline{q} \cdot \nabla\right) \overline{q} = \rho \overline{g} - \nabla p + \eta \nabla^2 \overline{q} + (\nabla \eta) \cdot (\nabla \overline{q} + \overline{q} \nabla)$$
(7)

where  $\eta = \eta(p,e)$ . For a special case in which the flow parameter  $\eta$  is treated as a constant, the equation of motion in Eq. (7) is the well known Navier-Stokes equation.

In view of the non-linear form of Eq. (7), the difficulties involved in obtaining an analytic form of solution satisfying Eq.

(7) and the imposed boundary conditions is formidable. By treating the soil as an incompressible and viscous material, the governing equations are similar to those in fluid dynamic problems.

The availability of large, high-speed computers and advanced numerical techniques (ref. 7), provides a powerful tool for solving complex non-linear boundary value problems in fluid dynamics. A computational method based on the Marker and Cell (MAC) technique (ref. 8) is used since the primitive variables of velocity components and pressure are solved directly, and the primitive variables are required to relate the interaction between the solid body and the fluid medium.

The Marker and Cell (MAC) method is a computational method with visual display for solving problems of time-dependent motions of a viscous, incompressible fluid with a free surface. Some recent workers using the MAC method are Donovan (ref. 9) and Viecelli (ref. 10). The MAC method requires that the external wall shapes be confined to the fixed rectangular cells of the Eulerian mesh. In this paper, the MAC method has been adapted and modified to handle the fluid-solid interaction problem involving the moving wall of the solid body. The restriction of the stationary wall boundary has been overcome by an iterative scheme involving the impulse-momentum principle and the translation of coordinates.

For a complete detailed description and discussion of the MAC method, the reader is urged to consult reference 8. Basically the method is a numerical technique for solving problems in incompressible hydrodynamics containing free surfaces. Using two spatial dimensions, the primary dependent variables are the pressure and the two velocity components. The variables are computed in each time step and the solution is advanced in small time increments. Using the Lagrangian approach to represent the fluid motion with time, massless "marker" particles are moved in each time step to new positions according to the velocity components in their vicinities. The marker particles serve to define the free surfaces and they do not enter into the solution of the Navier-Stokes equations. As with most other numerical methods which work in small incremental form, the MAC method works with a small time cycle. The results of the field variables in each cycle act as initial conditions of the next time cycle, and the calculations are continued for as many cycles as the investigator wishes.

During the small, but finite, time cycle  $\Delta t$ , the flow parameter  $\eta$  may be treated as a constant within each cell, such that  $\forall \eta = 0$ . Introducing

$$\phi = \frac{p}{\rho} \quad \text{and} \quad v = \frac{\eta}{\rho} \tag{8}$$

Eq. (7) describing the motions of an incompressible fluid in twodimensional Cartesian coordinates are:

$$D = \frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0$$
 (9)

$$\frac{\partial u}{\partial t} + \frac{\partial}{\partial x} u^2 + \frac{\partial}{\partial y} uv = g_x - \frac{\partial \phi}{\partial x} + v \left( \frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} \right)$$
(10)

$$\frac{\partial v}{\partial t} + \frac{\partial}{\partial x} uv + \frac{\partial}{\partial y} v^2 = g_y - \frac{\partial \phi}{\partial y} + v \left( \frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} \right)$$
(11)

The kinematic viscosity is considered to be a constant, but the numerical method can easily account for variable viscosity which may be treated as a function of pressure and velocity components.

Operating on Eq. (10) with  $\frac{\partial}{\partial x}$  and Eq. (11) with  $\frac{\partial}{\partial y}$  and allowing the interchange of space and time differentials, one obtains the Poisson equation:

$$\nabla^2 \phi = \frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = -R$$
(12)

where

$$R = \frac{\partial^2 u^2}{\partial x^2} + 2 \frac{\partial uv}{\partial x \partial y} + \frac{\partial^2 v^2}{\partial y^2} + \frac{\partial D}{\partial t} - v \frac{\partial^2 D}{\partial x^2} + \frac{\partial^2 D}{\partial y^2}$$

Equations (9) through (12) constitute the basic equations from which a finite difference scheme is developed.

The boundary conditions required for the problem are indicated in sketch 1. The stationary boundaries are represented by no-slip



#### Sketch 1.

impervious boundaries, and they are placed at sufficiently large distances away from the moving boundary to simulate an infinitely large region. The moving rigid block is represented by a no-slip impervious moving boundary. For the symmetric case, the line of symmetry is represented by a free-slip, impervious boundary. At the free surface, the boundary condition requires that the tangential and normal stresses vanish. The computational region is divided into rectangular cells as shown in figure 2. The positions of the variables on the rectangular cells are shown in sketch 2. The pressure parameter,  $\phi$ ,



Sketch 2.

is evaluated at the cell center. The field variables to be computed for each cell are u(i+1/2, j), v(i,j+1/2), and  $\phi(i,j)$ . The cell-centered values of u and v and corner values of uv are evaluated by simple averages. Representative examples are:

$$u_{i,j} = \frac{1}{2} (u_{i+1/2,j} + u_{i-1/2,j})$$

$$(uv)_{i+1/2, j+1/2} = \frac{1}{4} (u_{i+1/2,j} + u_{i+1/2, j+1})$$

$$\cdot (v_{i,j+1/2} + v_{i+1, j+1/2})$$

The time derivative quantities are approximated by forward differences of the first order

$$\left(\frac{\partial D}{\partial t}\right)_{i,j} = \frac{D_{i,j}^{n+1} - D_{i,j}^{n}}{\Delta t}$$

$$\left(\frac{\partial \mathbf{u}}{\partial t}\right)_{i+1/2,j} = \frac{\mathbf{u}_{i+1/2,j}^{n+1} - \mathbf{u}_{i+1/2,j}^{n}}{\Delta t}$$

where superscript n+1 denotes the advance time step. All the space derivatives are approximated more accurately by a central difference scheme. Representative examples are:

$$\left(\frac{\partial u^2}{\partial x}\right)_{i,j} = \frac{1}{\Delta x} \left(u_{i+1,j}^2 - u_{i,j}^2\right)$$

$$\left(\frac{\partial^2 \mathbf{u}}{\partial \mathbf{x}^2}\right)_{i,j} = \frac{1}{\Delta \mathbf{x}^2} \left(\mathbf{u}_{i+1,j} + \mathbf{u}_{i-1,j} - 2\mathbf{u}_{i,j}\right)$$

$$\left(\frac{\partial^2 uv}{\partial x \partial y}\right)_{i,j} = \frac{1}{\Delta x \Delta y} \left[ (uv)_{i+1/2,j+1/2} + (uv)_{i-1/2,j-1/2} \right]$$

$$(uv)_{i+1/2,j-1/2} - (uv)_{i-1/2,j+1/2} \right]$$

In advancing the solution from time step n to n+1, the Poisson equation is first solved iteratively by the Liebmann's methods of successive correction; that is, to sweep along the positive x-direction and the positive y-direction from the origin. In representing Eq. (12) by finite difference form, the  $\frac{\partial D}{\partial t}$  term should ideally vanish in order to satisfy the incompressibility condition. However, any iterative scheme will not solve Eq. (12) exactly so that the divergence D of each cell will not be zero. In order to compensate for this discrepancy, an auxiliary condition is imposed in reference(11)as

$$D^{n+1} = 0 (13)$$

which ideally would result in a zero divergence in the advance time step n+1. The auxiliary condition generates a self-corrective scheme in the computational procedure, so that a relatively coarse convergence criterion can be used for solving the Poisson equation as time advances without the accumulation of error. Imposing the condition of Eq. (13) for cell (i,j),

$$\left(\frac{\partial D}{\partial t}\right)_{i,j} = \frac{D_{i,j}^{n+1} - D_{i,j}^{n}}{\Delta t} \simeq \frac{D_{i,j}^{n}}{\Delta t}$$
(14)

the finite difference form of Eq. (12) for the pressure parameter is

$$\phi_{i,j}^{n+1} = \frac{1}{Z} \left[ \frac{1}{\Delta x^2} (\phi_{i+1,j} + \phi_{i-1,j}) + \frac{1}{\Delta y^2} (\phi_{i,j+1} + \phi_{i,j-1}) + R_{i,j} \right]$$
(15)

where

$$Z = 2\left(\frac{1}{\Delta x^2} + \frac{1}{\Delta y^2}\right)$$
(16)  
(cont<sup>\*</sup>d.)

$$R_{i,j} = \frac{1}{\Delta x^2} \left[ (u_{i+1,j})^2 + (u_{i-1,j})^2 - 2(u_{i,j})^2 \right] + \frac{1}{\Delta y^2} \left[ (v_{i,j+1})^2 + (v_{i,j-1})^2 - 2(v_{i,j})^2 \right] + \frac{2}{\Delta x \Delta y} \left[ (uv)_{i+1/2,j+1/2} + (uv)_{i-1/2,j-1/2} \right] - (uv)_{i+1/2,j-1/2} - (uv)_{i-1/2,j+1/2} \right] + \frac{D_{i,j}}{\Delta t} - v \left[ \frac{1}{\Delta x^2} (D_{i+1,j} + D_{i-1,j} - 2D_{i,j}) \right] + \frac{1}{\Delta y^2} (D_{i,j+1} + D_{i,j-1} - 2D_{i,j}) \right]$$

and

$$D_{i,j} = \frac{1}{\Delta x} (u_{i+1/2,j} - u_{i-1/2,j}) + \frac{1}{\Delta y} (v_{i,j+1/2} - v_{i,j-1/2})$$
(17)

After solving the pressure field, the new values of u and v for cell (i,j) are computed from the explicit finite difference form of Eqs. (2) and (3) evaluated at i+1/2, j and i,j+1/2, respectively. The equations for u and v are:

$$u_{i+1/2,j}^{n+1} = u_{i+1/2,j} + \Delta t \left\{ \frac{1}{\Delta x} \left[ (u_{i,j})^2 - (u_{i+1,j})^2 \right] \right\}$$

$$+ \frac{1}{\Delta y} \left[ (uv)_{i+1/2,j-1/2} - (uv)_{i+1/2,j+1/2} \right]^{(cont'd_{a})}$$
(18)

$$+ g_{x} + \frac{1}{\Delta x} \left( \phi_{i,j}^{n+1} - \phi_{i+1,j}^{n+1} \right) + \nu \left[ \frac{1}{\Delta x^{2}} (u_{i+3/2,j} + u_{i-1/2,j} - 2u_{i+1/2}) + \frac{1}{\Delta y^{2}} (u_{i+1/2,j+1} - 2u_{i+1/2,j}) \right]$$

$$+ u_{i+1/2,j-1} - 2u_{i+1/2,j} \right]$$

$$(18)$$

$$(concl'd.)$$

$$v_{i,j+1/2}^{n+1} = v_{i,j+1/2} + \Delta t \left\{ \frac{1}{\Delta y} \left[ (v_{i,j})^2 - (v_{i,j+1})^2 \right] + \frac{1}{\Delta x} \left[ (uv)_{i-1/2,j+1/2} - (uv)_{i+1/2,j+1/2} \right] + \frac{1}{\Delta x} \left[ (uv)_{i-1/2,j+1/2} - (uv)_{i+1/2,j+1/2} \right] + \frac{1}{\Delta x} \left[ (19)_{i,j+1} + \frac{1}{\Delta y} \left( \phi_{i,j}^{n+1} - \phi_{i,j+1}^{n+1} \right) + v \left[ \frac{1}{\Delta x^2} \left( v_{i+1,j+1/2} + \frac{1}{\Delta x} \right) \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] + \frac{1}{\Delta x} \left[ (v_{i+1,j+1/2} - \frac{1}{\Delta x} \right] +$$

+ 
$$v_{i-1,j+1/2} - 2v_{i,j+1/2} + \frac{-}{\Delta y^2} (v_{i,j+3/2} + v_{i,j-1/2} - 2v_{i,j+1/2}) \bigg]$$

#### BOUNDARY CONDITIONS

#### Moving Boundary

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As the rigid body penetrates into the fluid, the motion of the body introduces a nonsteady boundary condition. The position of the moving boundary (rigid body) depends on the forces exerted by the fluid. An iterative scheme involving the impulse-momentum principle and the translation of coordinates is adopted so that at the end of each time step, the Eulerian mesh is translated to match the boundaries of the moving rigid body. If the pressure and velocity components are known for cell (i,j) adjacent to the boundary, the stress components of the cell acting on the boundary by the fluid as shown in sketch 3 are:





The force components contributed by a single cell are:

$$f_{x} = \sigma_{x}' \Delta y + \tau_{xy} \Delta x - \phi \rho \Delta y$$

$$f_{y} = \sigma_{y}' \Delta x + \tau_{xy} \Delta y - \phi \rho \Delta x$$
(20)

where

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$$\sigma_{\mathbf{x}}' = 2\eta \frac{\partial u}{\partial \mathbf{x}}$$

$$\sigma_{\mathbf{y}}' = 2\eta \frac{\partial v}{\partial \mathbf{y}}$$

$$\tau_{\mathbf{x}\mathbf{y}} = \eta \left(\frac{\partial u}{\partial \mathbf{y}} + \frac{\partial v}{\partial \mathbf{x}}\right)$$

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The force components  $F_x$  and  $F_y$  experienced by the rigid body, treated as constant during one time step, are computed by integration of the forces of all the cells adjacent to the moving boundary. Equating the change in momentum of the rigid body between any time interval n and n+1, to the force acting on the body, one observes

$$M \frac{d\overline{q}}{dt} = M\overline{g} + \overline{F}$$
(21)

The finite difference form of Eq. (21) for the velocity components of the rigid body are:

$$u_{W}^{n+1} = u_{W}^{n} + \frac{F_{X}^{n+1}}{M} \Delta t$$

$$v_{W}^{n+1} = v_{W}^{n} + \left(g_{Y} + \frac{F_{Y}^{n+1}}{M}\right) \Delta t$$
(22)

with  $g_x = 0$ . The values of the force components  $F_x^{n+1}$  and  $F_y^{n+1}$  are required as boundary conditions at the beginning of each time cycle and must be found by an iterative scheme. The displacement of the body at the end of the time cycle, shown in . sketch 4, is computed from the average velocities as:

$$\Delta x_{W} = \frac{u_{W}^{n+1} + u_{W}^{n}}{2} \Delta t$$

$$\Delta y_{W} = \frac{v_{W}^{n+1} + v_{W}^{n}}{2} \Delta t$$
(23)



#### Sketch 4.

 $u_w^{n+1}$  $v_{M}^{n+1}$  as expressed Since the advanced time velocities and by Eq. (22) must also satisfy the momentum equations expressed by F<sup>n+1</sup> xe Eqs. (18) and (19), a judicious choice of trial values .and  $F_{ye}^{n+1}$  representing  $F_{x}^{n+1}$  and  $F_{y}^{n+1}$  respectively are estimated at ye the beginning of the computation. The estimated advance time velocities of the body  $u_{2}^{n+1}$  and  $v_{2}^{n+1}$  can be immediately evaluated and the reference coordinates are then translated according u<sup>n+1</sup> and  $v_{a}^{n+1}$ . to the magnitudes expressed by Eq. (23) using

In solving the finite difference Poisson equation, values of  $\phi$ , u, and v outside the computing region are obtained from the appropriate mementum and continuity equation. Although the types of boundary conditions applied will depend on the boundary under consideration, the boundary conditions for the case of a boundary to the left of the fluid shown in sketch 5 will be presented. The conditions for other boundaries are analogous.



Sketch 5.

The conditions for the moving boundary are:

1) 
$$v_{i-1,j+1/2} = 2v_w - v_{i,j+1/2}$$
  
 $v_{i-1,j-1/2} = 2v_w - v_{i,j-1/2}$   
2)  $u_{i-1,j}^2 = u_{i,j}^2$   
3)  $(uv)_{i-1/2,j+1/2} = u_w \times v_w$   
 $(uv)_{i-1/2,j-1/2} = u_w \times v_w$   
4)  $\phi_{i-1,j} = \phi_{i,j} + \left(\frac{F_x}{M}\right) \Delta x + 2v(u_w - u_{i+1/2,j})/\Delta x$   
5)  $u_{i-1/2,j} = u_w$   
6)  $D_{i-1,j} = D_{i,j}$ 

The no-slip and free-slip boundary conditions are the same as given in reference 5.

#### Free Surface

The treatment of a free surface cell is adopted according to the procedure given by Hirt and Shannon, reference 12. The normal and tangential stress conditions at the free surface can be expressed as

$$\phi = \phi_{a} + 2\eta \left[ n_{x}^{2} \frac{\partial u}{\partial x} + n_{x} n_{y} \left( \frac{\partial u}{\partial y} + \frac{\partial v}{\partial x} \right) + n_{y}^{2} \frac{\partial v}{\partial y} \right]$$

$$2n_{x} m_{x} \frac{\partial u}{\partial x} + (n_{x} m_{y} + n_{y} m_{x}) \left( \frac{\partial u}{\partial y} + \frac{\partial v}{\partial x} \right) + 2n_{y} m_{y} \frac{\partial v}{\partial y} = 0$$
(24)

where the direction cosines of the normal unit vector and the corresponding tangential unit vector relative to the surface are related as:

$$n_{\mathbf{x}} = -m_{\mathbf{y}}$$

and

$$n_y = m_x$$

The tangential stress condition is approximately satisfied by selecting the velocity components at the exterior edges of the surface cell so that the divergence of the cell vanishes. The normal stress condition can be treated accurately provided the orientation of the free surface is well defined. At present, the free surface defined by marker particles is approximated to lie either along the cell boundaries or along the diagonal of a cell. The normal unit vector in both of these cases is well defined. The method of this paper calculates a transient problem by working through a sequence of small time increments. The results of each time cycle are used to define the initial conditions for the next cycle. Each cycle itself is divided into the following phases:

1. Using a linear interpolation scheme, the trial values of the force components  $F_{xe}^{n+1}$  and  $F_{ye}^{n+1}$  are estimated. Fig. 3 shows that the correct choice will lie along the 45° line. Using the previous trial and computed values of the forces in the m and m - 1 recycles, the trial values for the next recycle will be chosen at the point of intersection. For the x-direction

$$F_{xe}^{n+1} = \frac{F_{xe}^{m-1} F_{xe}^{m} - F_{x}^{m-1} F_{xe}^{m-1}}{F_{xe}^{m} - F_{x}^{m} - F_{xe}^{m-1} + F_{x}^{m-1}}$$
(25)

where  $F_{xe}$  is the estimated and  $F_{x}$  is the computed force in the m<sup>th</sup> recycle. The equation for  $F_{ye}^{n+1}$  is analogous.

2. The estimated velocities of the moving boundary  $u_e^{n+1}$ and  $v_e^{n+1}$  computed from Eq. (22) are used in Eq. (23) for determining coordinate translations  $\Delta x_w$  and  $\Delta y_w$ .

3. The pressure  $\phi_{i,j}^{m}$  for each cell is calculated for the new coordinates. Using the values of neighboring cells as shown in Fig. 4,

$$\phi_{i,j}^{m} = (1 - \Delta x_{w}) (1 - \Delta y_{w}) \phi_{i,j} + \Delta x_{w} \left(1 - \frac{\Delta y_{w}}{2}\right) \phi_{i+1,j}$$
$$+ \Delta y_{w} \left(1 - \frac{\Delta x_{w}}{2}\right) \phi_{i,j+1}$$

4. Eq. (15) is solved iteratively for the pressure  $\phi_{i,j+1}^m$  by successive correction until the convergence criterion is satisfied as given in reference 8 as:

$$\begin{bmatrix} |\phi^{s} - \phi^{s+1}| \\ \phi^{s} + |\phi^{s+1}| + u_{i,j}^{2} + v_{i,j}^{2} + |g_{y}^{h}| t |g_{x}^{L}| \end{bmatrix} \max$$
(26)

where s means the s<sup>th</sup> iteration and  $\lambda$  is the convergence criterion which is a predetermined small positive number.

5. The new velocities of each cell are computed by Eqs. (18) and (19).

6. The forces  $F_x^{n+1}$  and  $F_y^{n+1}$  are computed by integrating the forces of all the cells adjacent to the moving boundary.

7. Steps (1) through (6) are recycled or repeated until the force tolerance is satisfied

$$\begin{vmatrix} F_{x}^{n+1} - F_{xe}^{n+1} \end{vmatrix} < \lambda_{f}$$

$$\begin{vmatrix} F_{y}^{n+1} - F_{ye}^{n+1} \end{vmatrix} < \lambda_{f}$$
(27)

where  $\lambda_{f}$  is the force tolerance.

8. The apparent viscosity,  $\eta_{app}$ , is computed for each cell using the cell centered velocity and the stress-strain-rate curve, (fig. 1).

9. The marker particles are moved to their new positions according to the same procedure given in reference 8. At the start of the calculation, the fluid configuration is represented by a uniform distribution of four particles per cell. The particles define the new free surface.

10. The cells are reflagged according to the new fluid configuration. The next time cycle can immediately begin.
A listing of the computer program is given in the Appendix.

#### STABILITY AND ACCURACY

All finite difference schemes expressed in explicit form for initial value problems are governed by some form of stability

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requirements. Roache (ref. 7) indicated that the existing mathematical theory for numerical solutions of nonlinear partial differential equations is still inadequate and that there are no rigorous stability analyses, error estimates, or convergence proofs. He wrote (ref. 7) "In computational fluid dynamics, it is still necessary to rely heavily on rigorous mathematical analysis of simpler, linearized, more or less related problems, and on heuristic reasoning, physical intuition, wind tunnel experience, and trial-and-error procedures."

The stability conditions recommended by MAC (ref. 8) are:

$$C \Delta t < \frac{2\Delta x \Delta y}{\Delta x + \Delta y}$$
(28a)

and

$$2v \ \Delta t < \frac{\Delta x^2}{\Delta x^2 + \Delta y^2}$$
(28b)

Hirt (ref. 13) in using a technique applicable to nonlinear equations with variable coefficients, further recommended the following "rule-of-thumb" for the MAC method:

$$v < \frac{1}{2} \Delta t \overline{u}^2$$
 (28c)

and

$$v < \frac{1}{2} \Delta x^2 \left(\frac{\partial \overline{u}}{\partial x}\right)$$
 (28d)

where

 $\overline{u}$  is the average maximum fluid speed  $\frac{\partial \overline{u}}{\partial x}$  is the average maximum velocity gradient in the direction  $\overline{\partial x}$  of the flow.

It is necessary in any calculation to consider which one of these conditions is the more restrictive, and which will govern the size of  $\Delta t$ , the time increment per cycle. For calculations involving large values of viscosity, the diffusional stability condition, Eq. (28b) will be used as a criteria for choosing the time step,  $\Delta t$ .

The degree of accuracy desired for a given problem also dictates the size of the cells and time steps. In view of the iterative scheme adopted for the moving boundary-fluid interaction problem, experience indicated that the time step must be small · enough to restrict the displacement of the rigid body  $\Delta x_{ij}$  and  $\Delta y_{\rm rel}$  to one quarter the cell size. The degree of accuracy in choosing the convergence criterion  $\lambda$  used for the pressure iteration has a direct bearing on satisfying the incompressibility condition  $D_{i,j}^{n+1} = 0$ . The final result will be the force components  $F_x$  and  $F_y$  acting on the rigid body which is the prime feature of interest. Generally, if Eq. (15) is to be iterated to a high level of accuracy by imposing a very small value for  $\lambda$ , the computational time will be increased many fold for each time step, and also as  $\lambda$  becomes smaller, the force components approach an asymtotic value. Figure 5 shows the relationship, for two cases, of  $\lambda$  and the vertical accelerative force  $F_{v}$  (expressed in g units) for a vertical penetration problem at the end of the first time cycle. Taking g<sub>max</sub> to be the asymtotic value, the gain in accuracy will be less than two percent for  $\lambda < 2 \times 10^{-4}$  for case (a) and for  $\lambda < 2 \times 10^{-5}$  for case (b) with force tolerance  $\lambda_{f} = 1 \times 10^{-4}$ . Using the computational method in an engineering application, it is necessary to establish the relationship between the convergence criterion and the feature of interest for each case to determine the magnitude of the convergence criterion for the computational experiment.

#### EXAMPLES OF THE CALCULATIONS AND COMPARISON WITH EXPERIMENTS

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Example I. Low velocity penetration of rigid body into still fluid

In an attempt to provide experimental corroboration of the computational techniques, the impact of a rigid flat block on a still water surface was simulated as an example (ref. 14).

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The apparatus shown in figure 6 was developed to experimentally observe and record the acceleration, pressure, and displacement of a block dropping in water. The water tank itself, a former wind tunnel test section, measures 1.23 m (4 ft) by 1.52 m (5 ft) by 1.23 m (4 ft) high, and can be sealed to provide for impact tests under reduced atmosphere. Viewing ports are provided (as shown) for lighting, camera access, and visual monitoring. For these tests, water was added to a depth of approximately 48 cm (19 in.) and colored with sea marker dye (sodium flouriscene) to provide better visual contrast.

The drop model shown in figure 7 was a rectangular structure fabricated from 1.95 cm (.375 in.) thick sheet plastic, and measured 7.6 cm (3 in.) wide by 25.4 cm (10 in.) high, and 61 cm (24 in.) in length. The length-to-width ratio was purposely made very high to better approximate the two-dimensional case used in the computer study. The minimum dropping weight of the model was 6.24 kg (13.75 lb), and provision was made for adding ballast in the form of lead shot so that the effects of added mass might be observed. The model was held at the desired height above the water surface by an electromagnet (shown in figure 7) which could be prepositioned and released from outside the tank, again to allow for future tests in reduced atmosphere. During a drop, the model was guided by teflon-coated steel rods to assure a flat impact on the water surface. Coil springs were installed on the bottom of the tank to absorb the shock loading resulting from extreme penetration at high dropping rates.

Model displacements were recorded by a high-speed camera (seen in the foreground of figure 6) operating at 500 frames/sec. High-speed color film was used with the necessary lighting provided by one quartz lamp inside the tank and two lamps on the outside aimed through viewing ports.

A reference probe (shown at the left of figure 7) could be adjusted vertically to pinpoint the still water surface, and vertical displacement of the model could be measured from the film by comparing the reference marks on the probe and on the face of the model. A time-code generator triggered an integral timing

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light in the camera so that time histories of displacement could be obtained using a film analyzer.

A strain-gage pressure transducer of 0 - 103 kPag (0 - 15 psig) range was installed inside the model with the sensing face flush with the bottom of the model. A ±12 g accelerometer was also installed inside the center bottom of the model oriented to sense vertical accelerations only, and outputs from these instruments were taken off the model and out through the top of the tank with trailing cables. Both outputs were amplified to increase sensitivity at low drop heights and were recorded on a direct-write oscillograph. The same time-code generator which triggered the camera timing light also provided a time base for the recorder.

Tests were conducted over a range of drop heights for two model weights. In every case, drop height was established with reference to the quiescent water level, and the drop was not initiated until the water surface was completely still. Camera orientation was checked periodically to insure parallel alinement with the surface. The camera and recorder were started about two seconds after impact.

#### Numerical Calculation

The arrangement of the computational domain is given in sketch 6.



Sketch 6.

Only one half of the field is necessary for a vertically symmetric case. The initial vertical impact velocity and the mass of the block were chosen from the experimental values. To test the computational method, the mass of the block was chosen small enough to allow the hydrostatic fluid pressure to push the block back towards the fluid surface.

Using a square grid, each cell had dimensions  $\Delta x = \Delta y = .9524$  cm. The fluid depth and width were chosen to simulate an infinite medium. The fluid depth measured from the face of the block was represented by 24 cells (23 cm), and the width of the fluid for a half field was represented by 60 cells (57 cm). The height of the block was chosen to assure that at full penetration, the block would not be submerged in the fluid. Dimensions for a half-block were 4 cells (3.8 cm) wide × 34 cells (32.4 cm) long. The kinematic viscosity of the fluid was 0.1 cm<sup>2</sup>/sec. The mass used for the two-dimensional case was calculated from the model weight per centimeter of length.

#### Comparison of Results

A comparison of computational and experimental results is summarized in table 1 and presented in figures 8(a), (b), and (c) to illustrate the effects of changes in drop height and in body mass. In figure 8(a), displacement, acceleration, and pressure time histories are shown for an experimental drop height of 1 cm using a model weight of 6.24 kg (13.75 lb). Analysis of the film used to measure displacement indicated the initial impact velocity,  $v_{o}$ , to be 33 cm/sec within an accuracy of ±5 percent. The computations were conducted for  $v_0 = 30$  cm/sec, with convergence criterion,  $\lambda = 2 \times 10^{-4}$  and force tolerance  $\lambda_f = 1 \times 10^{-4}$ . A time increment of  $\Delta t = .003$  sec was used for the first five cycles, and was reduced to .002 sec thereafter as the velocity of the model increased. Computations were terminated at t = .411 sec after the model had attained maximum penetration. As can be seen in figure 8(a), the agreement between experiment and computation is reasonably good for the water penetration phase. Calculations

were also performed with the space grids, reduced by one-half with  $\Delta x = \Delta y = .476$  cm and essentially the same results were obtained up to time t = .22 seconds after which the computational method became unstable.

The effects of increasing drop height to 2 cm are shown in figure 8(b) where much the same trends are noted as for the 1 cm case. In this instance, initial impact velocity for the experiment was found to be 47 cm/sec  $\pm$  5 percent, so for the computation  $v_0 = 50$  cm/sec was used. The convergence criterion, force tolerance, and time increments were the same as for figure 8(a), and computation was terminated at t = .395 sec.

In figure 8(c), the mass of the model was increased to 153.5 cm, and the drop height was 1 cm. At this weight, the experimental initial impact velocity was found to be 30 cm/sec, and  $v_0 = 30$  cm/sec was also used in the computations. Again, the time increment,  $\Delta t$ , was .003 sec for the first five cycles, and was reduced to .002 sec thereafter. At time t = .155 sec, the displacement of the block exceeded one-quarter cell size, so the time increment was reduced 25 percent to .0015 sec, and computations were terminated at t = .2745 sec. Again, reasonable agreement is noted between experiment and computation. However, it is felt that the agreement is sufficiently good to validate the program and give confidence to the computational techniques employed.

As previously suggested, the computational method not only gives a solution for force and displacement of the block during impact and entry, but computes displacement, velocity, and pressure throughout the flow field. The computed behavior of the flow field cannot readily be examined experimentally, but the agreement between computed and experimental block behavior lends credence to the predicted fluid dynamics. As an example of how the computations may be used to examine in detail the evolution of the fluid dynamics during water entry, figures 9(a) and (b) presents particle and velocity plots for an initial block impact velocity,  $v_o = 50$  cm/sec. The fluid pressure developed under the block may also be of interest in certain applications. Figure 10 shows how the excess hydrostatic pressure developed along the centerline of block varies with fluid depth as measured from the bottom of the block as it contacts the free surface. Two initial impact velocities are shown,  $v_0 = 30$  cm/sec and  $v_0 = 50$  cm/sec, and the figure indicates that the size of the fluid field originally chosen was adequate to simulate an infinite medium, since the excess hydrostatic pressure is insignificantly small.

# Example II. High velocity impact of a rigid block into a very viscous non-Newtonian fluid.

The arrangement of the computational domain is given in sketch 1. This numerical example simulated the case of an aircraft wheel landing on soil runway with a locked-wheel braking condition and zero lift. The dimensions and mass of the rigid block represented a two-dimensional equivalent of the case given in the figure 21 of reference 2. The stress and strain-rate curve for the viscous non-Newtonian fluid, simulated a soft clay soil with water-content of 33 percent (fig. 11d of ref. 6) as shown in figure 1.

Using a square grid, each cell had dimensions  $\Delta x = \Delta y = 2$  cm. The fluid depth measured from the bottom face of the block was represented by 10 cells (20 cm) and the width of the fluid was represented by 29 cells (58 cm). The height of the block was represented by 4 cells (8 cm) and the width represented by 7, 9 and 11 cells (14, 18 and 22 cm) to simulate various contact length. The mass per centimeter of length was 90,700 gm.  $\Delta t = 1 \times 10^{-5}$  sec was chosen using the diffusional stability condition and the maximum flow parameter,  $\eta_{app}$ , obtained from the initial secant slope of the stress and strain-rate curve. This small time step will impose a severe restriction on the practical use of the method because of the large amount of computer time . required for a given problem in which the time history of the force and displacements of the rigid block would be long. Only short calculations were made for this example, for t = 0 to

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t =  $1 \times 10^{-4}$  sec, using the same convergence criterion and force tolerance of example I.

Figure 11 shows the time history for the horizontal and vertical forces experienced by the block for various contact lengths. In all cases the initial horizontal impact velocity,  $u_0 = 500$  cm per second, vertical velocity  $v_0 = 0$  and the gravitational force are instantly applied. The horizontal force, developed by the noslip boundary condition, is proportional to the contact length. The magnitude of the horizontal force decreased gradually with time, whereas the magnitude of the vertical force oscillated upwards. The horizontal and vertical displacements would be very small. Figure 12 indicates the displacements at the end of  $t = 1 \times 10^{-4}$  sec. As expected, the horizontal and vertical displacements decreased as the contact length increased.

The variation of forces with initial horizontal impact velocity was calculated for case with contact length = 14 cm. Figure 13 shows the effects of increasing initial horizontal impact velocity for the time interval between  $t = 3 \times 10^{-5}$  sec and  $t = 1 \times 10^{-4}$  sec. As expected, the vertical force remained constant as the horizontal velocity increased. The horizontal force continued to increase as the horizontal velocity increased. Since the sinkage of the block (vertical displacement) was extremely small, the horizontal force experienced by the block was contributed mainly by the viscous tractive force and resistance associated with the inertia effect or the "bow-wave" did not materialize. The viscous tractive force increases linearly with velocity.

#### CONCLUDING REMARKS

The viability of the computational method for studying the low velocity penetration of a flat rigid block on a fluid medium has been demonstrated to agree well with experimentation. The method is capable of providing the complete pressure and velocity fields, and the visual display of the history of fluid configuration.
Some limitations inherent in the method must be mentioned. First, only non-turbulent flows are considered in the model. At high speeds of impact, the turbulent effects may not be ignored and some implementation for turbulent simulation may have to be incorporated in the method. Second, if the main feature of interest is centered at the short time impact phase, the choice of time increment may require some computational experimentation. This limitation will not be critical if the main feature of interest is centered at the maximum penetration of the impact body. In the comparative test cases by the numerical calculation and by experiment, the viscous effect is relatively insignificant since the viscosity of water is small, and the forces acting on the body are contributed predominantly by the pressure.

The computational method has not been tested for the case of. fluid-solid interaction involving a highly viscous non-Newtonian medium. The apparatus to provide experimental corroboration of the computational technique for the case of example II would be complex and no experimental study was made for this case.

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#### APPENDIX

C SOIL-FIRE INTERACTION
<u> </u>
C +++ hEFTUTIONS OF VARIABLES
C ALDIALL-Y-VEROCITY EDACTION OF PUEEL AT TIME CTED NAI TO STED N
C ALPHAY - VICTOTIT ERACTION OF WEEK AT TIME STEP NYL TO STEP N
C CONVECTIONVERSE COLITEPIA OF PPESSUPE TEPATION
C D(1,J)=DISCREPANCY TERM (DIVERGENCE)
C DATA(1)=APRAY FOR TAPE STUPAGE OF DATA ON TAPES A AND 13
C BYAS HAXLAND BIS OF PANY (FXCIDING FIRST CVCIE)
C DTETIME STEP SETWEEN CYCLE
C DICETURE ALTAFEN CELL PRINTS
C DIP/=TIAL REIVESN PARTICLE PRIVIS
C DX=CF11 NDTH
C DXK=IVITIAL PARTICLE SPACE I'I X-DIPECTION
C DYSESHIFTING DISTANCE OF WHEEL IN X-DIRECTION
$\frac{c}{c} = \frac{0}{2} \frac{c}{c} $
C DYSELSHETTAL PARTICLE SPACE IN Y-DIPECTION
C FRADELEPERCENTAGE DIFFERENCE BETWEEN FSTIMATE AND
C CALCULATED FLIAL HOPIZONTAL UNEEL FORCES
C ERROPVEPERCENTAGE DIFFERENCE LETWEEN ESTIMATED AND
CETADESDIL FLOW PARAMETER TPEATED AS CONSTANT
C F(1,J)=1.0=+NDI STATIONARY PIGIU BOUNDARY CELL)
C F([, 3)=2.0=FULL (FULL CFLL)
$\frac{C}{C} = \frac{F(1, j) = 2, 0 = 50.4}{F(1, j) = 2, 0 = 50.4} $ (FREF SUPFACE CELL)
$C \qquad \qquad$
C F(1, J) =0= SYI (VERTICAL LINE OF SYMMETRY AT LEFT BOUNDARY)
C FULL JEJOESFULAJ SIKESS INVARIANI LESS HAR FLUW YIFLD
C FC(1, J)=2=FCR TRUY EMPTY CELL FLAGGED SUP WHICH NEEDS AN ETA
C 'FE(I,J)=1.D=COK (COPNER CELL OF WHEEL)
C FF(1, J)=2. =04 (CELL DIRECTLY ADJACENT TO RAD AND ANDW)
$ \begin{array}{c} L \\ C \\ \mathsf$
C ESE INITIAL VALUE OF J FOR ERFF SURFACE CELLS
C FX.FY= TRIALSHIFT VALUE
C GALAE STRAIN OFFSET FOR ELASTIC RANGE
$\frac{1}{6} \frac{1}{6} \frac{1}$
C IBAR=NO. OF CELL IN X-DIRECTION
C IC- ITEPATION COUNT (NUMBER OF PRESSURE DENSITY ITERATIONS)
C IDM1X, JOMAX= CELL CONTAINING DMAX
C IFSYM=D=GENEPAL [/PAUL PROPLEM C IESYM=D=GENEPAL SA SYMETBYC ASOLIT VERTICAL C/L CE GCEMETDY
C III ( +D-) J MY IIEPATEGA COUNT OF 10 LOOP
C TWPEFLEDEAUXILLARY GEOMETRY PROBLEM
C INHEELEI-WHEEL GEOMETRY PROBLEM
C KC(1,J)=NUNBER OF PARTICLES IN CELL I.J
C MHAX=-MAX. NO. OF POINT TO BE INTERPOLATED=1
C MINEVS=MAX. NO. OF CURVES
C MARTINE MAX. NU. LE PUINT IN THE INDEPENDENT VARIABLE ARRAY
C NOSE NUMBER OF CYCLES STORED ON TAPE
C NOVSEACTUAL MA. OF CURVE
C NIF=ENUING L VALUE FOR ON LINE PRINT
C NISESTARTING I VALUE FOR ON LINE PRINT
C NJS=STAPTING J VALUE FOR ON LINE PRIMT
C NOREANJARER DE RE-CYCLES INCURRED
C NS=ACTUAL YD. OF POINT IN THE INDEPENDENT VARIABLE ARRAY
C NSPERIUMBER OF CYCLIS OF STRESSES STORED ON TAPE
C NY=INITIAL RO. OF PARTICLE IN Y-DIPECTION
C PHI(1, J) = CELL PRESSURE DIVIDED PY (CONSTANT) DENSITY
C PHIMILI, J) = INITIAL VALUE OFFIRE CONVERGENCE LITERATIONS
C R(1, 1) = SOURCE TEAM FOR PRESSURE CALCULATIONS

## REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

C SUNSTE AUTOMULATED POVEMENT OF WHEEL IN HORITTURINE DIRECTOR
C SOVER ACCOMMENTION MOVEMENT OF WHEEL IN VERTICAL DIRECTION
C SIXEDIAL FORCES IN X-DIRECTION
C SEXUE SILVAIL TE LINAL FORTUNAL WREEL FORCES
C SEVERESTINGTO DE LA VERTICAL WHEEL FORCES
C SIGMAY(L-D= NOPMAL SIZESS IN X-DIRECTION
C SIGMAY(L, J) = NOPMAL STRESS IN Y-PLOTOTION
C STUANT LIVE PRICIPLE STORS OF CACH CELL
C STHAAY="ANTIMUM STRAIN_ENCOUNTUPED_DU"ING_CYCLE
C STIALS SEALN (1./SEC) DATA PULNTS
<u>C STRESS (DYNES/(CMMEX)) CATA POINTS</u>
C SUPER SUPERIOR OF ARSOLUTE VALUE (F.K.1., 3)
C TADE(3) = OUTPUT STO2AGE OF VELCCTT34S
C TAPE(10)- STIPUT STOKAGE OF PAPTICLE COOPDINATES
C TAPT(11) - TEMPOPARY STUPAGE OF VELOCITIES OF PREVIOUS TIME STEP
C TAPE(13)- JUT2UT STUPACE OF PHL, ETA, E, FF
C TAPE(14) - TEPPOPARY STOPAGE OF PARTICLE COMPDINATES
C TABE(15)- TEMPHIPAPY STORAGE OF PARTICLE COOPDINATES
C TAPE(16) - TEMPORARY STUPAGE OF VELOCITIES FOR RESTARTING
C TAUXY(1,11= SHEAR STRESS ON X-Y PLANE
C TOPE TIME FOR CELL PRINT
C TOSELLAE OF DATA STORAGE
L IN-TALLEST SETNER PUSITIVE X-OIRCLIER ARD SEGMALLEST
$C = \frac{1}{100} $
C US=55114ATE OF FINAL HORIZONTAL WHEEL VELOCITY
C JULLI, JI=1-7FLOCITY AT TIME STEP M+1
C UNEX-VELOCITY OF THEEL AT TIME STEP N
C V([,J)=Y-V=LCCITY 06 CELL
C VG=ESTIMATE OF FINAL VERTICAL UHEFL VELOCITY
C VHI(I, J)=Y-VFLOCITY AT TIME STEP N+1
C VIEY-VELOCITY OF WHEEL AT TIME STEP N
C FWEMASS OF THEEL FER UNIT WIDTE
C WR=500ARE IF DISTANCE FRUM ANY PILINI 10 WHEEL CENTER
L WERTCHINGT INATE IN INTEL LETTER AT THE STEP A
C YELLENGTHAND STREET CELLER AL THE STEEL
C XO=INITIAL X-COORDINATE OF FIRST PARTICLE
C XAL(I)=X-C DROINATE OF CELL RIGHT BOUNDARY
C X2=X-COPRCIVATE OF RIGHT BOUNDARY
C (SEPARECOUNTER FOR NO. OF GETTING COLUMN DE PARTICLES
C (SPAR=CONATER FCP ND. OF GETTING COLUMN OF PARTICLES C Y(J)=Y-COC2DINATE OF CELL CENTER
C (SCPAR=CONATER FCP ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COC2DINATE OF CELL CENTEP C YK(K)=Y-CCC2DINATE OF PARTICLE K
C (SCPAR=CONTER FCP ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COCPDINATE OF CELL CENTEP C YK(K)=Y-COPRDINATE OF PARTICLE C YO=INITIAL Y-COORDINATE OF FIRST PARTICLE
C <pre>SC </pre> COUNTER FCP ND. OF GFITING COLUMN OF PARTICLES       C     Y(J)=Y-COCPDINATE OF CELL CENTEP       C     YK(K)=Y-CCPRDINATE OF PARTICLE K       C     YO=INITIAL Y-COORDINATE OF FIRST PARTICLE       C     YO=INITIAL Y-COORDINATE OF FIRST PARTICLE       C     YO=INITIAL Y-COORDINATE OF FIRST PARTICLE       C     YO=INITIAL Y-COORDINATE OF CELL LOWEP BOUNDARY       C     YO=INITIAL FOR CEORDINATE OF CELL LOWEP BOUNDARY
C <pre>SC </pre> <pre>SC </pre> <pre>Y(j)=Y-COLSDINATE OF CELL CENTFP</pre> <pre>C</pre> <pre>Y(k)=Y-COLSDINATE OF PAPTICLE K</pre> <pre>C</pre> <pre>Y(k)=INITIAL Y-COORDINATE OF FIRST PARTICLE</pre> <pre>C</pre> <pre>Y(l)=Y-CORDINATE OF CELL LOWEP BOUNDARY       <pre>C</pre>       <pre>YFOR</pre>       <pre>YFOR</pre>       <pre>SC YOURTE OF FIRST PARTICLE</pre>       <pre>C</pre>       <pre>YFOR</pre>       <pre>SC YOURTE OF CELL LOWEP BOUNDARY       <pre>C</pre>       <pre>YFOR</pre>       <pre>SC YEAR=COUNTE OF CELL LOWEP BOUNDARY       <pre>C</pre>       <pre>YFOR</pre>       <pre>SC YEAR=COUNTE OF CELL LOWEP BOUNDARY       </pre>       <pre>C</pre>       <pre>YFOR</pre>       <pre>SC YEAR=COUNTE OF CELL LOWEP BOUNDARY       </pre>       <pre>C</pre>       </pre>       <pre>YFOR</pre>       </pre>       <pre>SC YEAR=COUNTE OF CELL LOWEP BOUNDARY       </pre>       </pre> <pre>SC YEAR=COUNTE OF CELL LOWEP BOUNDARY       </pre> <pre>YFOR</pre>
C <pre>XSPAR=COLITER FCP ND. OF GFITING COLUMN OF PARTICLES</pre> C       Y(J)=Y-COCPDINATE OF CELL CENTEP         C       YK(K)=Y-CCPDINATE OF PARTICLE K         C       Y0=INITIAL Y-COORDINATE OF FIRST PARTICLE         C       Y0=L01=Y-COOPDINATE OF CELL LOWEP BOUNDARY         C       YSFPAR=COUNTER FOR NO. OF GETTING ROW OF PARTICLES         C       YSFPAR=COUNTER FOR NO. OF GETTING ROW OF PARTICLES         C       YT=Y-COCRDINATE OF LOWER BOUNDAPY
C <pre>C       <pre>C       Y(J)=Y-COCPOINATE OF CELL CENTEP         C       Y(K)=Y-COPOINATE OF CELL CENTEP         C       YN=INITAL Y-COORDINATE OF FIRST PARTICLE         C       YN=INITAL Y-COORDINATE OF CELL LOWEP BOUNDARY         C       YPL(J)=Y-COOPDINATE OF CELL LOWEP BOUNDARY         C       YSFPAR=COUNTER FOR NO. OF GETTING ROW OF PARTICLES         C       YT=Y-COORDINATE OF LOWER BOUNDARY         C       YT=Y-COORDINATE OF LOWER BOUNDAPY         C       YT=Y-COORDINATE OF LOWER BOUNDAPY         C       DIMENSION U(1), 1/1, 1/1, PHI(31, 1/1), P(31, 1/1), F(31, 1/1),</pre></pre>
C <pre>C       <pre>C       Y(J)=Y-COCPOINATE OF CELL CENTEP         C       Y(K)=Y-COPOINATE OF CELL CENTEP         C       YN=INITAL Y-COPOINATE OF FARTICLE K         C       YN=INITAL Y-COPOINATE OF FIRST PARTICLE         C       YPL(J)=Y-COPOINATE OF CELL LOWEP BOUNDARY         C       YSFPAR=COUNTER FOR NO. OF GETTING ROW OF PARTICLES         C       YSFPAR=COUNTER FOR NO. OF GETTING ROW OF PARTICLES         C       YT=Y-COPOINATE OF LOWER BOUNDAPY         C       .         ONMENSION U(31,17), V(31,17), PHI(31,17), F(31,17), F(31,17), F(31,17), FE(31,17), FE(31,17)</pre></pre>
C       <
C       <
C (SCPAR=COLITER FCP ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COCYDINATE OF CELL CENTEP C YK(K)=Y-CCCRDINATE OF PARTICLE K C YD=INITIAL Y-COORDINATE OF FIRST PARTICLE C YD=INITIAL Y-COORDINATE OF CELL LOWEP BOUNDARY C YSFPAR=COULTER FOR NO. CF GETTIN'S 40% OF PARTICLES C YT=Y-COCRDINATE OF LOWER BOUNDAPY C . DIMENSION U(1,17), V(1,17), PHI(1,17), F(1,17), F(1,17), *FE(31,17), SIG*AY(31,17), FK(31,17), F(31,17), *FE(31,17), SIG*AY(31,17), TAUXY(31,17), X(1020), YK(1020), *X(31), Y(17), Y1(31), Y0(17), NAXE(10), STRAN(56), SI3FS(56,11), *STRAIN(1), STF=SS(1,11,0FLY(56,1), F(55), S2(56,1), S3(56,1),
C (SCOAR=COLITER FCO ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COC/DINATE OF CELL CENTEP C YK(K)=Y-CC/DINATE OF PARTICLE K C YO=INITIAL Y-COORDINATE OF FIRST PARTICLE C YO=LOJ=Y-CD/DINATE OF CELL LOWE? BOUNDARY C YSFOAR=COULTER FOR NO. CF GETTIN'S QU: OF PARTICLES C YT=Y-COCREDINATE OF LOWER BOUNDAFY C . DIMENSION U(21,17),V(31,17),PMI(31,17),P(31,17),F(31,17), #FF(31,17),K(31,17),F(31,17),F(31,17), #FF(31,17),SIGMAY(31,17),FK(31,17),F(31,17), #SIGMAY(31,17),SIGMAY(31,17),FK(31,17),F(31,17), #SIGMAY(31,17),SIGMAY(31,17),TMUXY(31,17),F(31,17), #SIGMAY(31,17),SIGMAY(31,17),TMUXY(31,17),F(31,17),SIS(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),H(55),S2(56,1),S3(55,1), #TXE(1020),TYE(1020),H(31,17),DATA(39),TU(1020),DAT3(30)
C (\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
C (SCPAR=COLITER FCP ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COLOINATE OF CELL CENTEP C YK(K)=Y-CORDINATE OF PARTICLE K C YD=INITIAL Y-COORDINATE OF FIRST PARTICLE C YD=INITIAL Y-COORDINATE OF CELL LOWEP BOUNDARY C YSFPAR=COULTER FOR NO. OF GETTIN'S QUI OF PARTICLES C YT=Y-COCREINATE OF LOWER BOUNDAFY C . DIMEASION U(1,17)+V(31,17)+PH(31,17)+F(31,17)+F(31,17)+ *FE(31,17)+K(131,17)+F(31,17)+F(31,17)+ *FE(31,17)+K(131,17)+F(31,17)+F(31,17)+ *FE(31,17)+SIGMAY(31,17)+T(31,17)+F(31,17)+ *FE(31,17)+SIGMAY(31,17)+T(31,17)+K(1020)+YK(1020)+ *X(31)+Y(17)+Y(31,17)+O(1)+NAK(10)+STRAN(56)+SI3ES(56+1)+ *STRAIN(1)+SIF=SS(1,1)+OFLY(56+1)+F(55)+S2(56+1)+S3(56+1)+ *TXK(1320)+TXK(1020)+YK(31,17)+OATA(39)+TU(1020)+DAT3(30) EJUINALEMCE (KK,TU)+YK,TV) INTEGR F+FE+FC+FS
C (SCPAR=COLITER FCP ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COLOINATE OF CELL CENTEP C YK(K)=Y-COUNTE OF CELL CENTEP C YO=INITIAL Y-COORDINATE OF FIRST PARTICLE C YO=INITIAL Y-COORDINATE OF CELL LOWE? BOUNDARY C YD=UIJ=Y-COORDINATE OF CELL LOWE? BOUNDARY C YSFPAR=COUNTER FOR NO. CF GETTIN'S QUU OF PARTICLES C YT=Y-COORDINATE OF LOWER BOUNDAPY C . OIMENSION U(1,17),V(31,17),PH1(31,17),F(31,17),F(31,17), *FE(31,17),K(31,17),FK(31,17),F(31,17),F(31,17), *FE(31,17),K(31,17),FK(31,17),F(31,17),F(31,17), *FE(31,17),SGMAY(31,17),TK(31,17),X(1020),YK(1020), *X(31),Y(17),YL(31),YPL(17),NAYE(10),STRAN(56),STRES(56,1), *STRAIN(1),STFESS(1,1),OELY(56,1),F(55),S2(56,1),S3(56,1), *TXE(1020),TYE(1020),V(31,17),OATA(39),TU(1020),DAT3(30) EJULVALEMCE (KK,TU),YYK,TV) INTEGR F,FEFC,FS C PECLON DO GENERAL SETURE
C (SCPAR=COLITER FCP ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COLOINATE OF CELL CENTEP C YK(K)=Y-COCRDINATE OF PARTICLE K C YD=INITIAL Y-COORDINATE OF FIRST PARTICLE C YD=U)=Y-COORDINATE OF CELL LOWEP BOUNDARY C YSFPAR=COUTER FOR NO. CF GETTIN'S QU: OF PARTICLES C YT=Y-COCRDINATE OF LOWER BOUNDAFY C . DIMENSION U(=1,17),V(31,17),PH1(31,17),F(31,17),F(31,17), *FF(31,17),KC(31,17),FTA(31,17),FK(31,17),F(31,17), *FF(31,17),KC(31,17),FTA(31,17),FK(31,17),F(31,17), *SIGMAX(31,17),SIGMAY(31,17),TAX(11,17),XK(1020),YK(1020), *X(31),Y(17),Y2(31),YPL(17),NAYE(10),STRAN(56),STRES(56,1), *STRAIN(1),SIF=SS(1,11,0FLY(56,1),F(55),S2(56,1),S3(56,1), *INTEGF2,F,FE=C,FS C REGION 10 GENERAL SETUP C REGION 10 GENERAL SETUP
C (SCORFECTITER FCO ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COLODINATE OF CELL CENTEP C YK(K)=Y-CCORDINATE OF PARTICLE K C YOEINITIAL Y-COORDINATE OF FIRST PARTICLE C YOEINITIAL Y-COORDINATE OF CELL LOWE? BOUNDARY C YSFORECOUTER FOR NO. OF GETTING QU: OF PARTICLES C YT=Y-COORDINATE OF LOWER BOUNDAFY C. OIMEASION U(31,17),V(31,17),PH(31,17),F(31,17),F(31,17), *FE(31,17),K(131,17),PH(31,17),F(31,17),F(31,17), *SIGMAY(31,17),SIGMAY(31,17),TUXY(31,17),F(31,17), *SIGMAY(31,17),SIGMAY(31,17),TUXY(31,17),X(1020),YK(1020), *X(31),Y(17),Y2L(31),YPL(17),AAXE(10),STRAN(56),STRES(56,1), *STRAIN(1),SIF=SS(1,1),OELY(56,1),F(50),S2(56,1),S3(56,1), *IX*(1020),TY*(1020),T*(31,17),OATA(30),TU(1020),TV(1020),DAT3(30) EJUIVALEMCE (KK.TU),YYK,TV) INTEGME F,FEFE,FS C %EGION 10 GENERAL SETUP C 4000,CONTINUE
C (SCORFECTITER FCO ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COCJOINATE OF CELL CENTEP C YK(K)=Y-CCJODINATE OF PARTICLE K C YOEINITIAL Y-COORDINATE OF FIRST PARTICLE C YOEINITY CJOPDINATE OF CELL LOWEP BOUNDARY C YSFORECOUTER FOR NO. CF GETTIN'S 40% OF PARTICLES C YT=Y-COCRDINATE OF LOWER BOUNDAPY C . DIMENSION U(1,17),V(1,17),PH1(1,17),F(1,17),F(1,17), *FE(31,17),K(31,17),F(31,17),F(31,17), *F(31,17),SIGMAY(31,17),PH1(31,17),F(31,17), *SIGMAY(31,17),SIGMAY(31,17),TUXY(31,17),X(1020),YK(1020), *X(31),Y(17),Y1(31,17),TUXY(31,17),X(1020),YK(1020), *X(31),Y(17),Y1(31,17),TUXY(31,17),X(1020),YK(1020), *X(31),Y(17),Y1(31,17),TUXY(31,17),SIGMAY(30), *SIRATY(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), *SIRATY(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), *SIX(1020),TYK(1020),C(31,17),OATA(39),TU(1020),DAT3(30) EJUIVALEMCE (KK,TU),Y(K,TV) INTEGR F,FE,FC,FS C C REGION 17 GENERAL SETUP C A000 CORTINUE READ (2,1) (NAME(1),151,151,8)
C (SCPAR=COLITER FCP ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COLOINATE OF CELL CENTEP C YK(K)=Y-CORDINATE OF PARTICLE K C YD=INITIAL Y-COORDINATE OF FIRST PARTICLE C YD=INITIAL Y-COORDINATE OF CELL LOWEP BOUNDARY C YSFPAR=COULTER FOR NO. OF GETTIN'S QUI OF PARTICLES C YT=Y-COCRDINATE OF LOWER BOUNDAFY C . DIMENSION U(1,1),V(31,17),PH1(31,17),F(31,17),F(31,17), #FF(31,17),SIGMAY(31,17),F(31,17),F(31,17), #FF(31,17),SIGMAY(31,17),TAUXY(31,17),F(31,17), #SIGMAY (31,17),SIGMAY(31,17),TAUXY(31,17),XK(1020),YK(1020), #X(31),Y(17),Y2(31),YPL(17),NAYE(10),STRAN(56),SI3ES(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S3(56,1), #STRAIN(1),SIF=SS(1,1),OFLY(56,1),F(55),S2(56,1),S1(56,1),S1(50),
C (SCAR=CALITER FCP ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COCORDINATE OF CELL CENTFP C YK(K)=Y-CCORDINATE OF FIRST PARTICLE C YD_UJ=Y-COORDINATE OF FIRST PARTICLE C YD_UJ=Y-COORDINATE OF CELL LOWEP BOUNDARY C YSFPAR=COUTER FOR NO. CF GETINS 200 OF PARTICLES C YT=Y-COCRDINATE OF LOWER BOUNDAPY C . OIMENSION U(1,17),V(31,17),PH1(31,17),F(31,17),F(31,17), #FE(31,17),K(31,17),FK(31,17),F(31,17),F(31,17), #FE(31,17),K(31,17),TA(31,17),FK(31,17),F(31,17), #FE(31,17),K(31,17),TA(31,17),FK(31,17),K(1020),YK(1020), #X(31),Y(17),SIGMAY(31,17),TA(XY(31,17),XK(1020),YK(1020), #X(31),Y(17),Y2(31),YPL(17),NAYE(10),STRAN(56),ST3FS(56,1), #STRAIV(1),SIF=SS(1,1),OELY(56,1),F(55),S2(56,1),S3(56,1), #IXE(1020),TYE(1020),V(31,17),OATA(39),TU(1020),DAT3(30) EJUTVALEMCE (KK,TU),YYK,TV) IMTEGR F,FE.FC.FS C C 4000 CONTINUE REAL (3.1) (V1%(1),1=1,8) IF(E F,3)99C5,4001 4001 CONTINUE
C (SCAR=CALITER FCP ND. OF GFITTING COLUMN OF PARTICLES C Y(J)=Y-COCORDINATE OF CELL CENTEP C YK(K)=Y-CCORDINATE OF PARTICLE K C YD=INITIAL Y-COORDINATE OF FIRST PARTICLE C YD=U1=Y-COORDINATE OF CELL LOWEP BOUNDARY C YSFPAR=COUTER FOR NO. CF GETTIN'S QU: OF PARTICLES C YT=Y-COCRDINATE OF LOWER BOUNDAPY C . OIMENSION U(1,17),V(31,17),PH1(31,17),F(31,17),F(31,17), #FE(31,17),KC(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),KC(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),KC(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),KC(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),KC(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17), #FE(31,17),SIG*MY(31,17),TA(31,17),F(31,17), #SIG*MY(1,1,5)F=SS(1,1),0ELY(56,1),F(55),S2(56,1),S3(56,1), #SIRALV(1),SIF=SS(1,1),0ELY(56,1),F(55),S2(56,1),S3(56,1), #SIRALV(1),SIF=SS(1,1),0ELY(56,1),F(55),S2(56,1),S3(56,1), #SIRALV(1),SIF=SS(1,10,0TYK,TV) INTEGFR F,FE,FC,FS C C REGION 10 GENERAL SETUP C 40000 CONTINUE #EAU (5,1) (NA*E(1),T=1,8) IF(E*F,3)99C5,4001 4001 CONTINUE REAU (5,2)FCAF,JBAP,N(S,NIF,NJS,NJF
C (\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
C (SCOAR=COLITER FCO ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COLODINATE OF CELL CENTEP C YK(K)=Y-CCORDINATE OF CELL COMEP BOUNDARY C YO=INITIAL Y-COORDINATE OF CELL LOWEP BOUNDARY C YSFOAR=COUTER FOR NO. OF GETTING QU: OF PARTICLES C YI=Y-COCRDINATE OF LOWER BOUNDAPY C . DIMENSION U(1,17),V(1,17),PH1(1,17),F(1,17),F(1,17), #FE(31,17),K(1,17),CTA(31,17),F(31,17),F(31,17), #SIGMAX(31,17),SIGMAY(31,17),TUXY(31,17),F(31,17), #SIGMAX(31,17),SIGMAY(31,17),TUXY(31,17),F(31,17), #SIGMAX(31,17),SIGMAY(31,17),TUXY(31,17),X(1020),YK(1020), #X(1,17),Y1(31,17),SIGMAY(31,17),TUXY(31,17),X(1020),YK(1020), #SIRAIN(1),SIF=SS(1,1),OFLY(56,1),H(55),S2(56,1), #SIRAIN(1),SIF=SS(1,1),OFLY(56,1),H(55),S2(56,1),S3(55,1), #IXK(1020),TYK(1020),H(31,17),OATA(39),TU(1020),TV(1020),DAT3(30) EJUINALEMCE (KK,TU),YYK,TV) INTEGR F,FEFE,FS C C NEGION 10 GENERAL SETUP C 4000 CONTINUF READ (5,11)(N15,NIF,NJS,NJF READ (5,21)CAF,JBAP,NIS,NIF,NJS,NJF REAT (5,21)CAF,JBAP,NIS,NIF,MJS,NJF REAT (5,21)CAF,JBAP,NIS,NIF,MJS,NJF REAT (5,11),TCP,(TPP,DISP,ALPHAU,ALPHAV,CONV,GAMAF,RFOS,IWHEEL,
C (SFPAR=CM) ITER FC0 ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COCDINATE OF CELL CENTEP C YK(K)=Y-COORDINATE OF FRST PARTICLE C YOL(J)=Y-COORDINATE OF FIRST PARTICLE C YOL(J)=Y-COORDINATE OF CELL LOWER BOUNDARY C YSFPAR=COUNTER FOR NO. OF GETTING ROW OF PARTICLES C YT=Y-COORDINATE OF LOWER BOUNDAPY C . DIMENSION U(21,17),V(31,17),PM1(31,17),P(31,17),F(31,17), #FE(31,17),K(31,17),FIA(31,17),FK(31,17),F(31,17), #FE(31,17),K(31,17),TUXY(31,17),FX(1020),YK(1020), #X(31),Y(17),Y2(31),YPL(17),NAKE(10),STRAN(56),STRES(56,1), #STRATV(1),STF=SS(1,11,0FLY(56,1),F(55),S2(56,1),S3(55,1), #IXE(1020),TKE(1020),U(31,17),OATA(39),TU(1020),TV(1020),DAT3(30) EJUIVALEMCE (KK,TU),YXK,TV) IMTLGFR F,FE,FC,FS C PEGIDN 10 GENERAL SETUP C REAT (5,1) (NDME(1),IT,NAME(1),TU(1020),TV(1020),DAT3(30) EAUIVALEMCE (KK,TU),YXK,TV) IMTLGFR F,FE,FC,FS C PEGIDN 10 GENERAL SETUP C KEAT (5,1) (NDME(1),IT,NAME(1),KK,WK,WK,WK,WK,WK,VK,VK,V,O,YO,DXK, READ (5,3) ETAD,FKO,GX,GY,XR,YT,FW,WX,KY,WM,UK,VK,NY,XO,YO,DXK, #EDY,FS,ITA(,4]
C (SCPARECNITER FCC ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COCDINATE OF CELL CENTEP C YK(K)=Y-COORDINATE OF FERST PARTICLE C YOL(J)=Y-COORDINATE OF CELL LOWER BOUNDARY C YSFPARECOUNTER FOR NO. CF GETTING ROW OF PARTICLES C YT=Y-COCRDINATE OF LOWER BOUNDAPY C . DIMENSION U(1,17),V(31,17),PH1(31,17),P(31,17),F(31,17), #FE(31,17),K(31,17),F(31,17),F(31,17),F(31,17), #FE(31,17),K(31,17),F(31,17),F(31,17),F(31,17), #FE(31,17),K(31,17),F(31,17),F(31,17),F(31,17), #FE(31,17),K(13,17),F(31,17),F(31,17),F(31,17), #FE(31,17),K(13,17),F(31,17),F(31,17),F(31,17), #FE(31,17),K(13,17),F(31,17),F(31,17),F(31,17), #FE(31,17),K(13,17),F(31,17),F(31,17),F(31,17), #FE(31,17),K(13,17),F(31,17),F(31,17),F(31,17), #FE(31,17),K(1020),V(31,17),DXT4(30),F(32),F(32),F(32),F(32),F(31,17),F(
C (S*PAR=CM) ATE 4 FC% ND. OF GFITING COLUMN OF PARTICLES C Y(J)=Y-COC3DIWATE OF CELL CENTER C YYELD)=Y-COC3DIWATE OF FIRST PARTICLE C YPL(J)=Y-CJOPDIWATE OF CELL LOWE? BOUNDARY C YSFPAR=CUTTER FOR NO. CF GETINS 20% OF PARTICLES C YT=Y-COC3DIWATE OF LOWER BOUNDAPY C . DIMEASION U(1,17), V(31,17), PM(31,17), F(31,17), #FF(31,17), K(31,17), TA(31,17), F(31,17), #FF(31,17), K(31,17), TA(31,17), FK(31,17), #STEAR (31,17), SIGMAY(31,17), TA(31,17), FC(31,17), #STEAR (31,17), SIGMAY(31,17), TA(31,17), FC(31,17), #STEAR (1), Y2L(31), YPL(17), NAFL(10), STRAN(56), ST3ES(56,1), #STEAR (1), Y2L(31), YPL(17), NAFL(10), STRAN(56), ST3ES(56,1), #STEAR (1), Y2L(31), YPL(17), NAFL(10), STAN(56), ST3ES(56,1), #STEAR (1), SIGMAY(31,17), OATA(39), TU(1020), TV(1020), DAT4(30) EJUIVALENCE (KK,TU), Y1K, TV) INTLGF3 F, FE.FC, FS C C #SGIDN 17 GEVERAL SETUP C A000 CONTINUF REAC (5,1) (NAME(1), II, ML, NIF, MJS, NJF REAC (5,1) (NAME(1), II, F, MJS, NJF REAC (5,2) ICAR, JBAP, NIS, NIF, MJS, NJF REAC (5,2) ICAR, JBAP, NIS, NIF, MJS, NJF REAC (5,3) ET32, FK0, GX, GY, XR, YT, RW, WX, WY, WM, UK, VK, NY, XO, YO, DXK, #UYK, FX, UY, I, JTCP, ITPP, DTSP, ALPHAU, ALPHAV, CONV, GAMAF, BEPS, IWHEEL, #IFSYM, FS, IT4A(, AL REAC (5,1), STRES(1), JEL, MS, NUF, NY, IN, ITG, EPS PFIAC(2,2)) (STRAN(1), STRES(1), JEL, MS]
C (S <sup>C</sup> PAR=CO) (TER FC <sup>C</sup> KD), OF CFITING COLUMN OF PARTICLES C Y(J)=Y-COC2DINATE OF PAPTICLE K C YO= INITIAL Y-COORDINATE OF FIRST PARTICLE C YO= INITIAL Y-COORDINATE OF FIRST PARTICLE C YO= INITIAL Y-COORDINATE OF CELL LOWE? BOUNDARY C YSFPAR=COUNTER FOR NO. CF GETTIN'S 400, OF PARTICLES C YT=Y-COCRDINATE OF LOWER BOUNDAPY C OIMENSION U(E1,17),V(31,17),PM1(31,17),F(31,17),F(31,17), *EFE(31,17),KC(31,17),TA(31,17),FK(31,17),FC(31,17), *STEATSON U(E1,17),V(31,17),TA(31,17),FC(31,17), *STEATSON U(E1,17),V(31,17),TA(31,17),FC(31,17), *STEATSON U(E1,17),SIG*AY(31,17),TA(31,17),XC(1020),VK(1020), *X(31),Y(17),Y21(31),YPL(17),NAYE(10),STRANG561,STRES(56,11), *STRAIN(1),SIF=SS(1,1),OFLY(56,1),FC(56,1),S3(56,1), *IX(1020),TYK(1020),('(31,17),OATA(39),TU(1020),TV(1020),DAT3(30)) EJULYALEMCE (KK,TU),YV,TV) INTLGFR F,FEFC,FS C %EGION 10 GENERAL SETUP C %EGION 10 GENERAL SETUP C %EGION 10 GENERAL SETUP C %EGION 10 GENERAL SETUP READ (5,2) ICAR,JBAP,N(S,NJF,MJ,S,NJF READ (5,2) ICAR,JBAP,N(S,NJF,MJ,S,NJF READ (5,3) ET32,FKO,GX,GY,XR,YT,RW,WX,KY,KM,UL,VL,VL,VX,YO,YO,DXK, *UYK,FX,UY,IT,JCP,ITPP,UTSP,ALPHAU,ALPHAV,CONV,GAPAF,RFOS,IWHEEL, *IFSY*,ES,IT44(A,4] REAT(5,2) JAPPS,AMCVS,WAX,NS,NCVS,MS,IW,ITG,EPS PLAC(5,20) (STRAY(1),STRES(11),I=1,MS] PLAC(5,20) (STRAY(1),STRES(11),I=1,MS]
C (SCPARECMIATE FC° MD. OF GETTING COLUMN OF PARTICLES C Y(J)=Y-COCADINATE OF PAPTICLE K C YOLIJ=Y-CORDINATE OF FIRST PARTICLE C YOLIJ=Y-CORDINATE OF FIRST PARTICLE C YOLIJ=Y-CORDINATE OF CELL LOWER BOUNDARY C SPARECOUTES FOR NO. CF GETTING 2000 OF PARTICLES C YT=Y-CORRDINATE OF LOWER BOUNDARY C OTMENSION U(21,17),V(31,17),PH1(31,17),F(31,17), *FF(31,17),KC(31,17),V(31,17),PH1(31,17),F(31,17), *FF(31,17),KC(31,17),V(31,17),PH1(31,17),XC(1020),YK(1020), *X(31),V(17),Y2(31),YPL(17),MAYE(10),STRAN(50),STRS(56,1), *STRATV(1),STFSS(1,1),OFLV(56,1),H(55),S2(56,1),S3(56,1), *TXK(1020),TXK(1020),T(31,17),OATA(30),TU(1020),TV(1020),DATA(30) EJULVALEMEC (KK,TU),YYK,TV) INTLGFR F,FE,FC,FS C REGION 10 GENERAL SETUP C REGION 10 GENERAL SETUP C HARDON CONTINUE REAM (5,2)LCAR,BB2,NIF,MJS,NJF REAM (5,2)LCAR,JB2,NIF,MJS,NJF REAM (5,2)LCAR,JB2,NIF,
C (S <sup>C</sup> PAR=C <sup>C</sup> ) 4TER FC <sup>0</sup> AD. OF CFTINC COLUMN OF PARTICLES (Y) 1 = Y-CC) 2D INATE OF CELL CENTFP C YK(K) = Y-CC) 2D INATE OF CFLC LENTFP C YOL(J) = Y-CC) 2D INATE OF FIRST PARTICLE (Y) = [KITIAL Y-COORDINATE OF FIRST PARTICLE C YOL(J) = Y-CC) 2D INATE OF CELL LOWER BOUNDARY C YEPAR=COUTES FIR NO. CF GETTINS ADU OF PARTICLES (Y = Y-COCSCINATE OF LOWER BOUNDAPY C . OIMENSION U(1,17), V(31,17), PH((31,17), F(31,17), #FE(31,17), AC(13,17), T, TA(31,17), FE(31,17), #FE(31,17), AC(13,1,17), TA(31,17), FE(31,17), #SIGMAX(31,17), SIGMAY(31,17), TAUXY(31,17), XK(1020), YK(1020), TX(31), Y(17), Y(31), YPL(17), NAFE(10), STRAN(56), STRES(56,1), #STRAIN(1), SIF = SS(1,1), OFLY(56,1), H(55), S2(56,1), S3(56,1), #STRAIN(1), SIF = SS(1,1), OFLY(S6,1), H(10,20), TV(10,20), DAT3(30) E JUIVALEMCE (X, TU), YUK, TV) INHEGR F, FE, FC, FS C C #SG(DN 11 GENERAL SETUP C C #SG(DN 11 GENERAL SETUP READ(5,21) CAR, JBAP, N(S, N)F, MJS, NJF READ(5,21) CAR, JBAP, N(S, N)F, MJS, NJF READ(5,20) CONTINUF READ(5,20) CONTINUF READ(5,
C (SFPAR=CF)4TER FCP AD. OF CFITING COLUMN OF PARTICLES (Y)] BY-CC/2DINATE OF CELL CENTFP C YY(K)=Y-CC/2DINATE OF PAPTICLE K C Y)= INITIAL Y-COORDINATE OF FIRST PARTICLE C YOL(J)=Y-CC/2PDINATE OF FIRST PARTICLE C YOL(J)=Y-CC/2PDINATE OF CELL LOWER BOUNDARY C YSFPAR=COUTER FOR NO. CF GETTIN' AOU OF PARTICLES C YT=Y-CORRENATE OF LOWER BOUNDAPY C DIMENSION U(21,17)+V(31,17),P(31,17)+F(31,17), #FE(31,17)+K(131,17)+F(31,17), #FE(31,17)+K(131,17)+F(31,17)+ #FE(31,17)+K(131,17)+F(31,17)+ #FE(31,17)+K(131,17)+F(31,17)+ #FE(31,17)+K(131,17)+F(31,17)+ #FE(31,17)+K(120,1K) #STRATV(1)-STF3S(1,1)+PE(Y(56,1)+17)+F(31,17)+ #STRATV(1)-STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)-STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)-STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)-STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)-STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)-STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)+STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)+STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)+STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)+STF3S(1,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)+STF3S(1)+F(53,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)+STF3S(1)+F(53,1)+PE(Y(56,1)+F(55)+S2(56,1)+S3(56,1)+ #STRATV(1)+STF3S(1)+F(53,1)+F(53)+F
C (SFPAR=CO)ITER FCP KD. OF CFITING COLUMN OF PARTICLES (Y)]=Y-CC)2DINATE OF CFL CENTFP C YK(K)=Y-CC)2DINATE OF PAPTICLE K C Y)= [KITIAL Y-COORDINATE OF FIRST PARTICLE C Y)= [KITIAL Y-COORDINATE OF FIRST PARTICLE C YOE(J)=Y-CD2DINATE OF CELL LOWER BOUNDARY C YSFPAR=COUITER FOR NO. CF GETTIN'S QU: OF PARTICLES C YT=Y-CD2RDINATE OF LOWER BOUNDARY C DIMEASION U(21,17).V(31,17).PH[(31,17).F(31,17). *FF(31,17).s(C(31,17).F(31,17).F(31,17).F(31,17). *FF(31,17).s(C(31,17).F(31,17).F(31,17).F(31,17). *STGMAK (31,17).S(GMAY[31,17).JUXY(31,17).F(31,17).K(1020).YK(1020). *X(31).Y(17).YOE(31).YPL(17).NAME(10).STRAN(56).SI3FS(56,1). *STRATN(1).SIF*SS(1,11.0FLY(56,1).H(55).S2(56,1).S3(55,1). *TK(13)20).TYK(10201.K(31,17).JATA(30).TU(1020).TV(1020).DATA(30) EJUIVALEMCC (KK.TU).YYK.TV) INTEGR F.FE.FC.FS C *SGION 10 GENERAL SETUP C *SGION 10 SFROUCH.FSON SETUP.SETUP FROUCH SCONTINUE REAN(5,20) [SFROUCH.FSON SETUP.SETU
C (\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
C (\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
C (3 <sup>C</sup> PAR=C <sup>0</sup> ) (TEN FFC <sup>0</sup> ND. OF CFLTING COLUMN DF PARTICLES C Y(1)=Y-COC2DINATE OF CELL CENTEP C YELXI=Y-COC2DDINATE OF CELL CONTEP C YOELNITIAL Y-COORDINATE OF FORTICLE N C YOENNITIAL Y-COORDINATE OF CELL CONTEP C YELXIES C YELY-COC2DDINATE OF CELL CONTEP C YELY-COC2DDINATE OF CELL CONTEP C YEPAR=COULTER FOR NO. CF 62TILN3 ROW OF PARTICLES C YT=Y-COC2DINATE OF LOWER BOUNDARY C YEPAR=COULTER FOR NO. CF 62TILN3 ROW OF PARTICLES C YT=Y-COC2DINATE OF LOWER BOUNDARY C . DIMEASION U(21,17)+V(31,17),PH(31,17),F(31,17)+F(31,17)+ *FF(31,17)+K(120),YK(120), *K(31,17)+S(31,17)+TA(31,17)+FK(31,17)+F(31,17)+ *STGAIS(1)+SIESS(1,11),PELY(30,1)+F(31,17)+XK(1020)+YK(1020)+ *X(31)+Y(17)+Y(31)+Y(11)+DELY(30,1)+F(30)+S2(36)+S1-SE(36,1)+ *TXK(1020)+TYK(1020)+('(31,17)+DATA(30)+TU(1020)+TV(1020)+DAT3(30) EJULVALEMCC (XX-UU)+YYK,TV) INTEGEX F.FE.FC.FS C %GION 14 GEMERAL SETUP C %GION 14 SETUP C
C (3 <sup>C</sup> PAR=C <sup>0</sup> ) (TEN FFC <sup>0</sup> ND. OF CFITING COLUMN OF PARTICLES C Y(1)=Y-CO <sup>2</sup> (C) CFL CELL CONFP C YK(K)=Y-CO <sup>2</sup> (C) CORDINATE OF CELL LOWE <sup>2</sup> (C) CORDARY C Y = (A) (A) (A) (A) (C) (C) (C) (C) (C) (C) (C) (C) (C) (C
C (SPAR=CM) ATER FCO ND. OF GFTTING COUMA DF PARTICLES C (YL)FY-COCADINATE OF CELL CENTER C YK(K)=Y-CCGADINATE OF CELL CENTER C YA(K)=Y-CCGADINATE OF CELL LOWE? BOUNDARY C YSFORECOUTER FOR NO. CF GETTING AQUI OF PARTICLE C YALJ=Y-CGGADINATE OF CELL LOWE? BOUNDARY C YSFORECOUTER FOR NO. CF GETTING AQUI OF PARTICLES C YT=Y-COCADINATE OF LOWER BOUNDAPY C OTMEASION U[2],17),V(31,17),PM(31,17),F(31,17),F(31,17), #FF(31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #FF(31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #FF(31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #SSGMAY (31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #SSGMAY (31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #SSGMAY (31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #SSGMAY (31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #SSGMAY (31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #SSGMAY (31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #SSGMAY (31,17),SGMAY(31,17),TUXY(31,17),FC(31,17), #SSGMAY (31,17),SGMAY(31,17),TUXY(31,17),FC(31,17),SG(56,1), #SSGMAY (31,17),SGMAY(31,17),TUXY(31,17),TU(1020),TV(1020),DAT4(30) EJUTVALEMCE (X <iu),yux,tvv INTEGFS F,FE,FC,FS C %SGMY 19 GENERAL SETUP C 4000 CONTINE READ (5,3) ETC),FKO,GX,GY,XR,YI,RH,WX,KY,HM,UD,VK,NX,NY,XO,YO,DXK, #UYK,FX,UY,H 1,TCP,FTP9,DISP,ALPHAH,ALPHAV,CDNV,GAMAF,RHOS,IMHEEL, #IFEY*,55,JIAAC,AL #FFAY,5,JIAAC,AL #FFAY,5,JIAAC,AL #FFAY,5,JIAAC,AL #FAA(15,2) ICAE,JBAP,NIS,NFF,NDS,NCYS,MS,IN,ITG,EPS PIAD(C,201 (FFAULT),SYREGII,L,L=1,MS1 #FEAN(5,1) 47PIS,ANCYS,MPAY,NS,NCYS,MS,IN,ITG,FPS PIAD(C,201 (FFAULT),SYREGII,L,L=1,MS1 #FEAN(5,1) 47PIS,ANCYS,MPAY,NS,NCYS,MS,IN,ITG,FA,SX,SHETAD=,E12,4,5X, #AHYIF,C12,4,65(12,4/2112,4E12,4/6F12,4/5F12,4,5X,SHETAD=,E12,4,5X, #AHYIF,C12,4,65(12,4/2112,4E12,4/6F12,4/5F12,4,5X,SHETAD=,E12,4,5X, #AHYIF,C12,4,5X,SHMY,FF12,4,5X,SHMY,F12,4,5X,SHETAD=,E12,4,5X, #AHYIF,C12,4,5X,SHMY,FF12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,5X,SHMY,F12,4,7X,TMAPHAUZ, #SX, 4M YE,F12,</iu),yux,tvv 
C (S*PAR=C*)+TER FC* ND. OF GFTTING COUMN OF PARTICLES C (YL)=Y+COC*ODINATE OF CELL CENTEP C YR(K)=Y+COC*ODINATE OF CELL CENTEP C YPE(1)=Y+CO*ODINATE OF CELL LOWE* 60UMDARY C YPE(1)=Y+CO*ODINATE OF CELL LOWE* 60UMDARY C YPE(1)=Y+CO*ODINATE OF CELL LOWE* 60UMDARY C YPE(1)=Y+CO*ODINATE OF LOWER 60UMDARY C YPE(1)=Y+CO*ODINATE OF LOWER 60UMDARY C YPE(1)=Y+CO*ODINATE OF LOWER 60UMDARY C T=Y+CO*ODINATE OF LOWER 60UMDAPY C T= 01M#ASION U[1+17],V(31+17],PF(31+17],FC(31+17], *FF(31+17],SG*AAY(31+17],FC(31+17],FC(31+17], *FF(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *FF(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(31+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(13+17],SG*AAY(31+17],TUXY(31+17],FC(31+17], *SIG#AX(13+20),TIX(1020),TV(1020),TV(1020),TV(1020),DAT4(30) EDUTVALEFCE (X<,UD,YYK,TV) INTEGFR F,FE,FC,FS C C *SG1ON 10 GENERAL SETUP C READ(15,2) GTAX,SG,SG,YXR,YT,RH,WX,KY,WM,Ub,VK,NX,NY,XO,YO,DZKK, *DUYK,FX,DY,T,T,TCP,TTP2,DTSP,ALPHAU,ALPHAV,CCNV,GAMAF,RFCS,IWHEEL, *LFSYY,FS,114A(4) *SFAT(15+1) GTAY(41,STRES(11),L=1,MS1 *PEAD(15+2) T,TU,MCS,NSP,NPP P FAD(15+2) T,TU,MCS,NSP,NPP P FAD(15+
C (SPAR=CM) ATER FCO ND. OF CFTTING COUMN OF PARTICLES C (YL) P+CO2ADINATE OF CELL CENTEP C YK(K)=Y-CCADINATE OF CELL CENTEP C YALL Y-COADINATE OF CELL COMES BOUNDARY C YSFAR=COUNTER FOR NO. OF CELL LOWES BOUNDARY C STARTSON ULEL 17).V(31.17).PH(31.17).F(31.17).F(31.17). *FF(31.17).K(131.17).F(31.17).F(31.17).F(31.17). *FF(31.17).K(131.17).F(31.17).F(31.17).F(31.17). *FF(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *FIGAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *SIGMAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *SIGMAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *SIGMAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *SIGMAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *SIGMAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *SIGMAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *SIGMAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *SIGMAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17). *SIGMAX(31.17).SUSAN(31.17).TUXY(31.17).F(31.17).F(31.17).F(31.17). *SIGMAX(31.17).F(20.11(31.17).F(31.
C (SPARCONTRE PEC NO. OF OFFIING COLUMN OF PARTICLES C Y(1)=Y-COCOLUMATE OF CALL CENTRE C YK(K)=Y-COCOLUMATE OF CALL CONTRE C YDE(J)=Y-COCOLUMATE OF CELL CONTRE C YDE(J)=Y-COCOLUMATE OF CELL CONTRE C YDE(J)=Y-COCOLUMATE OF CELL LONE? BOUNDARY C YT=Y-COCOCUTATE OF LOWER BOUNDARY C OTTEX-COCOCUTATE OF LOWER ALLOWER AL
C (SPARCON TEM FED AD. OF OFFITING COLUMN OF PARTICLES C Y(1)=Y-CORDINATE OF CELL CENTER C YRENTIAL Y-CORDINATE OF CELL COMEP BOUNDARY C YDENTIAL Y-CORDINATE OF CELL LOWEP BOUNDARY C YDEFARCOUTER FUR NO. CF SETTING 400 OF PARTICLES C YTEY-CORDINATE OF LOWER BOUNDARY C SECONDUCTER FUR NO. CF SETTING 400 OF PARTICLES C YTEY-CORDINATE OF LOWER BOUNDARY C. DIMENSION UIT.TTINY(31.17).PM(131.17).F(31.17).F(31.17). *FE(21.17).KC(31.17).V(31.17).PM(131.17).F(31.17). *FE(21.17).KC(31.17).V(31.17).PM(131.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(31.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(3.11.17).YC(31.17).ACK(31.17).F(31.17).F(31.17). *SIGMAY(3.11.17).YC(31.17).ACK(31.17).F(31.17).F(31.17).F(31.17).F(31.17). *SIGMAY(3.11.17).F(31.17)

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*211[=+5]2.4453+3]11(=+5]2.434X+400(S=+112+4X+440(S=+112+4X+440)) *4X+440(P=+112+7)1X+701W0(S+++++12+2X+400)(SYM=+142+5X+34)(SYM=+142+5X+34)
*2X,641.541.5+1.2+5X,344 L=,E12,4+///)
5 1 10-44 T1 //////////////////////////////////
0006 104MAT(//,2X,29HCELL HAS GONE THEU TWO STAGES,/,2X,
+ 1945LV. 44NT A: FEGTED IS, / . 2X, 2111=, 12, 2X, 2115, 12, 2X, 2HE=, 12,
$\frac{1}{2} \frac{1}{2} \frac{1}$
*612.4)
00)8 F04"A1(///,21+234R(1,J) CHECK AT TIME T=+E12+4+/)
0.027 - 0.
*74 SU1R=1012,4}
$\frac{0011 \text{ EIDPAT}(-x_{*}) \text{ T=} \text{ F12} \text{ A}_{4} \text{ A}_{4} \text{ 7}_{4} \text{ SEX=} \text{ E12} \text{ A}_{4} \text{ A}_{4} \text{ 7}_{4} \text{ SEX=} \text{ E12} \text{ A}_{4} \text{ A}_{4} \text{ 7}_{4} \text{ SEX=} \text{ E12} \text{ A}_{4} $
0013 F1F#ATT 4X+2+ T=+F12.4+4X+7HFBROPU=+F12.8+4X+7HL4RCRV=+F12.9+
*4X,74 MOR=.(12)
*/ .2Y.44110 V=.516.8.5X.44VWN=.516.8.6X.3HUGE.E16.8.6X.3HVG=.E16.8.
*/ +2 <+ 4H SF Y= +: 16. 3+5X+4H SF Y=+ F16+8+2X+7HFRROPU=+ F16+8+2X+
#746 PRO 24 - F1 4, 22, 381C=, 110)
2X,154CAL(JL:TED_SEX=,E12.4)
0016 F0945T (4X, 23- 10 JSTEI TIME VARIABLES, //+4X, 3FDT=, E12.4+2X, 5HDTCP=,
$\frac{\pm 512.4.21.54.71}{10017} = 12.4.21.540159 = 12.4.71$
0018 FUE '0T1 44, H T=, E12.4.4X, 7H SDXSE=, E12.4.4X, 7H SDYSE=, E12.4}
19 FAP (AT(315,E.5,6)
0021 FOR 141 (2012-+1 0021 FOR 141 (14 5HSEXG=+E15-8+4X+5HSEYG=+E16-9+71
0.22 FUEMATE 4x, H T=, E12, 4, 4X, 7H DXSF=, E12, 4, 4X, 7H DYSF=, E12.4)
0023 FCF * 4T(//, 3X + HI J, 2X, 4HX(I), 1X, 4HY(J), 2X, 6HU(I, J), 6X, 6HV(I, J),
*11H51G/AY(1+2)+1X+10HIAUXY(1+1)+2X+10HF FE FC KC+/)
24 FILEMAT(1H .214 .9512.4.16)
$\frac{10025 \text{ F}^{-3} \text{ s}^{-3} \text{ t}^{-1} \text{ f}^{-1} \text{ s}^{-1} \text{ f}^{-1} \text{ s}^{-1} \text{ f}^{-1} \text{ s}^{-1} \text{ f}^{-1} \text{ s}^{-1} \text$
-0027  FOR "AT (/, 24, -4, 24, -4, 24, -4, 24, 74, 74) = 12, 22, 23, 34KC(1, J) = 12, 23, 34KC(1, J) = 12, 24, 24, 24, 24, 24, 24, 24, 24, 24, 2
+2 <. 3 HF (1 <. J)=, 12, 2X, 3 HKC (1 <. J)=, 12)
0228_FCP_4AT(7,2(,1)HEREF-SUPFACE_CELL_I=,12,2H_J=,12,1X,29HHAS_NO_EMPTY
0029 F0PVAT (/)
<u>+4X,7+STNYAK≠,E12.4</u>
31 FR3:44T(14 ,2:4 ,9E12.4.E8.1)
0033 FOR MATE 44, 4 T=, E12.4, 4X. 7HALPHAU=, E12.4, 4X. 7HALPHAV=, E12.4.
*4X, 7HC DN 44.(=, E12, 4)
51 FOR (ST(74 ERF IPT)
0002 FUE AT (/, 1x, 7410ACE B, /)
0054 Fir AT(/+1/+74TRAGE A+/)
0056 102401(24)23[5]
*D./)
0368 FUF AT (2/,2H1=,13,2X,2HJ=,13,2X,2HF=,12,2X,3HFF=,12)
$\frac{0059 \text{ Fi}R^{4}\text{AT}(2x,2HI=,13,2X,2HJ=,13,2X,4HTX\leq-,E12,4,2X,4HTYK=,E12,4,2X,}{22HE=,12,2X,3HEE=,12}$
JOOD FOR MAT(//+2X++++PARTICLE HAS MOVED INTO WHEEL+JCB TERMINATED+//+
*2X,19HELEYENT AFFECTED IS,/)
402 TOP ATTIX. 1213.12.15.24.64 / 2.4.4.12.12.12.12.12.12.12.12. 4927 FORMATIZA, 54 / 1975=15.22.64 / NCVS=.15.22.54 / 44X=.15.22.344/5=.15.22.
*5HNCVS=+15.27.3HMS=,15.2X.3HIW=,15.2X.4HITG=,15.2X.4HEPS=,615.6.//
*) 4028 FUEVATI/. 1/. 23 HOATA ONTATS LOD SOLINE CHOVE // 24 3000 20 0007044
*N(1), 3X, 2HST ESS(1), /)
4029 Filk SAT (1X, 12.2F17.4)
4030 FURMATE $47,27$ [=) $12,4,4X,7H$ NCS= $112$
tEP I=.F[2.4,/)
4032 FOP*AT(1x,32FINPUT DATA FCR SPLINE SUBPLUTINE,/)
C INITIALIZE COINTERS AND ESTABLISH SOME FOUNTION CONSTANTS
10P=1+910P TPP=T+)TPP
TSP=T+7F5P
DX δ≈+)X +∩ ζ
Z=2.04(1.0/07)+1.0/DYS)
GYYJ=ABS(GY+YJ)

# REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

	_GXX8=A351.GX*Y11
	UH0=UW
	Vn0=Vh
	<u>IRAR [=]]AR+1</u>
	1808/2-30/-2.
	JBA42=+4A8-2
	LJK472=1KAK2*JKA32
•······	N[J-[J-1J-1J-2]-0.1(#1020
	[JPA?=] 3AR# JN4 3
	NIJA=11FaR/1020
	NNI JV=1 IRAR-NI JN+1020
	WIJKI?KIJN+I
C	INITIALIZE VARIABLES TO START PROBLEM
190	$\frac{DC}{D1} \frac{1}{1} $
	D((,))=).
	S1GM4((;, J)=0.
	<u>SIG*NY((, ))=0.</u>
	1/(1,1)=`.
	V(1,J)=).
	PH1(1, J)=0.
	$\frac{R(1,J)=2.0}{2}$
	F(1, J)=
	FF(1,J)=)
	FC(1,J)=3
121	CCNTI'JF
<u> </u>	
<u>c</u>	SET-, P BAD CELLS
	JE(NCS_)E_0) GD T9 161
	D0_102_7=2,18481
	F(I,1)=1
0172	F(I, J34-)=1
•	- 
	IF(1FSYM. WE.11 G) TO 116
<u></u>	F(1,J)=6
0116	
01 33	F(18AR,J)=1
0161	CCNT1"JE
<u> </u>	
<del>c</del>	JIN CONDINNE OF EACH CREE
105	XTF=9.
<u> </u>	D) 106 I=1, IB4R
	X([]=X)J_5=UX XP([]]=X^FE
	XTE=YTE+3<
136	CONTINUE
<u> </u>	YTE=0.7
	Y( 1)=YTE-D_5#DY
	YPL (J) =YTE
<u> </u>	C1884119978
C	SETUP FULL CELL AND COORDINATES OF EACH PARTICLE
<u> </u>	
110	K=1
	N=0
	<u>S<sup>c</sup>X=0.</u>
	SEVC-0
	SFY6=0.
	SDXSF=).
	SDYSF=0.
·	A 5 + PAR = J.
	FRPCPuj=0.
	CRR(HV=).
	1) X S F = 0.
·····	0Y57=9.
	SU (P=0.
······	

KAAR=NX*NY
4PAP=K7A2/1020
4PR0+K4AR~4PAR+1020
MPAR   3/PAR+1
λ)) 11L Τζχ=1.NX
<u>YPaYQ</u>
<u> </u>
TYK(*)) = VP
<u></u>
F(1,1)=2
ETA(1, 1) = ETA(1, 1)
<u>KC{[]]]&gt;}[]]</u>
$1 + (N_s) (N_s$
<u>115 K=K+1</u> (
<u>' Y2=Y0+J3X</u>
<u> </u>
<u>wrlf(l4) (TXK(N), TYK(N), N=1, MPRF)</u>
<u>C</u>
C SET UP : NOW AND OR ADJACENT TO PNEW CELLS
L [F[U(\$.) 5.] 6] 1] 1]
C AUXILLARY GEGNETRY SET-UP
<u>c</u>
<u>אין 135 ו=2.6</u>
D2 135 J=3.41
F(1, J) =5
0135 V(I, .1) = Va
0 <sup>1</sup> 136 J= 3,+1
$\frac{136 + \xi_1(1, j) = 2}{100 + 127 + 1 - 2.6}$
F=(1,2)=2
137 FE(1,42)=2
$\frac{FE(\dot{\alpha}, \beta) = 1}{2}$
$r_{13}$
0134 CENTINUE
<u> </u>
V(1, 1) = 0
$\bigcup (1-1, j) = 1_{j_{k}}$
V(I+J)=V#
F= { (9, j) = 2
++ (17, J)=2
0128 CONTINE
HE (17, J)=2           0128 CONTINE           FE (10, 3)=1           FE (10, 5)=1
$\begin{array}{c} F_{E}(17, J) = 2 \\ \hline 0128 \ C^{N}TINE \\ \hline F_{E}(10, 3) = 1 \\ \hline F_{E}(10, 5) = 1 \\ \hline F_{E}(16, 3) = 1 \end{array}$
$\begin{array}{c} + f \in \{17, 3\} = 2 \\ \hline 0128  C \land \forall T1 \lor J = 2 \\ \hline F \in \{10, 3\} = 1 \\ \hline F \in \{10, 5\} = 1 \\ \hline F \in \{10, 5\} = 1 \\ \hline F \in \{16, 3\} = 1 \\ \hline F \in \{10, 5\} = 1 \\ \hline F \in \{10, $
$\begin{array}{c} + \left\{ 17, 3\right\} = 2 \\ \hline 0128 \ C \wedge \forall T1 \forall JE \\ \hline FE (10, 3) = 1 \\ \hline FE (10, 5) = 1 \\ \hline FE (16, 3) = 1 \\ \hline FE (16, 6) = 1 \\ \hline 0 \forall 129 \ [= 10, 16 \\ \hline FE (12) = 2 \\ \hline \end{array}$
$\begin{array}{c} + F_{1}(17, J) = 2 \\ \hline 0128 \ C \wedge \nabla T I \vee J = 2 \\ \hline FE(10, 3) = 1 \\ \hline FE(10, 5) = 1 \\ \hline FE(16, 3) = 1 \\ \hline FE(16, 3) = 1 \\ \hline FE(16, 5) = 1 \\ \hline FE(16, 5) = 1 \\ \hline FE(1, 7) = 2 \\ \hline FE(1, 7) = 2 \\ \hline FE(1, 7) = 2 \\ \hline \end{array}$
H: (17, J)=2         0128       CNMTINJE         FE (10, 3)=1         FE (10, 5)=1         FE (16, 3)=1         FE (16, 3)=1         FE (16, 5)=1         D 129         FE (1, 7)=2         FE (1, 7)=2         0129         CONTINUE
H: (17, J)=2         0128       CNVTIVE         FE (10, 3)=1         FE (10, 5)=1         FE (16, 3)=1         FE (1, 7)=2         FE (1, 7)=2         O129       CONTINUE         GO TO 113         20129
HE (17, J)=2         0128 CONTINJE         FE (10, 3)=1         FE (10, 5)=1         FE (16, 3)=1         FE (16, 3)=1         FE (16, 3)=1         FE (1, 7)=2         0129 CONTINUE         GO TO 113         0132 CONTINUE
HE (17, J)=2         0128 CONTINJE         FE (10, 3)=1         FE (10, 5)=1         FE (16, 3)=1         FE (16, 3)=1         FE (16, 3)=1         FE (1, 2)=2         FE (1, 7)=2         0129 CONTINUE         GO TO 113         0132 CONTINUE         C         APEEL GEOMETRY SET-UP
HE (17, J)=2         0128 CONTINJE         FE (10, 3)=1         FE (10, 3)=1         FF (16, 3)=1         FF (16, 3)=1         FF (16, 3)=1         FF (1, 2)=2         FF (1, 7)=2         0129 CONTINUE         GO TO 113         0132 CONTINUE         C         APEEL GEOMETRY SET-UP
H: (17, J=2         0128 CONTINJE         FE (10, 3)=1         FE (10, 5)=1         FE (16, 3)=1         0129 (16, 5)=1         0129 (10, 10)         FE (1, 2)=2         FE (1, 2)=2         FE (1, 7)=2         0129 CONTINUE         GO TO 113         0132 CONTINUE         C         MHEEL GEOMETRY SET-UP         C         MHEEL GEOMETRY 12 0
H: (17, J=2         0128 CONTINJE         FE (10, 3)=1         FE (10, 5)=1         FE (16, 3)=1         0129 (=10, 16         FE (1, 2)=2         FE (1, 7)=2         0129 CONTINUE         GO TO 113         0132 CONTINUE         C         MHEEL GEOMETRY SET-UP         C         M= (WX RR2) / TX + 2, 0         N= WX/OX+2, 0
$\begin{array}{c} + \xi \left( 17, J \right) = 2 \\ \hline 0128 \ CDNTINJE \\ \hline FE \left( 10, 3 \right) = 1 \\ \hline FE \left( 10, 5 \right) = 1 \\ \hline FE \left( 10, 5 \right) = 1 \\ \hline FE \left( 10, 5 \right) = 1 \\ \hline 0129 \ \left( 10, 16 \right) \\ \hline FE \left( 1, 2 \right) = 2 \\ \hline FE \left( 1, 7 \right) = 2 \\ \hline 0129 \ CONTINUE \\ \hline GO TO 113 \\ \hline 0132 \ CDNTINUE \\ \hline C \\ \hline \\ \hline \\ C \\ \hline \\ \hline \\ M^{M} = \left( WX + R_{M} \right) / X + 2 \cdot 1 \\ \hline \\ N = \left( WY + R_{M} - C \right) S \left( 3 \cdot 1416 / 4 \cdot 01 \right) / DY + 2 \cdot 0 \\ \hline \end{array}$
$\begin{array}{c} + \left\{ (17, 3) = 2 \\ \hline 0128 \ CDNTINJE \\ \hline FE (10, 3) = 1 \\ \hline FE (10, 5) = 1 \\ \hline FE (10, 5) = 1 \\ \hline FE (10, 5) = 1 \\ \hline D \ 7 \ 129 \ [= 10, 16 \\ \hline FE (1, 2) = 2 \\ \hline FE (1, 7) = 2 \\ \hline 0129 \ CDN \ I^{\text{WUE}} \\ \hline GO \ TO \ 113 \\ \hline 0132 \ CDN \ I^{\text{WUE}} \\ \hline C \\ \hline \\ \hline \\ \hline \\ C \\ \hline \\ \hline \\ M^{\text{W}} = (WX HW ) / X + 2 \cdot 3 \\ \hline \\ N^{\text{W}} = (WX HW ) / X + 2 \cdot 3 \\ \hline \\ N^{\text{W}} = (WX HW ) / X + 2 \cdot 3 \\ \hline \\$
H: (17, J)=2         0128 CPMTINJE         FE (10, 3)=1         FE (10, 5)=1         O129 (10, 10)         GO TO 113         0132 CPNTINUE         C         M= WX/DX+2.0         M= WX/DX+2.0         N= WYR(*C.S(3.1416/4.011/DY+2.0)         IM=M         D: 126 J= N,*N         D: 126 J= N,*N
$\begin{array}{c} + \left\{ 17, 3\right\} = 2 \\ \hline 0128 \ CDN TI NJE \\ \hline FE \left\{ 10, 3\right\} = 1 \\ \hline D \ 124 \ \left[ = 10, 16 \\ \hline FE \left\{ 1, 2\right\} = 2 \\ \hline FE \left\{ 1, 7\right\} = 2 \\ \hline O129 \ CON TI VUE \\ \hline GO TO 113 \\ \hline 0132 \ CON TI NUE \\ \hline C \\ \hline \\ \hline \\ C \\ \hline \\ M^{M} = \left\{ WX HW \right\} / (X + 2, n) \\ \hline \\ M^{M} = \left\{ WX HW \right\} / (X + 2, n) \\ \hline \\ M^{M} = \left\{ WX HW \right\} / (X + 2, n) \\ \hline \\ \hline \\ N^{N} = \left\{ WY + 4V + 6C \\ S \\ S \\ \hline \\ D^{N} 125 \ J = N, N \\ \hline \\$
$\frac{1}{1} + \frac{1}{1} + \frac{1}{1} = 2$ $0128 CPM TI WE$ $FE (10, 3) = 1$ $FE (10, 6) = 1$ $FE (10, 6) = 1$ $0 T 129 (= 10, 16$ $FE (1, 2) = 2$ $FE (1, 2) = 2$ $FE (1, 7) = 2$ $0129 CONTINUE$ $C$ $C$ $\frac{1}{1} = \frac{1}{1} + \frac{1}{1} = \frac{1}{1} + \frac{1}{1} = $
$\begin{array}{c} + \left\{ 117, J \right\} = 2 \\ \hline 0128 \ C^{\text{NM}} I^{\text{M}} J^{\text{E}} \\ \hline FE(10, 3) = 1 \\ \hline FE(10, 3) = 1 \\ \hline FE(10, 3) = 1 \\ \hline 0132 \ C^{\text{NM}} I^{\text{M}} J^{\text{M}} \\ \hline FE(1, 2) = 2 \\ \hline FE(1, 2) = 2 \\ \hline FE(1, 2) = 2 \\ \hline FE(1, 7) = 2 \\ \hline 0129 \ C^{\text{NM}} I^{\text{M}} J^{\text{M}} \\ \hline C \\ \hline C \\ \hline C \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{N}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline N^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX + RX \right\} / X + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX + RX + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX + RX + 2 \cdot 1 \\ MX + RX + RX + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX + RX + 2 \cdot 1 \\ \hline M^{\text{M}} = \left\{ MX + RX + 2 \cdot 1 \\ \hline M^{$
$\begin{array}{c} + \left\{ 117, J\right\} = 2 \\ \hline 0128 \ C^{\text{NMIN}E} \\ \hline FE(10, 3) = 1 \\ \hline O129 \ C^{\text{NIN}E} \\ \hline C \\ \hline C \\ \hline C \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{MEEL}} \ GE2^{\text{METKY}} \ SET-UP \\ \hline C \\ \hline M^{\text{MEEL}} \ GE2^{\text{MEEL}} $
$\begin{array}{c} + F \in \{1, 1, j\} = 2 \\ \hline 0128 \ C^{\gamma} \mathbb{N} [1 \forall j] \mathbb{E} \\ F \in \{10, 3\} = 1 \\ \hline F \in \{10, 6\} = 1 \\ \hline 0.7 \ 124 \ [= 10, 16 \\ \hline F \in \{1, 2\} = 2 \\ \hline f \in \{1, 7\} = 2 \\ \hline 0129 \ C^{\gamma} \mathbb{N} [1 \forall U] \\ \hline 00132 \ C^{\gamma} \mathbb{N} [1 \forall U] \\ \hline 0132 \ C^{\gamma} \mathbb{N} [1 \forall U] \\ \hline 0 \\ \hline \\$
$\begin{array}{c} + F \in \{1, 1, j\} = 2 \\ \hline 0128 \ C^{n} M[1 V]E \\ F \in \{10, 3\} = 1 \\ \hline F \in \{10, 3\} = 1 \\ \hline F \in \{10, 6\} = 1 \\ \hline D \uparrow 124 \ I = 10, 16 \\ \hline F \in \{1, 2\} = 2 \\ \hline F \in \{1, 7\} = 2 \\ \hline 0129 \ C^{n} M[1 VUE \\ \hline GO \ TO \ 113 \\ \hline 0132 \ C^{n} M[1 VUE \\ \hline C \\ \hline C \\ \hline M = (WX/DX + 2, 0) \\ \hline M^{M} = (WX + R \neq) / X + 2, 0 \\ \hline M^{M} = (WX + R \neq) / X + 2, 0 \\ \hline M^{M} = (WX + R \neq) / X + 2, 0 \\ \hline M^{M} = (WX + R \neq R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 01) / DY + 2, 0 \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 0] \\ \hline M^{M} = [W + R \neq R < S(13, 1416/4, 0] \\ \hline M^{M} = [W + R \rightarrow R < S(13, 1416/4, 0] \\ \hline M^{M} = [W + R \rightarrow R < S(13, 1416/4, 0] \\ \hline M^{M} = [W + R \rightarrow R < S(13, 1416/4, 0] \\ \hline M^{M} = [W + R \rightarrow R < S(13, 1416/4, 0] \\ \hline M^{M} = [W + R \rightarrow R < S(13, 1416/4, 0] \\ \hline M^{M} = [W + R \rightarrow R < S(13, 1416/4, 0] \\ \hline M^{M} = [W + R \rightarrow R < S(14, 146/4, 0] \\ \hline M^{M} = [W + R \rightarrow R < S(16, 146/4, 0] \\ \hline M^{M} = [W + R \rightarrow R $
$\begin{array}{c} ++ (17, J) = 2 \\ \hline 0128 \ C^{PN} T   V ) E \\ \hline FE(10, 3) = 1 \\ \hline FE(10, 3) = 1 \\ \hline FE(16, 3) = 1 \\ \hline 0.5, 129, 1 = 10, 16 \\ \hline FE(1, 2) = 2 \\ \hline FE(1, 7) = 2 \\ \hline 0129, CBN T   V U E \\ \hline GO TO 113 \\ \hline 0132, CONTINUE \\ \hline C \\ \hline C \\ \hline C \\ \hline C \\ \hline M = (WX + R + 7) / X + 2, 0) \\ \hline M = (WX + R + 7) / X + 2, 0) \\ \hline M = (WX + R + 7) / X + 2, 0) \\ \hline N = (W + R + 7) / X + 2, 0) \\ \hline N = (W + R + 7) / X + 2, 0) \\ \hline N = (W + R + 7) / X + 2, 0) \\ \hline M = (Y + R + 7) / X + 2, 0) \\ \hline N = (W + R + 7) / X + 2, 0) \\ \hline N = (Y + R + 7) / X + 2, 0) \\ \hline N = (W + R + 7) / X + 2, 0) \\ \hline N = (W + R + 7) / X + 2, 0) \\ \hline N = (W + R + 7) / X + 2, 0) \\ \hline N = (W + R + 7) / X + 2, 0) \\ \hline N = (W + R + 7) / X + 2, 0) \\ \hline N = (Y + R + 7) / X + 2, 0) \\ \hline N =$

•

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	WU= (L+1)
	V(I,J)=VW
	1F(IISYA,EQ.11 GO TO 138
	F([M,J]=5
<u> </u>	
0130	
01.30	$\frac{1}{16} \left( \frac{1}{10} \frac{1}{2} + 2 \frac{1}{2} \frac{1}{10} \frac{1}{$
	$\frac{1}{F((1)^2+2-4)} \times \frac{1}{F(1)-b} \times \frac{1}{F(1)} \times \frac{1}{F$
	FL(1+1,J)=?
	IF(IFSY3.EQ.1) 60 TO 121
	FF([4-1, J]=2
	<u>60 TO 121</u>
0122	FE([1+1,J]=2
•	<u>FF([+], J-L)=1</u>
121	CONTINUE
126	CONTINUE
	MM=(hX+RW*CDS(3.1416/4.0))/DX+3.0 0
	N=NN-1
	NN=(WY+RW)/DY+2.0
	00 127 I=M, MM
	00 124 J=N,NN
·	<u>NR=(Y(1)-WX)++2+(Y(J)-WY)++2</u>
	IF(NP.GT.(RW##2)) GO TO 124
•••••••••••••	F(1), 1)=5
	V(1/,1)=VW
0139	CONTINUE
	1f((4)+2.0*DY*(Y(J)-WY)+DY**2).LF.(*W**2)) G0 T0 124
· · · · · · · · · · · · · · · · · · ·	$1F((v-2, 0+DX+(X(1)-wX)+DX+2+2, 0+DY+(Y(1)-wY)+DY+2) = LE \cdot (P+++2)$
	x60 TO 125
	FF(1, J+1)=2
	IE(IESYM.E0.11 G0 T0 124
	FE(IN,J+1)=2
	FE(1P,J+1)=2 GO TO 124
0125	FE(IN,J+1)=2 GO TO 124 FE(I,J+1)=2
0125	FE(IN, J+1)=2       G0 TO 124       FE(I, J+1)=1       FE(I-1, J+1)=1
0125	FE(IN, J+1)=2       GO TO 124       FE(I, J+1)=2       FE(I, J+1)=2       FE(I-1, J+1)=1       IF(IFSYM.E0.1) GO TO 124
0125	FE(IN, J+1)=2       GO TO 124       FE(I, J+1)=2       FE(I-1, J+1)=1       IF(IFSYM.EG.1) GO TO 124       FF(IN, J+1)=2       FF(IN, J+1)=1
0125	FE(1N, J+1)=2 GO TO 124 $FE(1, J+1)=2$ $FE(1-1, J+1)=1$ $IF(1FSYM, EQ, 1) GO TO 124 FF(1N, J+1)=2 FE(1M+1, J+1)=1 C(NT1N, JE)$
0125	FE(IN,J+1)=2         GO TO 124         FE(I,J+1)=2         FF(I,J+1)=1         IF(IFSY*.CO.1) GO TO 124         FF(IN,J+1)=2         FF(I*+1,J+1)=1         CONTINUE         IM=IN-1
0125 124 127	FE (1N, J+1)=2         GO TO 124         FE (1, J+1)=2         FF (1-1, J+1)=1         IF (1FSY*-E0.1) GO TO 124         FF (1N, J+1)=2         FE (1*+1, J+1)=1         CONTINUE         IM= IN-1         CONTINUE
0125 124 127 113	FE (1N, J+1)=2         GO TO 124         FE (1, J+1)=2         FF (1, J+1)=1         IF (1FSYM.EO.1) GD TO 124         FF (1N, J+1)=2         FE (1*+1, J+1)=1         CONTINUE         IM= IN-1         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE
	FE (IV, J+1)=2         GO TO 124         FE (I, J+1)=2         FF (IV, J+1)=1         IF (IFSYM.EQ.1) GO TO 124         FF (IV, J+1)=2         FE (I*+1, J+1)=1         CONTINUE         IM= IV-1         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE
0125 124 127 0113 C	FE(IN, J+1)=2         GO TO 124         FE(I, J+1)=2         FE(I, J+1)=1         IF(IFSYM.EQ.1) GO TO 124         FF(IN, J+1)=2         FF(IM, J+1)=1         CONTINUE         IM=IN-1         CONTINUE         CONTINUE         SET-UP CB ADJACENT TU BND CELLS
 	FE(IN, J+1)=2         GO TO 124         FE(I, J+1)=2         FF(I, J+1)=1         IF(IFSYM.EQ.1) GO TO 124         FF(IN, J+1)=2         FF(IM, J+1)=1         CONTINUE         IM=IN-1         CONTINUE         CONTINUE         CONTINUE         SET-UP CB ADJACENT TÜ BND CELLS
0125 124 127 0113 C C C	FE(IN, J+1)=2         G0 T0 124         FE(I, J+1)=2         FF(I, J+1)=1         IF(IFSY*.C0.1) G0 T0 124         FF(IN, J+1)=2         FF(I*+1, J+1)=1         CONTINUE         IM=IN-1         CONTINUE         SET-UP CB ADJACENT TO BND CELLS         IF(NCS.NE.0) 60 T0 130
0125 124 127 0113 C C C C	FE(IN, J+1)=2         G0 T0 124         FE(I, J+1)=2         FF(I-1, J+1)=1         IF(IFSY*.E0.1) G0 T0 124         FF(IN, J+1)=2         FE(I*+1, J+1)=1         CONTINUE         IM=IN-1         CONTINUE         CONTINUE         SET-UP CB ADJACENT TU BND CELLS         IF(NCS.NE.Q) 50 T0 130         D0 141 I=2, IBAP1
0125 124 127 0113 C C C	FE(IN, J+1)=2         G0 T0 124         FE(I, J+1)=2         FF(I-1, J+1)=1         IF(IFSY*.E0.1) G0 T0 124         FF(IN, J+1)=2         FE(I*+1, J+1)=1         CONTINUE         IM=IN-1         CONTINUE         SET-UP CB 40JACENT TU 8ND CELLS         IF(NCS.NE.0) 60 T0 130         D0 141 I=2, IEA®1         IF(I, 2)=2
0125 124 127 0113 C C C C	FE (1P, J+1)=2         GO TO 124         FE (1, J+1)=2         FF (1, J+1)=1         IF (1FSY*E0.1) GO TO 124         FF (1N, J+1)=2         FE (1*+1, J+1)=1         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE         SET-UP CB 4DJACENT TÜ BND CELLS               IF (NCS.NE.0) GO TO 143         FF (1, 2).E0.5) GO TO 143         FF (1, 2)=2         IF (1, 2)=2         IF (1, 2)=2
0125 124 127 0113 C C C C 	FE(1N, J+1)=2         GO TO 124         FE(1, J+1)=2         FF(1, J+1)=1         IF(IFSYM.EQ.1) GO TO 124         FF(1N, J+1)=2         FF(1N, J+1)=1         CONTINUE         IM=IN-1         CONTINUE         SET-UP CB ADJACENT TO BND CELLS
0125 124 127 0113 C C C C 0143 0141	FE(IN, J+1)=2         GO TO 124         FE(I, J+1)=2         FF(I-1, J+1)=1         IF(IFSY*.EQ.1) GO TO 124         FF(IN, J+1)=2         FF(I*+1, J+1)=1         CONTIAUE         IM=IN-1         CONTIAUE         SET-UP CB ADJACENT TÜ BND CELLS               IF(NCS.NE.0) GO TO 143         FF(I, 2).E0.5) GO TO 143         FF(I, 2).E0.5) GO TO 1+1         FE(I, JBAR1).FQ.51 GO TO 1+1         FE(I, JBAR1).FQ.51 GO TO 1+1
0125 124 127 0113 C C C 0143 0141	FE(IN, J+1)=2         G0 T0 124         FE(I, J+1)=2         FF(I, J+1)=1         IF(IFSY*.CO.1) GO TO 124         FF(IY, J+1)=2         FF(IY, J+1)=2         FE(I*+1, J+1)=1         CONTINUE         IM=IM-1         CONTINUE         SET-UP CB ADJACENT TO BND CELLS         IF(F(I,2)=2         IF(F(I,2)=2         IF(F(I,2)=2         IF(F(I,2)=2         IF(F(I,3AR1).FO.5) GO TO 141         FE(I,3BAR1).FO.51 GO TO 141         FE(I,3BAR1).FO.51 GO TO 141         FE(I,2)=2         IF(F(I,2)=2,JEAR1
0125 124 127 0113 C C C 0143 0141	FE(IN, J+1)=2         GO TO 124         FE(I, J+1)=2         FF(I-1, J+1)=1         IF(IFSY*.E0.1) GO TO 124         FF(IN, J+1)=2         FE(I*+1, J+1)=1         CONTINUE         IM=IM-1         CONTINUE         SET-UP CB ADJACENT TO BND CELLS         IF(F(I,2)=2)         IF(F(I,2)=2)         FF(I, J+1)=2         FE(I*+1, J+1)=1         CONTINUE         IM=IM-1         CONTINUE         IM=IM-1         CONTINUE         IM=IM-1         CONTINUE         IF(F(I, 2), E0.5)         IF(F(I, 2)=2)         IF(F(I, 2)=2)         IF(F(I, 30AR1).FQ.5)         GO TO 143         FF(I, 30AY1)=2         CONTINUE         IVI 142         J=2         DVI 142         J=2         CONTINUE         DVI 142         J=2         DVI 142         J=2         DVI 142         J=2         DVI 142         J=2         DVI 142
0125 124 127 0113 C C C C 	FE(IN, J+1)=2         GO TO 124         FE(I, J+1)=2         FE(I, J+1)=1         IF(IFSYM.EQ.1) GO TO 124         FF(In, J+1)=2         FF(IM, J+1)=2         FF(IM, J+1)=2         FF(IM, J+1)=2         FF(IM, J+1)=1         CONTINUE         IM=IN-1         CONTINUE         GO TO 124         FF(IM, J+1)=2         FE(IM, J+1)=1         CONTINUE         IM=IN-1         CONTINUE         IM=IN-1         CONTINUE         SET-UP CB 4DJACENT TO BND CELLS         SET-UP CB 4DJACENT TO BND CELLS         IF(NCS.NE.0) GD TO 130         DO 141 I=2, IBA#1         IF(F(I, 2).EW.5) GO TO 143         FF(I, 2)=2         IF(F(IT, JHAR1).FO.5) GO TO 1+1         FF(I, I, IBA#1).FO.5) GO TO 1+1         FF(I, I, IBA#1).FO.5) GO TO 144         FF(I, I, IBA#1).FO.5) GO TO 144         FF(I, 2, J).EQ.5) GO TO 144
0125 124 127 0113 C C C C 0143 0141 0144	FE (1N, J+1)=2         GO TO 124         FE (1, J+1)=2         FF (1, J+1)=1         IF (1FSYM.EQ.1) GO TO 124         FF (1, J+1)=2         FF (1M, J+1)=2         FF (1M, J+1)=1         CONTINUE         IM= IN-1         CONTINUE         SET-UP CB 4DJACENT TO BND CELLS               IF (NCS.NE.Q) GO TO 143         FF (1, 2)=2         IF (F(1, 2).EQ.5) GO TO 143         FF (1, 2)=2         IF (F(1, JARAR1).FQ.5) GO TO 144         FF (1, 30AY1)=2         CONTINUE         DU 142 J=2, JEAR1         IF (F(2, J)=2         IF (F(2, MAX1) = 2         IF (F(2, MAX1) = 1         IF (F(2, MAX1) = 1         IF (F(2, MAX1) = 1         IF (F(2, MAX1) = 1 <tr< td=""></tr<>
0125 124 127 0113 C C C C 0143 0141 0144	FE(IN, J+1)=2         GO TO 124         FE(I, J+1)=2         FF(I-1, J+1)=1         IF(IFSY*.EQ.1) GO TO 124         FF(IN, J+1)=2         FF(I*+, J+1)=1         CONTINUE         CONTINUE         CONTINUE         CONTINUE         SET-UP CB ADJACENT TÜ BND CELLS               IF(NCS.NE.O) GO TO 130         DO 141 I=2, IBAP1         IF(F(I, 2), EO.5) GO TO 143         FF(I, 2)=2         IF(F(I, JARR1).FO.5) GO TO 1+1         FE(I, JBAP1)=2         CONTINUE         DU 142 J=2, JPAR1         IF(F(I, 2), EO.5) GO TO 144         FE(I, JBAP1)=2         CONTINUE         DU 142 J=2, JPAR1         IF(F(I, J), EQ.5) GO TO 144         FE(I, J)=2         IF(F(I, 2), EO.5) GO TO 144         FE(I, J)=2
0125 124 127 0113 C C C 0143 0141 0144 0147	FE(IN, J+1)=2         GO TO 124         FE(I, J+1)=2         FF(I, J+1)=1         IF(IFSY*.CO.1) GO TO 124         FF(IY, J+1)=2         FF(IY, J+1)=2         FF(IY, J+1)=2         FF(IY, J+1)=2         FF(IY, J+1)=1         CONTINUE         IM=IN-1         CONTINUE         CONTINUE         SET-UP CB ADJACENT TO BND CELLS         SET-UP CB ADJACENT TO BND CELLS         IF(F(1,2).EO.5) GO TO 143         FF(I,2)=2         IF(F(1,2).EO.5) GO TO 143         FF(I,2)=2         IF(F(1,JAAR1).FO.51 GO TO 144         FE(I,JBA*1)=2         CONTINUE         DU 142 J=2.JEAR1         IF(F(12,J).EO.5) GO TO 144         FE(I,2,J)=2         IF(F(12,J).EO.5) GO TO 142         FE(IRATIN)J=2         CONTINUE         DU 142 J=2.JEAR1         IF(F(12,J).EO.5) GO TO 142         FE(IRATIN)J=2         CONTINUE         DU 142 J=2.JEAR1         IF(F(EAR1,J).FEO.5) GO TO 142         FE(IRATIN)J=2         CONTINUE         CONTINUE
0125 124 127 0113 C C C C 0143 0144 0144 0142 013C	FE (1N, J+1)=2         GO TO 124         FE (1, J+1)=2         FF (1-1, J+1)=1         IF (FSY*.EO.1) GO TO 124         FF (1N, J+1)=2         FE (1*+1, J+1)=1         CONTINUE         IM=IM-1         CONTINUE         SET-UP CB ADJACENT TO BND CELLS         IF (F(1,2),EO,5) GO TO 143         FF (1, J+2, IRA*1)         IF (F(1, 2),EO,5) GO TO 143         FF (1, 2)=2         IF (F(1, 2),EO,5) GO TO 144         FE (1, 3BA\$1)=2         CONTINUE         IF (F(1, 2),EO,5) GO TO 144         FE (1, 2),EO,5) GO TO 142         FE (1, 3BA\$1)=2         CONTINUE         IF (F(1, J), EO,5) GO TO 142         FE (1, AR1), FO,5) GO TO 142         FE (1, AR1, J) = 2         CONTINUE         IF (F(1, D), EO,5) GO TO 142         FE (1RA\$1, J) = 2         CONTINUE
0125 124 127 0113 C C C C 0143 0144 0144 0144 0147 013C C C	FE(IN, J+1)=2         GO TO 124         FE(I, J+1)=2         FE(I, J+1)=1         IF(IFSYM.EQ.1) GO TO 124         FF(In, J+1)=2         FE(IM, J+1)=1         CONTINUE         CONTINUE         SET-UP CB ADJACENT TO BND CELLS         IF(INCS.NE.Q) GD TO 130         DO 141 I=2, IBAP1         SET-UP CB ADJACENT TO BND CELLS         IF(F(I, 2).E0.5) GO TO 143         FF(I, 2)=2         IF(F(I, 2).E0.5) GO TO 143         FF(I, 1, 3AR1).FO.51 GO TO 144         FF(I, 1, 3AR1).FO.51 GO TO 144         FF(I, 1, 3AR1).FO.51 GO TO 144         FF(I, 2).J=2         IF(FF(12, J).E0.5) GO TO 142         FE(I, AR1, J).FO.5) GO TO 142         FE(IAR1, J).FO.5) GO TO 142         FE(IAR1, J)=2         CONTINUE         CONTINUE
0125 124 127 0113 C C C 0143 0141 0144 0144 0147 0130 C C C	FE ( IN, J+1)=2         GO TO 124         FE ( I, J+1)=2         FF ( I, J+1)=1         IF ( IFSY*.EQ.1) GO TO 124         FF ( IN, J+1)=2         FF ( IN, J+1)=1         CONTINUE         IM= IN-1         CONTINUE         SET-UP CB 4DJACENT TO BND CELLS               SET-UP CB 4DJACENT TO BND CELLS               IF (NCS.NE.Q) GO TO 143         FF ( I, 2).EQ.5) GO TO 143         FF ( I, 2).EQ.5) GO TO 143         FF ( I, 2).EQ.5) GO TO 144         FF ( I, 2).EQ.5) GO TO 142         FE ( I, IRASH1).EQ.50 GO TO 142         FE ( I FAR I, J) = 2         TONTINUE         IF ( IF (E PAR I, J) FQ.50 GO TO 142         FE ( I FAR I, J) = 2         TONTINUE         SET UP SUR CELL AT INITIAL CONDITIONS
0125 124 127 0113 C C C 0143 0144 0144 0144 0144 0144 0144 0144	FE(IM,J+1)=2         GO TO 124         FE(I,J+1)=2         FE(I+J+1)=1         IF(IFSYM.EQ.1) GD TO 124         FF(IM,J+1)=2         FE(IM+1,J+1)=1         CONTINUE         IM=IM-1         CONTINUE         CONTINUE         SET-UP CB ADJACENT TO BND CELLS         SET-UP CB ADJACENT TO BND CELLS         IF(NCS.NE.O) GD TO 130         DO 141 1=2, IBAP1         IF(F(I,2)=E0.5) GO TO 143         FF(I,2)=2         IF(F(I,3AR1).FO.5) GO TO 141         FE(I+3AR1).FO.5) GO TO 142         FE(I,3AAP1)=2         CONTINUE         DU 142 J=2.JEAR1         IF(F(I2,J).EO.5) GO TO 144         FE(I,2J).EO.5) GO TO 144         FE(I,2J).EO.5) GO TO 144         FE(IRAG1.J).FO.5) GO TO 142         FE(IRAG1.J).FO.5) GO TO 143         FE(IRAG1.J).FO.5) GO TO 144
0125 124 127 0113 C C C 0143 0144 0144 0144 0144 0144 0146 C C C C	FE(1M,J+1)=2         GO TO 124         FE(1,J+1)=2         FF(1,J+1)=1         IF(1F\$YM.EQ.11 GD TO 124         FF(1+J+1)=1         CONTINUE         IM=TM-1         CONTINUE         GO TO 124         FE(1*+1,J+1)=1         CONTINUE         IM=TM-1         CONTINUE         CONTINUE         GO TO 230         DO 141 1=2,1RAP1         IF(F(1,2).ED.5) GO TO 143         FF(1,2).ED.5) GO TO 143         FF(1,2).ED.5) GO TO 144         FE(1,3AP1).=2         CONTINUE         DU 142 J=2,JPAR1         IF(F(1,2).ED.5) GO TO 144         FE(1,3AP1).=2         CONTINUE         DU 142 J=2,JPAR1         IF(F(12,4).ED.5) GO TO 144         FE(2,1)=2         IF(F(1EAR1,J).EO.5) GO TO 142         FE(1,AP1,J)=2         CONTINUE         SET UP SUR CELL AT INITIAL CONDITIONS         IF(NCS.NF.O) GO TO 163         IEFS
0125 124 127 0113 C C C 0143 0144 0144 0147 0136 C C C C	FE(1P,J+1)=2         GO TO 124         FF(1,J+1)=2         FF(1,J+1)=1         IF(IFSY*.EQ.1) GO TO 124         FF(I*J,J+1)=1         CONTIAUE         CONTIAUE         CONTIAUE         CONTIAUE         SET-UP CB ADJACENT TO BND CELLS         IF(F(1,2).EU.S) GO TO 143         FF(1,2).EU.S) GO TO 143         FF(1,2).EU.S) GO TO 143         FF(1,2).EU.S) GO TO 144         FF(1,2).FO.S) GO TO 142         FF(1,2).FO.S) GO TO 144         FF(1,2).FO.S) GO TO 142         FF(1,2).FO.S) GO TO 142         FF(1,2).FO.S) GO TO 142         FF(1,2).FO.S) GO TO 142         FF(1,2).FO.S GO TO 163         SLT UP SUR CELL AT INIT(AL CONDITIONS         IF(FNCS.NF.O) GO TO 16
0125 124 127 0113 C C C C 0143 0144 0144 0144 0144 0147 C C C C C C	FE(1P,J+1)=2         GO TO 124         FE(1,J+1)=2         FF(1-1,J+1)=1         IF(1FSYM.E0.1) GO TO 124         FF(1M,J+1)=2         FF(1M,J+1)=1         CONTIAUE         IF(F(T,JARAT).FG.5) GO TO 1+1         FE(I,AZ).FG.5) GO TO 1+1         FE(I,AZ).FG.5) GO TO 144         FE(I,AZ).FG.5) GO TO 144         FE(E(TAR1.J).FG.5) GO TO 142         FE(IF(TEAR1.J).FG.5) GO TO 142         FE(IFAR1.J).FG.5) GO TO 142         FE(IFAR1.J.Z).FG.5) GO TO 143         <
0125 124 127 0113 C C C C 0143 0144 0144 0144 0144 0147 0130 C C C C	FE(1P, J+1)=2         GO TO 124         FE(1, J+1)=2         FE(1, J+1)=2         FF(1F, J+1)=1         IF(1FSYM-E0, 1) GO TO 124         FF(1P, J+1)=2         FE(1M, J+1)=2         FE(1M, J+1)=1         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE         CONTINUE         SET-UP CB ADJACENT TO BND CELLS         IF(NCS.NE.0) GO TO 130         DO 141 I=2, IBA?0         IF(FT1, 2).ED.5) GO TO 143         FF(1, 2).ED.5) GO TO 143         FF(1, 2).ED.5) GO TO 144         FF(1, 3AR1).FO.5) GO TO 144         FF(1, 2).ED.5) GO TO 144         FF(1, 2).ED.5) GO TO 144         FF(1, 2).ED.5) GO TO 142         FF(1AR1, J).FO.5) GO TO 142 </td
0125 124 127 0113 C C C 0143 0144 0144 0144 0144 0144 0146 0130 C C C C C 131 0143 0143 0144 0143 0144 0143 0144 014	FE(1P, J+1)=2         GO TO 124         FE(1, J+1)=2         FE(1, J+1)=2         FF(1N, J+1)=2         FF(1N, J+1)=2         FF(1N, J+1)=2         FF(1N, J+1)=2         CONTINUE         IM=IN-1         CONTINUE         CONTINUE         SET-UP CB 4DJACENT TO BND CELLS         Y         FF(1,2).20.5) GO TO 143         FF(1,2).20.5) GO TO 144         FF(1,2).20.5) GO TO 144         FF(12,J).20.5) GO TO 142         FF(F(12,J).50.5) GO TO 142         FF(1F(2,J).50.5) GO TO 142         FF(1F(2,J).50.5) GO TO 142         FF(10,10,F0.2) GO TO 163
0125 124 127 0113 C C C 0143 0144 0144 0144 0144 0147 0144 0147 013C C C C C C C 131 0143 0141 0143 0144 0143 0144 0144 0147 0143 0144 0144 0147 0144 0147 0143 0144 0144 0144 0144 0147 0143 0144 0145 0144 0144 0144 0144 0144 0147 0146 0147 0146 0147	FE(1)*,J+1)=2       CO         GO       TO       124         FE(1,J+1)=2       FE(1,J+1)=2         FF(1),J+1)=2       FE(1,J+1)=2         FF(1),J+1)=2       FE(1,J+1)=2         FE(1),J+1)=2       FE(1,J+1)=2         FE(1),J+1)=2       FE(1,J+1)=2         FE(1,J+1)=2       FE(1,J+1)=2         CONTINUE       Image: Constant of the state of
0125 124 127 0113 C C C C 0143 0144 0144 0144 0144 0144 0144 0144 0147 C C C C C 131 0143 0141 0144	FE(1)*,J+1)=2       F         GO TO 124       F         FE(1,J+1)=2       F         CONTINUE       F         IM=IN-1       CONTINUE         CONTINUE       F         CONTINUE       F         SET-UP CB ADJACENT TO BND CELLS       F         CONTINUE       F         IF(F(1,2).E0.5) GO TO 143       F         FE(1,2)=2       F         IF(F(1,JAAR1).F0.5) GO TO 143       F         FE(1,JAAY1)=2       F         CONTINUE       F         DU 142       F         FE(1,JAAY1)=2       F         CONTINUE       F         DU 143       F         FE(1,JAAY1)=2       F         CONTINUE       F         SET UP SUR CELL AT INITIAL CONDITIONS         SET UP SUR CELL AT INITIAL CONDITIONS         IF(F(1,SNF.0) GO TO 163         J=FS       F
0125 124 127 0113 C C C C C 0143 0144 0147 0144 0147 013C C C C C C C C C C C C C C	FE(1)*.J+1)=2       Control 124         FE(1,J+1)=2       FE(1,J+1)=2         FF(1,J+1)=2       FE(1,J+1)=1         IF(1,J+1)=2       FE(1,J+1)=2         FF(1,V,J+1)=2       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=2         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=1         CONTIAUE       FE(1,J+1)=2         FE(1,J+1)=2       FE(1,J+1)=2         CONTIAUE       FE(1,J+1)=2         FE(1,J+1)=2       FE(1,J+1)=2         CONTINUE       FE(1,J+1)=2         FE(1,J+1)=2       FE(1,J)=2         CONTINUE       FE(1,J)=2         SET UP SUR CELL AT INITIAL CONDITIONS         IF(FICS_NF.0) GO TO 163       FE(1,J)=2         SET UP SUR CELL AT INITIAL CONDITIONS         IF(FICS_NF.0) GO TO 163       FE(1,J)=3         CONTINUE       FE(1,J)=3         CON
0125 124 127 0113 C C C C 0143 0144 0144 0144 0144 0147 0130 C C C C C 131 0143 0144 0144 0144 0144 0145 0130 0145 015 015 015 015 015 015 015 01	FE(1P,1+1)=2       F         GO TO 124       F         FE(1,1+1)=2       F         FF(1-1,1+1)=1       F         IF(IF\$YM_EQ.1) GO TO 124       F         FF(1M,1)=1       F         CONTIAUE       F         IM=IM-1       CONTIAUE         CONTIAUE       F         IM=IM-1       CONTIAUE         CONTIAUE       F         IF(F(1,1)+1)=2       F         CONTIAUE       F         IF(F(1,2)+2)       F         CONTIAUE       F         IF(F(1,2)+2)       F         IF(F(1,2)+2)       F         IF(F(1,3)+AR1)+2       F         CONTINUE       F         IF(F(1,3)+AR1)+2       F         CONTINUE       F         IF(F(1,3)+AR1)+2       F         CONTINUE       F         IF(F(1,3)+2)+2       F         CONTINUE       F         SET UP SUR CELL AT INITIAL CONDITIONS         IF(F(1,1)+5)+2)+60 TO 143         F       F         CONTINUE         SET UP SUR CELL AT INITIAL CONDITIONS         IF(F(RS,NF-0) 60 TO 163         J=FS         U0 131 1=2+16AC1     <
0125 124 127 0113 C C C C 0143 0144 0144 0144 0144 0144 0144 0144 0144 0144 0144 0144 0144 0130 C C C C C C C C C C C C C	FE(1P,1+1)=2       F         GO TO 124       F         FE(1,1)=1       F         IF(1F,Y**EQ,1) GO TO 124       F         FF(1F,1)=1       F         IF(1F,Y**EQ,1) GO TO 124       F         FF(1F,1)=1       F         CONTIAUE       F         IM=1P-1       CONTIAUE         CONTIAUE       F         CONTIAUE       F         IF(FR1,2)=2       F         IF(FR1,3AP1)=2       F         CONTINUE       F         DU1 142 J=2,JEARI       F         IF(FR1RAR1,J)=2       F         CONTINUE       F         SET UP SUR CELL AT INITIAL CONDITIONS       F         IF(NCS,NF.0) GO TO 131       F         IF(NCS,NF.0) GO TO 131       F         IF(NCS,NF.0) GO TO 131       F         IF(INTIAL       F
0125 124 127 0113 C C C 0143 0141 0144 0144 0147 0144 0147 0144 0147 013C C C C C C C C C C C C C C	FE(1P,1+1)=2       F         GO TO 124       F         FE(1,1+1)=2       F         IF(IFSYM.EQ.1) GO TO 124       F         FF(IP,1+1)=2       F         IF(IFSYM.EQ.1) GO TO 124       F         FF(IP,1+1)=1       COMINATE         CONTINUE       CONTINUE         SET-UP C6 ADJACENT TO BND CELLS       CONTINUE         SET-UP C6 ADJACENT TO BND CELLS       F         IF(RCS.NE.0) GO TO 143       F         FE(1,2)=2       CONTINUE         DO 141 F=2,FBA?       CONTINUE         DO 141 F=2,FBA?       CONTINUE         DO 142 F=2,OPAN       F         FE(1,30=2) GO TO 144       F         FE(1,40=1,1).FO.5) GO TO 142       F         FE(1AAR1,J).FO.5) GO TO 142       F         FE(1AAR1,J).FO.5) GO TO 142       F         FE(1AAR1,J).FO.5) GO TO 163       S         J=FS       CONTINUE         CONTINUE       CONTINUE         SIT UP SUR CELL AT IN
0125 124 127 0113 C C C C C 0143 0144 0144 0144 0144 0144 0144 0144 0144 0144 0144 0145 C C C C C C C C C C C C C	FE(1P,1+1)=2       F         GO TO 124       F         FF(1,1)=2       F         FF(1,1)=1       F         IF(IFSY*EQ.11 GO TO 124       F         FF(1P,1+1)=1       F         CONTINUE       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F       F         F
0125 124 127 0113 C C C C 0143 0144 0147 0144 0147 013C C C C C C 131 0144 0147 013C C C C C C C C C C C C C C	FE(1)*,1+1)=2       F         GO TO 124       F         FE(1,1)=2       F         FF(1,1)=1       F         IF(1FSV4.E0.1) GO TO 124       F         FF(1),1+1=1       F         CONTIAUE       F         SET-UP CB ADJACENT TO BND CELLS       F         IF(F(I,2)-CO-S) GO TO 143       F         FE(1,2)-CO-S) GO TO 144       F         FE(1,3042)=2       F         CONTINUE       F         IF(F(I,2)-J)=2       F         IF(F(I,2)-J)=2       F         IF(F(I,2)-J)=2       F         IF(I)=1)=2       F <tr< td=""></tr<>

01/0	Chittane .
0140	F([RAV], J]=3
	U([PAP1, J)=0.0
	V([KA:(+,J)=0.0
0153	CONTINO.
<u> </u>	ESTAR ISH THITTAL HYDROSTATIC DOSCONDE
<u> </u>	
	IE(NCS.4F.0) SO TO 114
	<u>N=FS+1</u>
	$\frac{101109}{10} J = N_{\pm} J^{\pm} \Delta R I$
	PHI(1+J)=(Y(J)-(WY+RW++5+DY))+GY
0109	CENTIME
0114	CONTINF
<u> </u>	READ ULLIN VILL FROM TAPEL STAND STURE THESE ON MAIN STORAGE
C	
	IF(VCS.EC.0) GO TO 157
0104	READ(8)DATA, U, V
0108	<u>17 ([]] 7 (0) 104 (08</u>
	THS=H4TA(1)
	KBAR=DATA (2)
	S0XSF=DATA(3)
	XSE PAR=DATA(5)
	YSEPAR=DATA(6)
	SFX=7AT4(7)
	5+Y=0414(3) V#=0414(3)
	U4=CATA(10)
	AL P-AJ=DATA(1)}
	ALPHAV=DATA(12)
	$\frac{10}{10} \left[ \left( \frac{3}{10} \right) - \frac{10}{10} \right]$
	OUTPP=04TA(15)
	DXSF=[4T4(25)
	DYSF=04TA(26)
•	IC=RATA(29)
	<u>SUMR</u> =DATA(30)
	SEXC-DATA(2)
	SFYG=DATA(32)
	1F(ABS(TDS-T).LT.(DDICP/2.)) GC TO 904
, · · · · · · · · · · · · · · · · · · ·	
0904	GU 10 901
	IF(EOF,8)155,904
C	
<u> </u>	READ FINAL SET DATA OF PHI(IJ),F(IJ),FE(IJ), AND ETA(IJ) FROM
<u> </u>	THECTIST AND STORE THESE ON MAIN STORAGE
0155	READ(13)DATA, PHI, ETA, F, FE
	IF(EPF,13)155,905
0905	$\frac{105}{101} = \frac{101}{100} = \frac{100}{100} = $
	IF(ABS(TDS-I).LT.(CDT(P/2.)) GO TO 903
	WRITE(5.57)
00.17	
0905	1F(E9E+13)156+903
C	
<u></u>	ESTABLISH COUNTERS FOR PARTICLE COORD. CALCULATIONS
L 0156	R54C(14)DATR
	1F(FPF+14)156+159
0158	CONTINUE
<u> </u>	
	00TPP=)AT3(14)
·	1F(A8S(TDS-T).LT.(00TPP/2.)) GO TO 902
	H9118(6.57)
0002	GI 11 901 NDAD-KAAA (1020
	MP3P=KBAR-MPAR+1020
	MPAR1=MPAR+1
<u> </u>	
<u>с</u>	PRIME INPUT DATA FOR VERIFICATION
0157	WRITE (3.4) (MANE(1),1=1.8),13AR, JBAR, ETAO, FKC, GX, GY, XR, YT, RW, WX,
*	WY, WI, UI, VE, MX, NY, XO, YU, DXK, DYK, DX, NY, DT, DTCP, DTPP, DTSP, ALPHAU,
*	URIJELA-4032)
	WKITE (6, 10?7) INPTS. MACVS. MMAX. NS. NCVS. MS. IN. ITG. FPS
·····	

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	WRITE(4,4028) WRITE(4,4029)(1.5[RAN(1).5[RES(1).1=1.NS)
сС	STURE INITIAL VALUES ON TAPES
	WRITE(6.,29)
	ASS1/# 170 T-1 KRF1 TPP=0
0170	
0171	CONTINUE
<u> </u>	REGION 30 R([J) CALCULATION
300	
	CALL SECOND(BTIME)
C	
<u></u>	CALCULATE D FOR COMPUTING THE SOURCE TERM
	D14034 J=2, JB481
	D[I,J] = 0.
	$\frac{[F(F(1,J),NE,2,AND,F(1,J),NF,3] GU TT 4034}{D(1,J)=((U(1,J)-U(1,J-1))/DY)}$
<u>4034</u> C	
<u> </u>	CALCULATION OF THE SOURCE TERM
	SUHR=0.
	D0 301 J=2, J3ARI
	<u>R(I+J)=0.</u>
	US=(U([, ])+U([-1, ]))**2
	$V = \{V(1, j) + V(1, j - j) + * \}$ $UVBR = \{i(1, j + j) + U(1, j) + * \{V(1+1, j) + V(1, j)\}$
•	VYTL={U(1-1,J)+U(1-1,J-1))*(V(1+J-1)+V(1-1,J-1)) VYTL={U(1,J+J(1+J-1))*(V(1+1,J-1)+V(1,J-1)}
	UV&L=(J([-1,J+1)+U([-1,J))*(V([,J)+V([-1,J])
<u> </u>	DLEFT=O(I-1,J)
	DABOVE=D(I, J-1)
	DBELOW=0(1+J+1) TF(FE(1+J).NE.2) GC TO 319
	$\frac{1}{10} \left( \frac{1}{1} + $
0202	
	DLEF1≈0'(1,J)
	IF(F(I-1, J).E.J.5) GD TO 304 UVBL=0.
	UVIL=0
03 94	
	IF(FE(I-1, J).NE.1) GD TC 303
	IF(F(I-1,J-1).NE.5) GC TU 305 DRELCW≤DRELCV+(U(I-1,J+1)-UW)/DX
0305	G0 T0 303 DABOVE=DABOVE+(U(I-1,J-1)-UW)/DX
0303	IF(F(I+1,J).L). 1.00.F(1+1,J).E0.5) GO TO 306
	60 TO 307
0306	URS=US DR1GHT=D(1,J)
	IF(F(1+1.J).5) G(1 TO 308
	<u>IIVTY=0.</u>
0308	UVAR=U/#¥V#¥4.
	UVTR=UW*VW*4. IF(FF(1+1,J). YE.1) GU TO 307
	16(6(1+1, J-11, NE, 5) CO TO 309 0861 08=0051 08 + (09-0(1, J+1))/7X
0307	IF(F(T, J-1), F), I, OK, F(1, J-1), E0, 5) GU TO 310
	VAS=(V([+J-1)+V([+J-2))**2 GU T(+3]]
0310	
	IF(F(I, 1-1).10.5) GC TO 312

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UVT,L =0
υντα =ινανγικά.
<u>1.(+i(i,j-1), wF, 1) GU TO 311</u>
[F(F(I-1, J-1) - NF - 5) <u>GC TO 313</u>
0313 01 F I = 01 F F T + (V(1 - 1 + J - 1) - VW) / 0Y
0311 [F(F([, 1+]], FO, 1, 1)P, F([, 1+1), FO, 51 GO TO 314
V-1S=(V(1,J+1)+V(1,J))**2
<u></u>
0314 V03-V1 08610W=0(1-1)
[F(F(1, J+1), FQ.5) GD TO 316
<u> </u>
1/(1/1/31) 0316. it/041=1145/uitz4
[F[FF([,J+1].NF.1] GO TC 315
[F(F(I-1, J+1), NF. 5) GD TC 218
$\frac{\text{DR}[GH] = 03 [GH] + (VI - V[1+1, J]) / DY}{200}$
$\begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $
0319 1F(FF(1-1,J-1).NE.1) 60 TO 320
UVTL=U/4×V/4×4
$\frac{\partial P_{i}}{\partial P_{i}} = \frac{\partial P_{i}}{\partial P_{i}} + \frac{\partial P_{i}}{\partial P_{i}} $
60 Tr 323
0320 [F(F([-1,J+1].NE.1] CO TO 32]
UVE L = (IVA V V + 4 .
$\frac{D[\xi \vdash \tau = 0]_{-} \in \Gamma + \{(2, *V_N) - V(1, J) - V(1, J) / 0Y}{D[\xi \vdash \tau = 0]_{-} (J_{-} \downarrow J_{-} J_{-} \downarrow J_{-} \downarrow J_{-} J_{-} \downarrow J_{-} J_{-} \downarrow J_{-} J_{-$
CO TO 323
0321 [F(FF([+1,J-1).NE.1) GC TG 322
UVTX=UJ>VX+4.
$\frac{DARGVE = (A - a_1)E + ((2 + a_2)) - U(1 + J - U(1 + J - 1))/Dx}{DARGVE = (A - a_1)E + (A - a_2) - U(1 + J - 1) - U(1 + J -$
0 1 22
0322 IF (FF(I+1,J+1),NE.1) GQ TO 323
UVBR=UW#VW#4.
$\frac{PRIGHI = 0R[GH] + \{(2, 2VA) + V(1, J) + V(1+1, J)/PY}{PRICIPAL (2, 2VA) + (1, J) + (1, 1+1)/PY}$
0323 URS=(U(1+1,J)+U(1,J))==2
ULS = (U(I-1,J)+U(I-2,J)) + 2
VAS=(V(I,J+1)+V(I,J))**2
VAS = (V(I, J-I) * V(I, J-2)) * * ?
**(VRS+VAS-(7,*VS))/(4,*DYS)
** (UV3k+UV1L-UV1R-UV8L)/(2.*DX*(Y)-D(1,J)/DT
+-ETA([, ]) ≠( DF [GHT+DL2FT-(2+*C([, ])) /CXS
+-ETA(1,J)+(DBEL0++)ABOVE-(2.+0(1,J)))/DYS
C C
C REGION 40-A FREE-SURFACE PRESSURE CORRECTION
<u>c</u>
D0 451 J=2, JBAR1
IF(F(1,J),NE,3) 50 TO 451
PHI(I,J)=0.
IF(F(1, J-1).NF.4) GC TO 452
[F(F(I-1+J), NF.4) GC TO 453
++(V(1+1, J)+V(1+1, J-1)-V(1, J-1))/DX)
GO T7 451
0453 [f(F(I+1,J).NE.4) GO TC 454
$\frac{117}{1000} (F(1, j+1), F(0, 4) G(1, 10, 4) (I_{1,1}, 1) (I_{1,1}, $
+ (v(1, d) + v(1, d) + v(1, d) + v(1, d) + (1, d) + (1
GU TO 451
0454 1F(F(1, J+1), E), 4) GC TO 451
PHI(I, I)=2.0*+TA(I,J)*(V(I,J)-V(I,J-1))/DY
0452 [F(f([+],1],NF.4) G) TC 455
IF (F(1, J+1), NF, 4) GQ TO 455
1F(F(1-1, 1), F), 4) GO TO 451
$PHI(I, J) = 0.5 \text{ fr} IA(I, J) \neq (U(I, J) + HI(I-1, J) - U(I, J-1) - U(I-1, J-1))/0Y$
0+56 1F(F(1-1,J),EQ.4) 60 TO 451
PHI([,J)=2.0←LTA([,])+(U(I,J)-U(I-1,J))/DX
••••••••••••••••••••••••••••••••••••••

01.61	<u>C2 T0 451</u>
(1455	IF(F(I, J+I), NF, 4) GU TO 457
	PH(1), 1)=2.06(76(1,1))+(y(1,1)-y(1,1-1))/(y)
	63 T0 451
0458	PHI(1, 1) = -, 5*(TA(1, J) * ((3(1, J) + U(1-1, 3) - U(1, J-1) - U(1-1, 1-1))/DY
	*+(V([+1,-1)+V(I+1,J-1)-V(I,J-1)/(X)
	<u>-60 Y0 451</u>
0457	IF(F(f-1, J), I+, 4) GO (11, 45)
0461	POI(1,))=2-3%FTA(1,J)*(U(1,J)-U(1-1,J))/DX
<u> </u>	
<u> </u>	STURE VAPIABLES FOR RE-CYCLING
r	
	WRITE(16)U,V,FTA,PHI,P
<u> </u>	<u>60 ID 4038 '</u>
<u>_(</u>	
<u> </u>	RE-ESTABLISH VARIABLES FOR RE-CYCLE
4036	READ(16)11-V-ETA-PHL-0
	IF(E)E+1614036+4038
4038	
<u> </u>	
<u> </u>	CALCULATE ESTIMATE OF FINAL WHEEL VELOCITY
	VC=VW+(GY+(SFYG/ 48)) *0T
<u> </u>	FX={((\G+\JW)/2,)*0T)/DX
	FY=(((JG+VW)/2.)*0T)/0Y
C	
C	CELL VARIABLES AFTER SHIFTING COUDINATES
<u> </u>	
<del>.</del>	
0417	LF(FY.6E.0.0) 60 TO 418
	<u>11=-1</u>
0418	FX= ABS(FX)
	EY=ABS(EY)
	$\frac{100}{420}$ $\frac{1}{1}$ $\frac{2}{10}$ $\frac{1}{10}$ $\frac{1}{10$
•	1111 (1, J) -NC42 - A3" - FT (+ J / - NF - 2) - GU 10 - 42"
	[F(FE(I,J).NE.2) GO TO 421
	IF(F(I+1, J).NE.1) GO TO 422
· <u> </u>	IF(F(I+1, J).NE.]) GU TÚ 422 PHI(1+1, J)=PHI(I, J)+GX+DX+2.*ETA(I, J)*U(1-1, J)/DX
	IF(F(I+1, J).NE.1) GU TÚ 422 PHI(1+1, J)=PHI(I, J)+GX+DX+2.*ETA(I, J)*U(I-1, J)/DX SU TU 423 IC(SU:1) NC CL 20 TO 102
0422	$\frac{IF(F(I+1, J), NE, I) GU TU 422}{PH(1+1, J) = PH((I, J) + GX = DX + 2, *ETA(I, J) * U(I-1, J)/DX}$ GO TU 423 IF(F(I+1, J), NE, S) GO TO 423 PH((I+1, J) = PH(I, J) + GEXC(I, U) = DX + 2, *ETA(I, J) + U(I-1, J) + U(I)/DX
0422	$\frac{IF(F(I+1, J) \cdot NE \cdot I) GU TU 422}{PHI(1+1, J) = PHI(1, J) + GX = DX + 2 \cdot ETA(1, J) = U(1-1, J) / DX}$ GO TU 423 IF(F(I+1, J) - NE - 5) GO TO 423 PHI(1+1, J) = PHI(1, J) - (SFYG/W/) = DX + 2 \cdot ETA(1, J) + (U(1-1, J) - UW) / DX IE(F(I-1, I) - NE - I) GO TU 424
0422	$ \begin{array}{l} IF(F(I+1, J) \cdot NE \cdot I) & GO & TO & 422 \\ PHI(I+1, J) = PHI(I, J) + GX \neq DX + 2 \cdot XETA(I, J) \times U(I-1, J) / DX \\ SO & TO & 423 \\ IF(F(I+1, J) = PHI(I, J) - (SFYG/W) \times DX + 2 \cdot XETA(I, J) \times (U(I-1, J) - UW) / DX \\ IF(F(I-1, J) = PHI(I, J) - (SFYG/W) \times DX + 2 \cdot XETA(I, J) \times (U(I-1, J) - UW) / DX \\ IF(F(I-1, J) = PHI(I, J) - GX + DX - 2 \cdot XETA(I, J) \times U(I, J) / DX \\ \end{array} $
0422	$\frac{IF(F(I+1, J) \cdot NE \cdot I) GO TO 422}{PHI(1+1, J) = PHI(1, J) + GX \neq DX + 2 \cdot \times ETA(1, J) \times U(I-1, J)/DX}$ $\frac{IF(F(I+1, J) \cdot NE \cdot 5) GO TO 423}{PHI(1+1, J) = PHI(1, J) - (SFYG/W/) \neq DX + 2 \cdot \times ETA(1, J) + (U(I-1, J) - UW)/DX}$ $\frac{IF(F(I-1, J) \cdot NE \cdot I) GO TO 424}{PHI(1-1, J) = PHI(1, J) - GX \neq DX - 2 \cdot \times ETA(1, J) \times U(1, J)/DX}$
0422	$ \begin{array}{l} F(F(I+1, J), NE, I) & GO & TO & 422 \\ PHI(I+1, J) = PHI(I, J) + GX \neq DX + 2 * ETA(I, J) * U(I-1, J) / DX \\ SO & TO & 423 \\ \hline \\ PHI(I+1, J) = PHI(I, J) - (SFYG/W/) * DX + 2 * ETA(I, J) + (U(I-1, J) - UW) / DX \\ \hline \\ IF(F(I-1, J) = PHI(I, J) - (SFYG/W/) * DX + 2 * ETA(I, J) + (U(I-1, J) - UW) / DX \\ \hline \\ IF(F(I-1, J) = PHI(I, J) - GX + DX - 2 * TA(I, J) * U(I, J) / DX \\ \hline \\ GO & TO & 425 \\ \hline \\ IF(F(I-1, J) * NE * 5) & GO & TO & 429 \\ \end{array} $
0422 0423 0423 0424	$ \begin{array}{l} F(F(1+1, J), NE, 1) & GO TO 422 \\ PHI(1+1, J) = PHI(1, J) + GX \neq DX + 2, *ETA(1, J) * U(1-1, J) / DX \\ SO TO 423 \\ F(F(1+1, J), NE, 5) & GO TO 423 \\ PHI(1+1, J) = PHI(1, J) - (SFYG/WP) * DX + 2, *ETA(1, J) * (U(1-1, J) - UW) / DX \\ F(F(1-1, J), NE, 1) & GO TO 424 \\ PHI(1-1, J) = PHI(1, J) - GX \neq DX - 2, *TA(1, J) * U(1, J) / DX \\ GO TO 425 \\ F(F(1-1, J), NE, 5) & FO TO 429 \\ PHI(1-1, J) = PHI(1, J) + (SFXG/WT) * DX + 2, *ETA(1, J) * (UW - U(1, J)) / DX \\ \end{array} $
0422	$ \begin{array}{l} \text{IF}(F([1+1, J], \text{NE}_{\bullet})] & \text{GO} \ \text{TO} \ 422 \\ PHI(1+1, J) = PHI(1, J) + GX \neq DX + 2 * & \text{ETA}(1, J) * U([-1, J]/DX \\ \hline \text{GO} \ \text{TO} \ 423 \\ \hline \text{FIF}(F([1+1, J] * \text{NE}_{\bullet})) & \text{GO} \ \text{TO} \ 423 \\ \hline \text{PHI}([1+1, J] = \text{PHI}(1, J) - (SFYG/WP) * DX + 2 * & \text{ETA}(1, J) * (U(1-1, J) - UW)/DX \\ \hline \text{IF}(F([1-1, J] * \text{NE}_{\bullet})) & \text{GO} \ \text{TO} \ 424 \\ \hline \text{PHI}([-1, J] = \text{PHI}(1, J) - GX \neq DX - 2 * & \text{ETA}(1, J) * U([-1, J]/DX \\ \hline \text{GO} \ \text{TO} \ 425 \\ \hline \text{FIF}(F([-1, J] * \text{NE}_{\bullet})) & \text{CO} \ \text{TO} \ 429 \\ \hline \text{PHI}([-1, J] = \text{PHI}(1, J) + (SFXG/W^{+}) * DX + 2 * & \text{ETA}(1, J) * (UW - U(1, J))/DX \\ \hline \text{GO} \ \text{TO} \ 425 \\ \hline \text{GO} \ \text{TO} \ 425 \\ \hline \text{CO} \ \text{TO} \ \text{CO} \ \text{TO} \ \text{CO} \ \text{TO} \ \text{CO} \ \text{TO} \ TO$
0422 0423 0424 0424 0429	$ \begin{array}{l} \text{IF} \{F([1+1, J], \text{NE}_{\bullet}]\} & \text{GO TO } 422 \\ PHI(1+1, J) = PHI(1, J) + GX \neq DX + 2 * & \text{ETA}(1, J) \neq U([-1, J]/DX \\ \hline \\ \text{GO TO } 423 \\ \hline \\ \text{PHI(1+1, J) = PHI(1, J) - (SFYG/WP) \neq DX + 2 * & \text{ETA}(1, J) \neq (U(1-1, J) - UW)/DX \\ \hline \\ \text{IF}(F([1-1, J]) = PHI(1, J) - (SFYG/WP) \neq DX + 2 * & \text{ETA}(1, J) \neq (U(1-1, J) - UW)/DX \\ \hline \\ \text{IF}(F([1-1, J]) = PHI(1, J) - GX \neq DX - 2 * & \text{ETA}(1, J) \neq U(1, J)/DX \\ \hline \\ \text{GO TO } 425 \\ \hline \\ \text{FIF}(F([-1, J]) = NE_{\bullet}S) & \text{GO TO } 429 \\ \hline \\ \text{PHI(1-1, J) = PHI(1, J) + (SFXG/W^{*}) \neq DX + 2 * & \text{ETA}(1, J) \neq (UW - U(1, J))/DX \\ \hline \\ \text{GO TO } 425 \\ \hline \\ \text{IF}(F([-1, J]) = NE_{\bullet}S) & \text{GO TO } 425 \\ \hline \\ \text{IF}(F([-1, J]) = NE_{\bullet}S) & \text{GO TO } 425 \\ \hline \\ \text{PHI(1-1, J) = PHI(1, D) = OYD Y \\ \hline \end{array} $
0422 0423 0424 0424 0429 0429	$ \begin{array}{l} \text{IF} \{F(I+1, J), NE, i\} & \text{GO TO } 422 \\ \text{PHI}(I+1, J) = PHI(I, J) + GX \neq DX + 2, *ETA(I, J) * U(I-1, J) / DX \\ \text{GO TO } 423 \\ \text{IF}(F(I+1, J) = PHI(I, J) - (SFYG/W/) * DX + 2, *ETA(I, J) * (U(I-1, J) - UW) / DX \\ \text{IF}(F(I-1, J) = PHI(I, J) - GX \neq DX - 2, *ETA(I, J) * U(I, J) / DX \\ \text{GO TO } 425 \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{GO TO } 425 \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{GO TO } 425 \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{GO TO } 425 \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{GO TO } 425 \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{GO TO } 425 \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{GO TO } 425 \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) / DX \\ \text{IF}(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2, *ETA(I, J) * (UW - U(I, J) + (UW - U(I,$
0422 0423 0424 0424 0429 0425	$ \begin{array}{l} F(F(I+1, J) * NE * 1) & GO TO 422 \\ PHI(I+1, J) * PHI(I, J) + GX * DX + 2 * ETA(I, J) * U(I-1, J) / DX \\ O TO 423 \\ IF(F(I+1, J) * PHI(I, J) - (SFYG/W) * DX + 2 * ETA(I, J) * (U(I-1, J) - UW) / DX \\ IF(F(I-1, J) = PHI(I, J) - (SFYG/W) * DX + 2 * ETA(I, J) * (U(I-1, J) - UW) / DX \\ IF(F(I-1, J) = PHI(I, J) - GX * DX - 2 * TA(I, J) * U(I, J) / DX \\ GO TO 425 \\ IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * ETA(I, J) * (UW - U(I, J) / DX \\ GO TO 425 \\ IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * ETA(I, J) * (UW - U(I, J) / DX \\ GO TO 425 \\ IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * ETA(I, J) * (UW - U(I, J) / DX \\ IF(F(I-1, J) = PHI(I, J) - GX * DX \\ IF(F(I, J+1) = PHI(I, J) - GX * DX \\ IF(F(I, J+1) + I) = PHI(I, J) + GY * DY + 2 * ETA(I, J) * U(I, J) / DY \\ IF(F(I, J+1) + I) = PHI(I, J) + GY * DY + 2 * ETA(I, J) * U(I, J) / DY \\ IF(F(I, J+1) + I) = PHI(I, J) + GY * DY + 2 * ETA(I, J) * U(I, J) / DY \\ IF(F(I, J+1) + I) = PHI(I, J) + GY * DY + 2 * ETA(I, J) * U(I, J) / DY \\ IF(I, J+1) = PHI(I, J) + GY * DY + 2 * ETA(I, J) * U(I, J) / DY \\ IF(I, J+1) = PHI(I, J) + GY * DY + 2 * ETA(I, J) * U(I, J) / DY \\ IF(I, J+1) = PHI(I, J) + GY * DY + 2 * ETA(I, J) * U(I, J) + DY + 2 + DY + 2 * ETA(I, J) * U(I, J) + DY + 2 + DY + 2 + ETA(I, J) * U(I, J) + DY + 2 + DY + D$
0422 0423 0424 0424 0429 0429	$ \begin{array}{l} \text{IF} \left( F(I+1, J) \cdot \text{NE}_{\bullet} \right) & \text{GO TO } 422 \\ PHI(1+1, J) = PHI(I, J) + GX \div DX + 2 \cdot \times \text{ETA}(I, J) \times U(I-1, J) / DX \\ \text{IF} \left( F(I+1, J) \cdot \text{NE}_{\bullet} \right) & \text{GO TO } 423 \\ PHI(1+1, J) = PHI(I, J) - (SFYG/W') \times DX + 2 \cdot \times \text{ETA}(I, J) \times (U(I-1, J) - UW) / DX \\ \text{IF} \left( F(I-1, J) \cdot \text{NE}_{\bullet} \right) & \text{GO TO } 423 \\ PHI(I-1, J) = PHI(I, J) - GX \div DX - 2 \cdot \times \text{ETA}(I, J) \times U(I, J) / DX \\ \text{GO TO } 425 \\ \text{IF} \left( F(I-1, J) \cdot \text{NE}_{\bullet} \right) & \text{GO TO } 429 \\ PHI(I-1, J) = PHI(I, J) + (SFXG/W') \times DX + 2 \cdot \times \text{ETA}(I, J) \times (UW - U(I, J)) / DX \\ \text{GO TO } 425 \\ \text{FIF} \left( F(I-1, J) \cdot \text{NE}_{\bullet} \right) & \text{GO TO } 425 \\ PHI(I-1, J) = PHI(I, J) - GX \div DX \\ \text{IF} \left( F(I, J+1) \cdot \text{NE}_{\bullet} \right) & \text{CO TO } 425 \\ PHI(I-1, J) = PHI(I, J) - GX \div DX \\ \text{IF} \left( F(I, J+1) \cdot \text{NE}_{\bullet} \right) & \text{CU TO } 426 \\ PHI(I, J+1) = PHI(I, J) + GY \div DY + 2 \cdot \times \text{ETA}(I, J) \div V(I, J-1) / DY \\ \text{GO TO } 427 \\ \end{array}$
0422 0423 0424 0424 0429 0425 0425	$ \begin{array}{l} F(F(I+1, J) \cdot NE \cdot I) & GO TO 422 \\ PHI(I+1, J) = PHI(I, J) + GX \div DX + 2 \cdot \times ETA(I, J) \times U([-1, J]/DX \\ \hline O TO 423 \\ \hline IF(F(I+1, J) \cdot NE \cdot S) & GO TO 423 \\ PHI(I+1, J) = PHI(I, J) - (SFYG/W) \times DX + 2 \cdot \times ETA(I, J) \times (U(I-1, J) - UW)/DX \\ \hline IF(F(I-1, J) \cdot NE \cdot S) & GO TO 423 \\ \hline PHI(I-1, J) = PHI(I, J) - GX \div DX - 2 \cdot \times ETA(I, J) \times U(I, J)/DX \\ \hline GO TO 425 \\ \hline IF(F(I-1, J) \cdot NE \cdot S) & GO TO 429 \\ \hline PHI(I-1, J) = PHI(I, J) + (SFXG/W') \times DX + 2 \cdot \times ETA(I, J) \times (UH - U(I, J))/DX \\ \hline GO TO 425 \\ \hline IF(F(I-1, J) - PHI(I, J) + (SFXG/W') \times DX + 2 \cdot \times ETA(I, J) \times (UH - U(I, J))/DX \\ \hline GO TO 425 \\ \hline PHI(I-1, J) = PHI(I, J) + (SFXG/W') \times DX + 2 \cdot \times ETA(I, J) \times (UH - U(I, J))/DX \\ \hline GO TO 425 \\ \hline PHI(I-1, J) = PHI(I, J) - GX \div DX \\ \hline IF(F(I, J+1) \cdot NE \cdot S) & GO TO 425 \\ \hline PHI(I-1, J) = PHI(I, J) - GX \div DX \\ \hline IF(F(I, J+1) \cdot NE \cdot S) & GO TO 425 \\ \hline PHI(I, J+1) = PHI(I, J) + GY \div DY + 2 \cdot \times ETA(I, J) \times V(I, J-1)/DY \\ \hline GO TO 427 \\ \hline IF(F(I, J+1) \cdot hE \cdot S) & GO TO 427 \\ \hline \end{array}$
0422 0423 0424 0429 0429 0425 0425	$ \begin{array}{l} F(F(I+1, J) * NE * 1) & GO TO 422 \\ PHI(I+1, J) * PHI(I, J) + GX * DX + 2 * & ETA(I, J) * U([-1, J]/DX \\ \hline O TO 423 \\ \hline PHI(I+1, J) = PHI(I, J) - (SFYG/W) * DX + 2 * & ETA(I, J) * (U(I-1, J) - UW)/DX \\ \hline IF(F(I-1, J) = PHI(I, J) - GX * DX - 2 * & ETA(I, J) * U(I, J)/DX \\ \hline OT 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * & ETA(I, J) * (UW - U(I, J))/DX \\ \hline GO TO 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * & ETA(I, J) * (UW - U(I, J))/DX \\ \hline GO TO 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * & ETA(I, J) * (UW - U(I, J))/DX \\ \hline GO TO 425 \\ \hline IF(F(I, J+1) * NE * 5) & GO TO 425 \\ \hline PHI(I-1, J) = PHI(I, J) + GX * DX \\ \hline IF(F(I, J+1) * NE * 5) & GO TO 425 \\ \hline PHI(I-1, J) = PHI(I, J) + GX * DX \\ \hline IF(F(I, J+1) * NE * 5) & GO TO 425 \\ \hline PHI(I, J+1) = PHI(I, J) + GY * DY + 2 * & ETA(I, J) * V(I, J-1)/DY \\ \hline GO TO 427 \\ \hline IF(F(I, J+1) * NE * 5) & GO TO 427 \\ \hline PHI(I+J+1) = PHI(I, J) + (SFYG/W') * DY + 2 * & ETA(I, J) * (V(I, J-1) - VW)/DY \\ \end{array}$
0422 0423 0424 0429 0429 0429 0425 0425 0426 0427	$ \begin{array}{l} F(F(I+1, J) * NE * 1) & GO TO 422 \\ PHI(1+1, J) * PHI(I, J) + GX * DX + 2 * ETA(I, J) * U([-1, J]/DX \\ \hline O TO 423 \\ \hline PHI(1+1, J) = PHI(1, J) - (SFYG/W) * DX + 2 * ETA(I, J) * (U(I-1, J) - UW)/DX \\ \hline IF(F(I-1, J) = PHI(1, J) - GX * DX - 2 * TA(I, J) * U(I, J) / DX \\ \hline O TO 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/W) * DX + 2 * ETA(I, J) * (UW - U(I, J))/DX \\ \hline GQ TO 425 \\ \hline IF(F(I-1, J) = NE * 5) & GQ TO 429 \\ \hline PHI(I-1, J) = PHI(I, J) + (SFXG/W) * DX + 2 * ETA(I, J) * (UW - U(I, J))/DX \\ \hline GQ TO 425 \\ \hline IF(F(I-1, J) = NE * 5) & GQ TO 425 \\ \hline PHI(I-1, J) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) * NE * 5) & GQ TO 425 \\ \hline PHI(I-1, J) = PHI(I, J) + GX * DX \\ \hline IF(F(I, J+1) * NE * 5) & GQ TO 425 \\ \hline PHI(I, J+1) = PHI(I, J) + GX * DX \\ \hline IF(F(I, J+1) * NE * 1) & GU TO 427 \\ \hline PHI(I, J+1) = PHI(I, J) - (SFYG/W) * DY + 2 * ETA(I, J) * (V(I, J-1) - VW)/DY \\ \hline IF(F(I, J-1) * NE * 1) & GO TO 428 \\ \hline DUT(I, J-1) * NE * 1) & GO TO 428 \\ \hline DUT(I, J-1) * NE * 1) & OO TO 428 \\ \hline DUT(I, J-1) * DUT(I, D) = OX * DX \\ \hline DUT(I, J-1) * DUT(I, D) = OX * DX \\ \hline DUT(I, J-1) * DUT(I, D) = OX * DX \\ \hline DUT(I, J-1) * DUT(I, D) = OX * DX \\ \hline DUT(I, J-1) * DUT(I, D) = OX * DX \\ \hline DUT(I, J-1) * DUT(I, D) = OX * DX \\ \hline DUT(I, J-1) * DX \\ \hline DUT(I, J) = OX * DX $
0422 0423 0424 0429 0429 0425 0425 0425 0426	$ \begin{array}{l} F(F(I+1, J) * NE * 1) & GO TO 422 \\ PHI(1+1, J) * PHI(I, J) + GX * DX + 2 * & ETA(I, J) * U([-1, J]/DX \\ \hline OT M 423 \\ \hline PHI(1+1, J) = PHI(1, J) - (SFYG/W) * DX + 2 * & ETA(I, J) * (U(I-1, J) - UW)/DX \\ \hline IF(F(I-1, J) = PHI(1, J) - GX * DX - 2 * & ETA(I, J) * U(I, J)/DX \\ \hline OT M 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * & ETA(I, J) * (UW - U(I, J))/DX \\ \hline OF(M 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * & ETA(I, J) * (UW - U(I, J))/DX \\ \hline GO TO 425 \\ \hline IF(F(I, J+1) * NE * 0) & GO TO 425 \\ \hline PHI(1, -1, J) = PHI(1, J) - GX * DX \\ \hline IF(F(I, J+1) * NE * 0) & GO TO 425 \\ \hline PHI(1, -1, J) = PHI(1, J) - GX * DX \\ \hline IF(F(I, J+1) * NE * 1) & GC TO 426 \\ \hline PHI(1, J+1) = PHI(I, J) + GY * DY + 2 * & ETA(I, J) * V(I, J-1)/DY \\ \hline GO TO 427 \\ \hline IF(F(I, J+1) * NE * 1) & GO TO 427 \\ \hline PHI(1, J+1) = PHI(I, J) - (SFYG/W) * DY + 2 * & ETA(I, J) * (V(I, J-1) - VW)/DY \\ \hline If(F(I, J-1) * NE * 1) & GO TO 428 \\ \hline PHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline CO TO 427 \\ \hline IF(F(I, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline IF(F(I, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * V(I, J)/DY \\ \hline OT M 427 \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * UY \\ \hline DHI(1, J-1) = PHI(I, J) - GY * UY - 2 * & ETA(I, J) * UY \\ \hline DHI(1, J-1) = PHI(I, J) = & ETA(I, J) * UY \\ \hline DHI(I, J) = & ETA(I, J) * UY \\ \hline DHI(I$
0422 0423 0424 0429 0429 0425 0425 0426 0427	$ \begin{array}{l} \text{IF} \{F(I+1, J), NE, I\} & \text{GO TO } 422 \\ PHI(I+1, J) = PHI(I, J) + GX \div DX + 2, & \notin \text{ETA}(I, J) \times U(I-1, J) / DX \\ \text{IF} \{F(I+1, J) = PHI(I, J) - (SFYG/W/) \div DX + 2, & \notin \text{ETA}(I, J) \times (U(I-1, J) - UW) / DX \\ \text{IF} \{F(I-1, J) = PHI(I, J) - GX \div DX - 2, & & \notin \text{ETA}(I, J) \times U(I, J) / DX \\ \text{GO TO } 425 \\ \text{IF} \{F(I-1, J) = PHI(I, J) + GX \div DX - 2, & & & & & & \\ \text{F} \{F(I-1, J) = PHI(I, J) + (SFXG/W') \div DX + 2, & & & & \\ \text{F} \{F(I-1, J) = PHI(I, J) + (SFXG/W') \div DX + 2, & & & & \\ \text{F} \{F(I-1, J) = PHI(I, J) + (SFXG/W') \div DX + 2, & & & \\ \text{F} \{F(I-1, J) = PHI(I, J) + (SFXG/W') \div DX + 2, & & & \\ \text{F} \{F(I-1, J) = PHI(I, J) - GX \div DX \\ \text{IF} \{F(I-1, J) = PHI(I, J) - GX \div DX \\ \text{IF} \{F(I-1, J) = PHI(I, J) - GX \div DX \\ \text{IF} \{F(I, J+1) - NE, L\} \in U \in 16 \\ \text{C} TO \\ \text{C} TO$
0422 0423 0424 0429 0429 0425 0425 0426 0427 0428	$ \begin{array}{l} F(F(I+1, J) * NE * 1) & GO TO 422 \\ PHI(I+1, J) * PHI(I, J) + GX * DX + 2 * ETA(I, J) * U(I-1, J) / DX \\ O TO 423 \\ IF(F(I+1, J) = PHI(I, J) - (SFYG/W) * DX + 2 * ETA(I, J) * (U(I-1, J) - UW) / DX \\ IF(F(I-1, J) = PHI(I, J) - GX * DX - 2 * * TA(I, J) * U(I, J) / DX \\ O TO 425 \\ PHI(I-1, J) = PHI(I, J) + GX * DX - 2 * * TA(I, J) * U(I, J) / DX \\ O TO 425 \\ IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * ETA(I, J) * (UW - U(I, J)) / DX \\ O TO 425 \\ IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * ETA(I, J) * (UW - U(I, J)) / DX \\ O TO 425 \\ IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * ETA(I, J) * (UW - U(I, J)) / DX \\ O TO 425 \\ IF(F(I, J+1) = PHI(I, J) - GX * DX \\ IF(F(I, J+1) = PHI(I, J) - GX * DX \\ IF(F(I, J+1) = PHI(I, J) + GY * DY + 2 * ETA(I, J) * (V(I, J-1) / DY \\ O TO 427 \\ IF(F(I, J+1) * NE * 1) & O TO 427 \\ PHI(I, J-1) = PHI(I, J) - (SFYG/W') * DY + 2 * ETA(I, J) * (V(I, J-1) - VW) / DY \\ II(F(I, J-1) = PHI(I, J) - GY * UY - 2 * ETA(I, J) * (V(I, J) / DY \\ O TO 421 \\ IF(F(I, J-1) * DE + 1) (J + (SFFG/W') * DY + 2 * ETA(I, J) * (V(I, J) / DY \\ PHI(I, J-1) = PHI(I, J) + (SFFG/W') * DY + 2 * ETA(I, J) * (V(I, J) / DY \\ \end{array}$
0422 0423 0424 0429 0429 0425 0425 0426 0427 0428 0428	$ \begin{array}{l} F(F(I+1, J) * NE * 1) & GO TO 422 \\ PHI(I+1, J) = PHI(I, J) + GX & ETA(I, J) & U(I-1, J) / DX \\ IF(F(I+1, J) = PHI(I, J) - (SFYG / W') & DX + 2 * ETA(I, J) & U(I-1, J) - UW) / DX \\ IF(F(I-1, J) = PHI(I, J) - (SFYG / W') & DX + 2 * ETA(I, J) & U(I-1, J) - UW) / DX \\ IF(F(I-1, J) = PHI(I, J) - GX & ETA(I, J) & U(I, J) / DX \\ GO TO 425 \\ IF(F(I-1, J) * NE * 5) & GO TO 429 \\ PHI(I-1, J) = PHI(I, J) + (SFXG / W') & DX + 2 * ETA(I, J) & U(I, J) / DX \\ GO TO 425 \\ IF(F(I-1, J) * NE * 5) & GO TO 429 \\ PHI(I-1, J) = PHI(I, J) + (SFXG / W') & DX + 2 * ETA(I, J) & (UW - U(I, J)) / DX \\ GO TO 425 \\ IF(F(I-1, J) * NE * 5) & GO TO 425 \\ PHI(I-1, J) = PHI(I, J) - GX & DX \\ IF(F(I, J+1) * NE * 1) & CC TO 425 \\ PHI(I, J+1) = PHI(I, J) - GX & ETA(I, J) & V(I, J-1) / DY \\ GO TO 425 \\ IF(F(I, J+1) * NE * 5) & GO TO 427 \\ IF(F(I, J+1) * NE * 5) & GO TO 427 \\ IF(F(I, J+1) * NE * 1) & GO TO 428 \\ PHI(I, J-1) = PHI(I, J) - (SFYG / M') & DY + 2 * ETA(I, J) & (V(I, J-1) - VW) / DY \\ II(F(I, J-1) * NE * 1) & GO TO 421 \\ PHI(I, J-1) = PHI(I, J) + (SFYG / M') & DY + 2 * ETA(I, J) & (V(I, J) / DY \\ PHI(I, J-1) = PHI(I, J) + (SFYG / M') & DY + 2 * ETA(I, J) & (V(I, J) / DY \\ PHI(I, J-1) = PHI(I, J) + (SFYG / M') & DY + 2 * ETA(I, J) & (V(I, J) / DY \\ PHI(I, J-1) = PHI(I, J) + (SFYG / M') & DY + 2 * ETA(I, J) & (V(I, J) / DY \\ PHI(I, J) = (I, -FY) & PHI(I, J) + FX & (I, -FY / 2 * ) & PHI(I+M, J) \\ \end{array}$
0422 0423 0424 0429 0429 0425 0425 0425 0426 0427 0428 0421	$ \begin{array}{l} F(F(I+1, J) * NE * 1) & GO TO 422 \\ PHI(1+1, J) * PHI(I, J) + GX & ETA(I, J) & U(I-1, J) / DX \\ \hline O TO 423 \\ \hline PHI(1+1, J) & PHI(I, J) - (SFYG/W/) & DX + 2 * ETA(I, J) & U(I-1, J) - UW) / DX \\ \hline IF(F(I-1, J) & PHI(I, J) - GX & ETA(I, J) & U(I, J) / DX \\ \hline O TO 425 \\ \hline PHI(I-1, J) & PHI(I, J) - GX & ETA(I, J) & U(I, J) / DX \\ \hline O TO 425 \\ \hline IF(F(I-1, J) & NE & S) & OO TO 429 \\ PHI(I-1, J) & PHI(I, J) + (SFXG/W') & DX + 2 & ETA(I, J) & U(I, J) / DX \\ \hline O TO 425 \\ \hline IF(F(I-1, J) & NE & S) & OO TO 429 \\ PHI(I-1, J) & PHI(I, J) + (SFXG/W') & DX + 2 & ETA(I, J) & UW - U(I, J) / DX \\ \hline O O TO 425 \\ \hline PHI(I-1, J) & PHI(I, J) + (SFXG/W') & DX + 2 & ETA(I, J) & UW - U(I, J) / DX \\ \hline O O TO 425 \\ \hline PHI(I-1, J) & PHI(I, J) - GX & DX \\ \hline IF(F(I, J+1) & NE & S) & OO TO 425 \\ \hline PHI(I, J+1) & PHI(I, J) - GY & ETA(I, J) & V(I, J-1) / DY \\ \hline O O TO 427 \\ \hline IF(F(I, J+1) & NE & S) & OO TO 427 \\ \hline IF(F(I, J+1) & NE & S) & OO TO 428 \\ \hline PHI(I, J-1) & = PHI(I, J) - (SFYG/W') & DY + 2 & & ETA(I, J) & V(I, J-1) - VW / DY \\ \hline If(F(I, J-1) & NE & S) & OC TO 421 \\ \hline PHI(I, J-1) & = PHI(I, J) - (SFYG/W') & DY + 2 & & & & & & & & & \\ \hline O TO 421 \\ \hline If(F(I, J-1) & NE & S) & OC TO 421 \\ \hline PHI(I, J) & = (1, -FX) & & & & & & & & & & & & \\ \hline PHI(I, J) & = (1, -FX) & & & & & & & & & & & & & & & & \\ \hline PHI(I, J) & = (1, -FX) & & & & & & & & & & & & & & & & & & &$
0422 0423 0424 0429 0429 0425 0425 0425 0426 0427 0428 0421 0428	$ \begin{array}{l} F(F(I+1, J) * NE * 1) & GO TO 422 \\ PHI(1+1, J) * PHI(I, J) + GX * DX + 2 * ETA(I, J) * U(I-1, J) / DX \\ \hline O TO 423 \\ \hline PHI(1+1, J) = PHI(I, J) - (SFYG/W) * DX + 2 * ETA(I, J) * (U(I-1, J) - UW) / DX \\ \hline IF(F(I-1, J) = PHI(I, J) - GX * DX - 2 * * TA(I, J) * U(I, J) / DX \\ \hline O TO 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + GX * DX - 2 * * TA(I, J) * U(I, J) * U(I, J) / DX \\ \hline GO TO 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * ETA(I, J) * (UW - U(I, J)) / DX \\ \hline GO TO 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/W') * DX + 2 * ETA(I, J) * (UW - U(I, J)) / DX \\ \hline GO TO 425 \\ \hline PHI(I-1, J) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) * NE * 6) & CO TO 425 \\ PHI(I, J+1) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) * NE * 6) & CO TO 425 \\ PHI(I, J+1) = PHI(I, J) - GY * DY + 2 * ETA(I, J) * V(I, J-1) / DY \\ \hline GO TO 427 \\ \hline IF(F(I, J+1) * NE * 1) & GO TO 428 \\ PHI(I, J-1) = PHI(I, J) - (SFYG/MF) * DY + 2 * ETA(I, J) * (V(I, J-1) - VW) / DY \\ \hline IF(F(I, J-1) * NE * 1) & GO TO 428 \\ PHI(I, J-1) = PHI(I, J) - GY * UY - 2 * ETA(I, J) * V(I, J) / DY \\ \hline GO TO 421 \\ \hline IF(F(I, J-1) * NE * 5) & GF TO 421 \\ \hline PHI(I, J) = (1 - FX) * (1 - FY) * PHI(I, J) + FX * (1 - FY/2 * PHI(I + M, J)) \\ * FY * (1 - FX) * (1 - FY) * PHI(I, J) + FX * (1 - FY/2 * PHI(I + M, J)) \\ * FY * (1 - FX) * (1 - FY) * PHI(I, J) + FX * (1 - FY/2 * PHI(I + M, J)) \\ \hline CONTINUE \\ \hline $
0422 0423 0424 0429 0429 0429 0425 0426 0427 0428 0421 0428 0421	$ \begin{array}{l} F(F(I+1, J) * NE * 1) & GO TO 422 \\ PHI(1+1, J) * PHI(I, J) * GX * DX * 2 * & ETA(I, J) * U(I-1, J) / DX \\ \hline O TO 423 \\ \hline PHI(I+1, J) = PHI(I, J) - (SFYG/M') * DX + 2 * & ETA(I, J) * (U(I-1, J) - UM) / DX \\ \hline IF(F(I-1, J) = PHI(I, J) - GX * DX - 2 * & ETA(I, J) * U(I, J) / DX \\ \hline O TO 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + GX * DX + 2 * & ETA(I, J) * U(I, J) * (UH - U(I, J)) / DX \\ \hline GO TO 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/H') * DX + 2 * & ETA(I, J) * (UH - U(I, J)) / DX \\ \hline GO TO 425 \\ \hline IF(F(I-1, J) = PHI(I, J) + (SFXG/H') * DX + 2 * & ETA(I, J) * (UH - U(I, J)) / DX \\ \hline GO TO 425 \\ \hline IF(F(I, J+1) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) = PHI(I, J) - GX * DX \\ \hline IF(F(I, J+1) = PHI(I, J) - (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J-1) - VM) / DY \\ \hline II(I(F(I, J-1) * NE * 5) & GC TO 421 \\ \hline IF(F(I, J-1) = PHI(I, J) - (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J-1) = PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J-1) = PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J-1) = PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J-1) = PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J-1) = PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J-1) = PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J-1) = PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J) = (1 - FX) * (1 - FY) * PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J) = (1 - FX) * (1 - FY) * PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (V(I, J) / DY \\ \hline PHI(I, J) = (1 - FX) * (1 - FY) * PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * (VF + V(I, J)) / DY \\ \hline PHI(I, J) = (1 - FX) * (1 - FY) * PHI(I, J) + (SFYG/MF) * DY + 2 * & ETA(I, J) * DY + DY$
0422 0423 0423 0424 0429 0429 0429 0425 0427 0428 0427 0428 0421 0420 C C	$ \frac{1}{1} 1$
0422 0423 0424 0429 0425 0425 0425 0425 0427 0426 0427 0428 0421 0420 C C	IF (F (I + 1, J) = PH (I, J) + GX + DX + 2. * ETA(I, J) * U(I-1, J)/DX PH (I + 1, J) = PH (I, J) + GX + DX + 2. * ETA(I, J) * U(I-1, J) - UM)/DX IF (F (I - 1, J) = PH (I, J) - (SF YG / M') * DX + 2. * ETA(I, J) * (U(I-1, J) - UM)/DX IF (F (I - 1, J) = PH (I, J) - GX + DX - 2. * ETA(I, J) * U(I, J) / DX GG TG 425 IF (F (I - 1, J) = PH (I, J) + (SF XG / M') * DX + 2. * ETA(I, J) * (UM - U(I, J))/DX GG TG 425 IF (F (I - 1, J) = PH (I, J) + (SF XG / M') * DX + 2. * ETA(I, J) * (UM - U(I, J))/DX GG TG 425 IF (F (I - 1, J) = PH (I, J) + (SF XG / M') * DX + 2. * ETA(I, J) * (UM - U(I, J))/DX GG TG 425 IF (F (I - 1, J) = PH (I, J) - GX * DX IF (F (I - 1, J) = PH (I, J) - GX * DX IF (F (I, J + 1) NE + 1) GU TU 426 PH I(1, J + 1) = PH (I, J) + GY + DY + 2. * ETA(I, J) * (V(I, J - 1) / DY GO TG 427 IF (F (I, J + 1) NE + 1) GU TU 427 PH I(I, J - 1) = PH (I, J) - (SF YG / M') * DY + 2. * ETA(I, J) * (V(I, J - 1) - VW) / DY II (F (I, J - 1) NE + 1) GO TU 428 PH I(I, J - 1) = PH I(I, J) - (SF YG / M') * DY + 2. * ETA(I, J) * (V(I, J - 1) - VW) / DY II (F (I, J - 1) NE + 1) GO TU 428 PH I(I, J - 1) = PH I(I, J) + (SF YG / M') * DY + 2. * ETA(I, J) * (V(I, J - 1) - VW) / DY II (F (I, J - 1) NE + 1) GO TU 421 PH I(I, J - 1) = PH I(I, J) + (SF YG / M') * DY + 2. * ETA(I, J) * (VK - V(I, J) / DY PH I(I, J - 1) = PH I(I, J) + (SF YG / M') * DY + 2. * ETA(I, J) * (VK - V(I, J) / DY PH I(I, J) = (1 FX) * (1 FY) * PH I(I, J) + FX * (1 FY / 2. ) * PH I(I + M, J) * + FY * (1 FX / 2. ) * PH I(I, J + N) CONTINUE PEGION 40 PRESSURE DENSITY CALCULATIONS
0422 0423 0424 0429 0429 0425 0425 0425 0427 0426 0427 0428 0421 0420 C C C C C 400 401	IF(F(I+1, J)=PHI(I, J)+GX=DX+2.*ETA(I, J)*U(I-1, J)/DX         OT(V 423         IF(F(I+1, J)=PHI(I, J)-(SFYG/W/)*DX+2.*ETA(I, J)*(U(I-1, J)-UW)/DX         IF(F(I-1, J), NE.1) GO TO 423         PHI(I-1, J)=PHI(I, J)-GX+DX-2.*ETA(I, J)*(U(I-1, J)-UW)/DX         IF(F(I-1, J), NE.1) GO TO 424         PHI(I-1, J)=PHI(I, J)-GX+DX-2.*ETA(I, J)*(U(I-1, J)/DX         GO TO 425         IF(F(I-1, J), NE.5) GO TO 429         PHI(I-1, J)=PHI(I, J)+(SFXG/W1)*DX+2.*ETA(I, J)*(UW-U(I, J))/DX         GO TO 425
0422 0423 0424 0429 0429 0425 0425 0425 0427 0426 0427 0428 0421 0420 0420 0 0420 0 0 0 401	IF(F(I+I,J).NE.1) GU TO 422 PHI(I+I,J)=PHI(I,J)+GX+DX+2.*ETA(I,J)*U(I-1.J)/DX IF(F(I+I,J).NE.5) GD TO 423 PHI(I+I,J)=PHI(I,J)-(SFYG/WP)*DX+2.*ETA(I,J)*(U(I-1.J)-UW)/DX IF(FF(I-1,J).NE.1) GD TO 424 PHI(I-1.J)=PHI(I,J)-GX+DX-2.*ETA(I,J)*U(I,J)/DX GU TO 425 IF(FF(I-1,J).NE.5) GD TO 429 PHI(I-1,J)=PHI(I,J)+(SFXG/WP)*DX+2.*ETA(I,J)*(UW-U(I,J))/DX GO TO 425 IF(FF(I-1,J).NE.6) GO TO 425 PHI(I-1,J)=PHI(I,J)+(SFXG/WP)*DX+2.*ETA(I,J)*(UW-U(I,J))/DX GO TO 425 IF(FF(I,J+1).NE.6) GO TO 425 PHI(I-1,J)=PHI(I,J)-GX*DX IF(FF(I,J+1).NE.6) GO TO 425 PHI(I,J+1)=PHI(I,J)+GY+DY+2.*ETA(I,J)*(V(I,J-1)/DY GO TO 427 PHI(I,J+1)=PHI(I,J)-(SFYG/WP)*DY+2.*ETA(I,J)*(V(I,J-1)-VW)/DY If(FF(I,J+1).NE.1) GO TO 428 PHI(I,J-1)=PHI(I,J)-(SFYG/WP)*DY+2.*ETA(I,J)*(V(I,J)/DY GO TO 421 IF(FF(I,J-1).NE.5) GC TO 421 PHI(I,J-1)=PHI(I,J)+(SFYG/WP)*DY+2.*ETA(I,J)*(V(I,J)/DY PHI(I,J-1)=PHI(I,J)+(SFYG/WP)*DY+2.*ETA(I,J)*(V(I,J)/DY PHI(I,J-1)=PHI(I,J)+(SFYG/WP)*DY+2.*ETA(I,J)*(V(I,J)/DY PHI(I,J-1)=PHI(I,J)+(SFYG/WP)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J-1)=PHI(I,J)+(SFYG/WP)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J-1)=PHI(I,J)+(SFYG/WP)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J-1)=PHI(I,J)+(SFYG/WP)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J-1)=PHI(I,J)+(SFYG/WP)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J-1)=PHI(I,J)+(SFYG/WP)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)=(1FX)*(1FY)*PHI(I,J)+FX*(1FY)2.)*PHI(I+M,J) **FY*(1FX/2.)*PHI(I,J*N) CONTINUE REGION 40 PRESSURE DENSITY CALCULATIONS IC=0 CON*AX=0.6 UO 402 IFFN=1,10
0422 0423 0423 0424 0429 0425 0425 0425 0425 0426 0427 0428 0421 0428 0421 0420 C C C C C C C	IF(F(I+I,J).NE.1) GU TO 422 PHI(I+I,J)=PHI(I,J)+GX+DX+2.*ETA(I,J)*U(I-1.J)/DX IF(F(I+I,J).NE.5) GD TO 423 PHI(I+I.J)=PHI(I,J)-(SFYG/WP)*DX+2.*ETA(I.J)*(U(I-1.J)-UW)/DX IF(F(I-I.J).NE.1) GD TO 424 PHI(I-1.J)=PHI(I,J)-GX*DX-2.*ETA(I.J)*(U(I,J)/DX GQ TO 425 IF(F(I-1.J).NE.5) GD TO 429 PHI(I-1.J)=PHI(I,J)+(SFXG/WT)*DX+2.*ETA(I.J)*(UW-U(I,J))/DX GQ TO 425 IF(F(I-1.J).NE.5) GD TO 425 PHI(I-1.J)=PHI(I.J)-GX*DX IF(F(I.J+I).NE.5) GD TO 425 PHI(I-1.J)=PHI(I.J)-GX*DX IF(F(I.J+I).NE.1) GU TO 425 PHI(I-1.J)=PHI(I.J)-GX*DX IF(F(I.J+I).NE.5) GD TD 427 PHI(I.J+I)=PHI(I.J)-GX*DY IF(F(I.J+I).NE.5) GD TD 427 PHI(I.J+I)=PHI(I.J)-(SFYG/WF)*DY+2.*ETA(I.J)*(V(I.J-1)/VW)/DY If(F(I.J-I).NE.5) GD TD 428 PHI(I.J-1)=PHI(I.J)-GY*UY-2.*ETA(I.J)*(V(I.J-1)/VW)/DY If(F(I.J-1).NE.5) GD TD 421 PHI(I.J-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.J)*(V(I.J)/DY GQ TO 421 IF(F(I.J-1).NE.5) GD TD 421 PHI(I.J-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.J)*(V(I.J)/DY PHI(I.J)-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.J)*(VH-V(I.J))/DY PHI(I.J)-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.J)*(VH-V(I.J))/DY PHI(I.J)-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.J)*(VH-V(I.J))/DY PHI(I.J)-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.J)*(VH-V(I.J))/DY PHI(I.J)-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.J)*(VH-V(I.J))/DY PHI(I.J)-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.J)*(VH-V(I.J))/DY PHI(I.J)-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.J)*(VH-V(I.J))/DY PHI(I.J)-1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.D)*(VH-V(I.J))/DY PHI(I.J)=1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.D)*(VH-V(I.J))/DY PHI(I.J)=1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.D)*(VH-V(I.J))/DY PHI(I.J)=1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.D)*(VH-V(I.J))/DY PHI(I.J)=1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.D)*(VH-V(I.J))/DY PHI(I.J)=1)=PHI(I.J)+(SFYG/WF)*DY+2.*ETA(I.D)*(VH-V(I.J))/DY PHI(I.J)=1)=PHI(I.J)+N) CONTINUE PHON A00 PRESSURE DENSITY CALCULATIONS IC=0 CONWAX=0.G DD 403 J=2.JRAK1
0422 0423 0423 0424 0429 0429 0425 0425 0426 0427 0428 0421 0420 C C C C C 400 401	IF(F(F(1+1,J)+E) GU TO 422 PHI(1+1,J)=PHI(1,J)+GX+DX+2.*ETA(1,J)*U(1-1,J)/DX IF(F(1-1,J)+K*5) GU TO 423 PHI(1+1,J)=PHI(1,J)-(SFYG/M/)*DX+2.*ETA(1,J)*U(1-1,J)-UM)/DX IF(F(1-1,J)=PHI(1,J)-GX+DX-2.*ETA(1,J)*U(1,J)/DX GU TO 425 IF(F(1-1,J)=NE.5) GU TO 429 PHI(1-1,J)=PHI(1,J)+(SFXG/W1)*DX+2.*ETA(1,J)*(UM-U(1,J))/DX GU TO 425 IF(F(1-1,J)=NE.5) GU TO 425 PHI(1-1,J)=PHI(1,J)-GX+DX IF(F(1,J+1)=NE.1) GU TO 425 PHI(1-1,J)=PHI(1,J)+GY+DY+2.*ETA(1,J)*V(1,J-1)/DY GU TO 427 IF(F(1,J+1)=NE.1) GU TO 425 PHI(1,J+1)=PHI(1,J)+GY+DY+2.*ETA(1,J)*V(1,J-1)-VW)/DY If(F(1,J+1)=NE.1) GU TO 428 PHI(1,J-1)=PHI(1,J)-GX+UY-2.*ETA(1,J)*V(1,J)/DY GU TO 427 IF(F(1,J-1)=PHI(1,J)-GY+UY-2.*ETA(1,J)*V(1,J)/DY GU TO 421 IF(F(1,J-1)=PHI(1,J)+(SFYG/W')*DY+2.*ETA(1,J)*(V(1,J)/DY GU TO 421 IF(F(1,J-1)=PHI(1,J)+(SFYG/W')*DY+2.*ETA(1,J)*(1,J)/DY PHI(1,J-1)=PHI(1,J)+(SFYG/W')*DY+2.*ETA(1,J)*(V,h-V(1,J)/DY PHI(1,J-1)=PHI(1,J)+(SFYG/W')*DY+2.*ETA(1,J)*(V,h-V(1,J)/DY PHI(1,J)=(1FX)*(1FY)*PHI(1,J)+FX*(1FY/2.)*PHI(1+M,J) **FY*(1FX/2.)*PHI(1,J+N) CONTINUE REGION 40 PRESSURE DENSITY CALCULATIONS IC=0 CONMAX=0.6 DO 402 ITFN=1,10 DO 403 I=2.FAARI PHI 403 I=2.FAARI
0422 0423 0423 0424 0429 0425 0425 0425 0425 0426 0427 0428 0421 0420 C C C C 400 401	IF(F(F(1,1,1)=PHI(1,1)+Gx+Dx+2,*ETA(1,1)*U(1-1,1)/DX GO TO 423 FH([1+1, J)=PHI(1, J)-(SFYG/W/)*DX+2.*ETA(1, J)*(U(1-1, J)-UW)/DX IF(F(F(1-1, J)=PHI(1, J)-(SFYG/W/)*DX+2.*ETA(1, J)*(U(1-1, J)-UW)/DX GO TO 425 FF(F(1-1, J)=PHI(1, J)-(SX+DX-2.*ETA(1, J)*(UH-U(1, J))/DX GO TO 425 FF(F(1-1, J)=PHI(1, J)+(SFXG/W')*DX+2.*ETA(1, J)*(UH-U(1, J))/DX GO TO 425 FF(F(1-1, J)=PHI(1, J)+(SFXG/W')*DX+2.*ETA(1, J)*(UH-U(1, J))/DX GO TO 425 FF(F(1, J)=PHI(1, J)-GX+DX IF(F(1, J+1)=PHI(1, J)-GX+DX IF(F(1, J+1)=PHI(1, J)+GY+DY+2.*ETA(1, J)*(U(1, J-1)/DY GO TO 425 FHI(1, J+1)=PHI(1, J)-(SFYG/W/)*DY+2.*ETA(1, J)*(V(1, J-1)/DY GO TO 427 FF(F(1, J+1)=PHI(1, J)-(SFYG/W/)*DY+2.*ETA(1, J)*(V(1, J)/DY If(F(1, J-1)=PHI(1, J)-(SFYG/W/)*DY+2.*ETA(1, J)*(V(1, J)/DY GO TO 421 IF(F(1, J-1)=PHI(1, J)-(SFYG/W/)*DY+2.*ETA(1, J)*(V(1, J)/DY PHI(1, J-1)=PHI(1, J)+(SFYG/W/)*DY+2.*ETA(1, J)*(V(1, J)/DY GO TO 421 FF(F(1, FX)=(1, -FY)=1, 10 CONTINUE PREGION 40 PRESSURE DENSITY CALCULATIONS IC=0 CON*Ax=0.6 UO 402 (IFFN=1, 10 D) 403 J=2, JRAR1 IF(F(1, J)-NF,22) D) T 403 FF(F(1, J)-NF,22) D T 403 FF(F(1, J)-NF,22) D T 403
0422 0423 0424 0429 0429 0425 0425 0427 0427 0427 04227 0422 0421 0420 C C C C C C C C C	IF(F([1+1, J)=PHI(1, J)+GX *DY +2. *ETA(1, J)*U(1-1, J)/DX GO TO 423 IF(F(1+1, J)=PHI(1, J)-GX *DY +2. *ETA(1, J)*U(1-1, J)-UM)/DX IF(F(1-1, J)=PHI(1, J)-GX *DY +2. *ETA(1, J)*U(1, J)/DX GO TO 425 IF(F(1-1, J)=PHI(1, J)-GX *DY +2. *ETA(1, J)*U(1, J)/DX GO TO 425 IF(F(1-1, J)=PHI(1, J)+(SFXG/M')*DX +2. *ETA(1, J)*(UW-U(1, J))/DX GO TO 425 IF(F(1-1, J)=PHI(1, J)+(SFXG/M')*DX +2. *ETA(1, J)*(UW-U(1, J))/DX GO TO 425 IF(F(1-1, J)=PHI(1, J)-GX *DY IF(F(1, J+1),NE.6) GO TO 425 PHI(1-1, J)=PHI(1, J)=GX *DY IF(F(1, J+1),NE.6) GO TO 425 PHI(1, J+1)=PHI(1, J)=GX *DY GO TO 427 IF(F(1, J+1),NE.5) GO TO 427 PHI(1, J+1)=PHI(1, J)=(SFYG/M')*DY +2. *ETA(1, J)*(V(1, J-1)-VW)/DY If(F(1, J+1),NE.5) GO TO 427 PHI(1, J-1)=PHI(1, J)=(SFYG/M')*DY +2. *ETA(1, J)*(V(1, J)-1)-VW)/DY If(F(1, 1-1)=PHI(1, J)=(SFYG/M')*DY +2. *ETA(1, J)*(V(1, J)/DY GO TO 421 IF(F(1, 1-1)=NE.5) GC TO 421 PHI(1, J)=(1.=FY)*(1.=FY)*PHI(1, J)+FX*(1.=FY/2.)*PHI(1+M, J) *+FY*(1.=FX)*(1.=FY)*PHI(1, J)+FX*(1.=FY/2.)*PHI(1+M, J) *+FY*(1.=FX)*(1.=FY)*PHI(1, J)+FX*(1.=FY/2.)*PHI(1+M, J) PHI(1, J)=(1.=FX)*(1.=FY)*PHI(1, J)+FX*(1.=FY/2.)*PHI(1+M, J) PHI(1, J)=(1.=FX)*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(1+M, J) PHI(1, J)=(1.=FX)*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(1+M, J) PHI(1, J)=(1.=FX)*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(1+M, J) PHI(1, J)=(1.=FX)*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*FX*(1.=FY)*PHI(2.)*F
0422 0423 0424 0429 0425 0425 0425 0425 0427 0426 0427 0422 0422 0421 0420 C C C C 400 401	IF (F(1+1, J) = PHI (1, J) + GX + DX + 2. * ETA(1, J) * U(1-1, J) / DX SO TO 423 IF (F(1+1, J) = PHI (1, J) - (SF YG / M') * DX + 2. * ETA(1, J) * U(1-1, J) - UM) / DX IF (F(1-1, J) = PHI (1, J) - (SF YG / M') * DX + 2. * ETA(1, J) * U(1, J) / DX GO TO 425 IF (F(1-1, J) = PHI (1, J) - (SF XG / M') * DX + 2. * ETA(1, J) * (UM - U(1, J) / DX GO TO 425 IF (F(1-1, J) = PHI (1, J) + (SF XG / M') * DX + 2. * ETA(1, J) * (UM - U(1, J) / DX GO TO 425 IF (F(1-1, J) = PHI (1, J) + (SF XG / M') * DX + 2. * ETA(1, J) * (UM - U(1, J) / DX GO TO 425 IF (F(1-1, J) = PHI (1, J) + (SF XG / M') * DX + 2. * ETA(1, J) * (UM - U(1, J) / DX GO TO 425 IF (F(1, J+1) = PHI (1, J) - GX * DX IF (F(1, J+1) = PHI (1, J) - GX * DX IF (F(1, J+1) = PHI (1, J) - GY * DY + 2. * ETA(1, J) * (V(1, J-1) / DY GO TO 427 IF (F(1, J+1) = PHI (1, J) - (SFYG / M') * DY + 2. * ETA(1, J) * (V(1, J-1) / DY GO TO 421 IF (F(1, J-1) = PHI (1, J) - (SFYG / M') * DY + 2. * ETA(1, J) * (V(1, J-1) / DY GO TO 421 IF (F(1, J-1) = PHI (1, J) - (SFYG / M') * DY + 2. * ETA(1, J) * (V(1, J) / DY PHI (1, J) = PHI (1, J) - (SFYG / M') * DY + 2. * ETA(1, J) * (V(1, J) / DY PHI (1, J) = PHI (1, J) + (SFYG / M') * DY + 2. * ETA(1, J) * (V(1, J) / DY PHI (1, J) = PHI (1, J) + (SFYG / M') * DY + 2. * ETA(1, J) * (V(1, J) / DY PHI (1, J) = PHI (1, J) + (SFYG / M') * DY + 2. * ETA(1, J) * (V(1, J) / DY PHI (1, J) = (L - FX) * (L - FY) * PHI (1, J) + FX * (L - FY / 2. ) * PHI (1, J) / DY PHI (1, J) = (L - FX) * (L - FY) * PHI (1, J) + FX * (L - FY / 2. ) * PHI (1, J) / DY PHI (1, J) = (L - FX) * (L - FY) * PHI (1, J) + FX * (L - FY / 2. ) * PHI (1, J) / DY PHI (1, J) = (L - FX) * (L - FY) * PHI (1, J) + FX * (L - FY / 2. ) * PHI (1, J) + M * J) REGION 40 PRESSURE DENSITY CALCULATIONS IC=0 CONM*AX=0.6 DO 403 J= 2. FARA1 DI 403 J= 2. FARA1 DI 403 J= 2. FARA1 DI 403 I=
0422 0423 0424 0429 0429 0425 0425 0425 0427 0426 0427 0428 0421 0420 C C C C C 400 401	IF(F(I+1, J)=PHI(I, J)+GX=DY+2, *ETA(I, J)*U(I-1, J)/DX GO TO 423 IF(F(I+1, J)=PHI(I, J)+GX=DY+2, *ETA(I, J)*U(I-1, J)=UH)/DX IF(F(I-1, J)=PHI(I, J)=CYFG/HV)*DX+2.*ETA(I, J)*U(I-1, J)=UH)/DX IF(F(I-1, J)=PHI(I, J)=CYFG/HV)*DX+2.*ETA(I, J)*U(I, J)/DX GO TO 425 IF(F(I-1, J)=PHI(I, J)+(SFXG/HV)*DX+2.*ETA(I, J)*(UH-U(I, J))/DX GG TO 425 IF(F(I-1, J)=PHI(I, J)+(SFXG/HV)*DX+2.*ETA(I, J)*(UH-U(I, J))/DX GG TO 425 IF(F(I-1, J)=PHI(I, J)=CYEDY IF(F(I, J)=DHI(I, J)=CYEDY IF(F(I, J)=DHI(I, J)=CYEDY IF(F(I, J)=DHI(I, J)=CYEDY GG TO 425 PHI(I, J+1)=PHI(I, J)=CYEDY IF(F(I, J)=DHI(I, J)=CYEDY IF(F(I, J)=DHI(I, J)=CYEDY/HV)*DY+2.*ETA(I, J)*(V(I, J-1)-VH)/DY GG TO 427 IF(F(I, J)=DHI(I, J)=CYEDY/HV)*DY+2.*ETA(I, J)*(V(I, J-1)-VH)/DY IF(F(I, J)=DHI(I, J)=CYEDY/HV)*DY+2.*ETA(I, J)*(V(I, J)/DY GG TO 421 IF(F(I, J)=DHI(I, J)=CYEDY/HV)*DY+2.*ETA(I, J)*(V(I, J)/DY GG TO 421 IF(F(I, J)=DHI(I, J)=CYEDY/HV)*DY+2.*ETA(I, J)*(V(I, J)/DY PHI(I, J)=DHI(I, J)+(SFYG/MV)*DY+2.*ETA(I, J)*(V(I, J)/DY PHI(I, J)=DHI(I, J)+(J)+(J)+(J)+(J)+(J)+(J)+(J)+(J)+(J)+(
0422 0423 0424 0429 0429 0425 0425 0425 0427 0427 0428 0421 0420 C C C C C C 400 401	IF(F(I+1,J).NE.1) GU TO 422 PHI(I+1,J).NE.5) GD TO 422 IF(F(I+1,J).NE.5) GD TO 423 IF(F(I+1,J).NE.1) GG TO 424 PHI(I-1,J).PHI(I,J)-GX*DX-2.*ETA(I,J)*(U(I-1,J)-UM)/DX IF(F(I-1,J).PHI(I,J)-GX*DX-2.*ETA(I,J)*U(I,J)/DX GO TO 425 IF(F(I-1,J).PHI(I,J)-GX*DX-2.*ETA(I,J)*(UM-U(I,J))/DX GO TO 425 IF(F(I-1,J).PHI(I,J)-GX*DX-2.*ETA(I,J)*(UM-U(I,J))/DX GO TO 425 IF(F(I-1,J).PHI(I,J)-GX*DX-2.*ETA(I,J)*(UM-U(I,J))/DX GO TO 425 IF(F(I,J).PHI(I,J)-GX*DX IF(F(I,J).PHI(I,J)-GX*DX IF(F(I,J).PHI(I,J)-GX*DX IF(F(I,J).PHI(I,J)-GX*DX IF(F(I,J).PHI(I,J)-GX*DX IF(F(I,J).PHI(I,J)-GX*DX IF(F(I,J+1).NE.1) GC TO 425 PHI(I,J-1).PHI(I,J)-GX*DX IF(F(I,J-1).NE.1) GC TO 427 PHI(I,J-1).PHI(I,J)-GX*DY+2.*ETA(I,J)*(V(I,J)-1)-VW)/DY IF(F(I,J-1).NE.1) GO TO 428 PHI(I,J-1)-PHI(I,J)-GY*UY-2.*ETA(I,J)*(V(I,J)/DY GO TO 421 IF(F(I,J-1).NE.1) GC TO 428 PHI(I,J-1)-PHI(I,J)-GX*UY-2.*ETA(I,J)*(V(I,J)/DY GO TO 421 IF(F(I,J-1).NE.1) GC TO 421 PHI(I,J-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-1)-PHI(I,J)+(SFGG/W)*DY+2.*ETA(I,J)*(VK-V(I,J))/DY PHI(I,J)-NE.2) OD T` 403 IEC=0 CONMAXE0.C DO 403 J=2.JBARAI PDI 403 J=2.JBARAI PDI 403 J=2.JBARAI PDI 403 J=2.JBARAI PDI 403 I=2.HARAI PDI 404 I=2.HARAI PDI 405 I=2.HARAI PDI 405 I=2.HARAI PDI 404 I=2
0422 0423 0423 0424 0429 0425 0425 0425 0426 0427 0428 0421 0428 0421 0420 C C C C C C C C C C C C C C C C C C C	IF(F(I+1,J)*PH(I,J)*G×E) GO TO 422 SO TO 423 IF(F(I+1,J)*PH(I,J)*G×E) GO TO 423 PHI(I+1,J)*PH(I,J)=PHI(I,J)*G×E) Z*ETA(I,J)*U(I-1,J)*U(I-1,J)-UM)/DX IF(F(I-1,J)*PHI(I,J)=GX*DX-2.*ETA(I,J)*U(I,J)/DX GO TO 425 IF(F(I-1,J)*PHI(I,J)+G×E) GO TO 429 PHI(I-1,J)=PHI(I,J)+(SFXG/M*)*DX+2.*ETA(I,J)*(UM-U(I,J))/DX GO TO 425 IF(F(I-1,J)*PHI(I,J)+(SFXG/M*)*DX+2.*ETA(I,J)*(UM-U(I,J))/DX GO TO 425 IF(F(I-1,J)*PHI(I,J)=GX*DX IF(F(I,J)*PHI(I,J)=C) GU TO 427 PHI(I-1,J)=PHI(I,J)=C) GU TO 426 PHI(I-1,J)=PHI(I,J)=GX*DX IF(F(I,J+1)*NE.5) GD TD 427 PHI(I-1,J)=PHI(I,J)=GYFG/M*)*DY+2.*ETA(I,J)*(V(I,J-1)-VW)/DY IF(F(I,J-1)*NE.1) GO TO 428 PHI(I,J-1)=PHI(I,J)=GYFG/M*)*DY+2.*ETA(I,J)*(V(I,J)/DY GO TO 427 IF(F(I,J-1)*NE.1) GO TO 428 PHI(I,J-1)=PHI(I,J)+(SFYG/M*)*DY+2.*ETA(I,J)*(V(I,J)/DY GO TO 421 IF(F(I,J-1)*NE.5) GC TO 421 PHI(I,J-1)=PHI(I,J)+(SFYG/M*)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PHI(I,J-1)=PHI(I,J)+(SFYG/M*)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PHI(I,J-1)=PHI(I,J)+(SFYG/M*)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PHI(I,J-1)=PHI(I,J)+(SFYG/M*)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PHI(I,J)=I1.=FX/2.)*PHI(I,J)+(SFYG/M*)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PHI(I,J)=I1.=FX/2.)*PHI(I,J+N) CONTIAUE PEGION 40 PRESSURE DENSITY CALCULATIONS IC=0 CON*AX=0.6 DD 403 J=2,JRAR1 DD 403 J=2,JRAR1 DD 403 J=2,JRAR1 DD 403 I=2,IRAR1 DD 405 IFEN=1,10 DD 407 I=21 GB TC 405 IF(F(I+J),NE.5) GB TC 405 IF(F(I+J),NE.5) GB TC 405 IF(I+I,J)*NE.5) GB TC 405 IF(I+I+J)*NE.5) GB TC 405 IF(I+I+J
0422 0423 0423 0424 0429 0425 0425 0425 0426 0427 0428 0421 0420 C C C C C C C C C C C C C C C C C C C	IF(F(I+1,J).NE.1) GU TO 422 PH(I+1,J).NE.1) GU TO 422 IF(F(I+1,J).NE.5) GD TO 423 IF(F(I+1,J).NE.5) GD TO 423 PH(I(+1,J).PH(I,J)-GX*DX-2.*ETA(I,J)*U(I-1,J)/DX GO TO 425 IF(F(I-1,J).NE.5) GO TO 429 PH(I-1,J).PH(I,J)-GX*DX-2.*ETA(I,J)*U(I,J)/DX GO TO 425 IF(F(I-1,J).PH(I,J)-GX*DX-2.*ETA(I,J)*(UH-U(I,J))/OX GO TO 425 IF(F(I-1,J).PH(I,J)-GX*DX-2.*ETA(I,J)*(UH-U(I,J))/OX GO TO 425 IF(F(I,J).PH(I,J)-GX*DX-2.*ETA(I,J)*(I,J-1)/DY GO TO 425 IF(F(I,J+1).NE.1) GU TU 426 PH(I,J)-PH(I(I,J)-GY*DY+2.*ETA(I,J)*(V(I,J-1)-VW)/DY If(F(I,J-1).NE.5) GD TD 427 PH(I,J)-PH(I(I,J)-GY*C/W)*DY+2.*ETA(I,J)*(V(I,J-1)-VW)/DY If(I,I)-PH(I(I,J)-GY*C/W)*DY+2.*ETA(I,J)*(V(I,J-1)-VW)/DY If(I,I)-PH(I(I,J)-GY*C/W)*DY+2.*ETA(I,J)*(V(I,J)/DY GO TO 421 IF(F(I,J-1).NE.1) GO TD 428 PH(I(I,J)-1)-PH(I(I,J)-GY*C/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY GO TO 421 IF(F(I,J)-1)-PH(I(I,J)+GY/C/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-1)-PH(I(I,J)+GY/C/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-1)-PH(I(I,J)+GY/C/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-1)-PH(I(I,J)+GY/C/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-1)-PH(I(I,J)+GY/C/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-1)-PH(I(I,J)+GY/C/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-1)-PH(I(I,J)+GY/C/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-1)-PH(I(I,J)+GY/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-1)-PH(I(I,J)+GY/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-1)-PH(I(I,J)+GY/W)*DY+2.*ETA(I,J)*(VK-V(I,J)/DY PH(I(I,J)-NK-2.1) DT * 403 IF(F(I+1,J).NK-2.1) DT * 403 IF(F(I+1,J).NK-2.1) CD T* 405 IF(F(I+1,J).NK-2.1) CD T* 405 IF(F(I+1,J)
0422 0423 0423 0424 0429 0429 0425 0426 0427 0426 0427 0428 0421 0428 0421 0420 C C C C C 040 400 401	$ \begin{array}{l} F(F([1+1,J), NE,1) & GO TO 422 \\ PH(1+1,J) = NH(1,J) = NE, S) & GO TO 423 \\ F(F([1+1,J) = NH(1,J) = (SFYG/MP) * DX + 2 * ETA([1,J) * (U(1-1,J) - UM)/DX \\ PH(1(-1,J) = NH(1,J) = (SFYG/MP) * DX + 2 * ETA([1,J) * (U(1-1,J) - UM)/DX \\ \hline F(F(1-1,J) = NH(1,J) = (SFYG/MP) * DX + 2 * ETA([1,J) * (U(1-1,J) - UM)/DX \\ \hline F(F(1-1,J) = NH(1,J) = (SFYG/MP) * DX + 2 * ETA([1,J) * (UM - U(1,J))/DX \\ \hline GO TO 425 \\ \hline F(F(1-1,J) = NH(1,J) = (SFYG/MP) * DX + 2 * ETA([1,J) * (UM - U(1,J))/DX \\ \hline GO TO 425 \\ \hline F(F(1-1,J) = NH(1,J) = (SFYG/MP) * DX + 2 * ETA([1,J) * (UM - U(1,J))/DX \\ \hline GO TO 425 \\ \hline F(F(1,J) = NH(1,J) = (SFYG/MP) * DX + 2 * ETA([1,J) * (U(1,J-1)/DY \\ \hline GO TO 425 \\ \hline F(F(1,J+1) = NH(1,J) + (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J-1)/DY \\ \hline F(F(1,J+1) = NH(1,J) + (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J-1)/DY \\ \hline F(F(1,J+1) = NH(1,J) - (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J-1)/DY \\ \hline F(F(1,J-1) = NH(1,J) - (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J)/DY \\ \hline F(F(1,J-1) = NH(1,J) + (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J)/DY \\ \hline F(F(1,J-1) = NH(1,J) + (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J)/DY \\ \hline F(F(1,J-1) = NH(1,J) + (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J)/DY \\ \hline F(F(1,J-1) = NH(1,J) + (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J)/DY \\ \hline F(F(1,J-1) = NH(1,J) + (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J)/DY \\ \hline F(F(1,J-1) = NH(1,J) + (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J)/DY \\ \hline F(F(1,J-1) = NH(1,J) + (SFYG/MP) * DY + 2 * ETA([1,J) * (V(1,J) / DY \\ \hline F(F(1,J) = NE - S) & OT TO 403 \\ \hline F(F(1,J) = NE - S) & OT TO 403 \\ \hline F(F(1,J) = NE - 2) & OT T 403 \\ \hline F(F(1,J) = NE - 2) & OT T 403 \\ \hline F(F(1,J) = NE - 2) & OT T 403 \\ \hline F(F(1,J) = NE - 2) & OT T 403 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline F(F(1,J) = NE - 2) & OT T 405 \\ \hline$
0422 0423 0424 0429 0429 0425 0426 0427 0426 0427 0428 0421 0420 C C C C C C C 0420 C C C C 0420 C C C C C C C C C C C C C C C C C C C	$ \begin{array}{l} \left[ F(F([1+1,J),NE,1) & GU & TO & 422 \\ PH(1(+1,J)=NE,1) & GV & TO & 423 \\ \hline \\ F(F([1+1,J)=NH(1,J)=CSFG/MP)*DX+2.*ETA([1,J)*U([-1,J)-UM)/DX \\ \hline \\ F(F([1-1,J)=NE,1) & GO & TO & 423 \\ PH(1(-1,J)=NE,1) & GO & TO & 424 \\ PH(1(-1,J)=NE,1) & GO & TO & 424 \\ PH(1(-1,J)=NE,1) & GO & TO & 429 \\ \hline \\ F(F(1-1,J)=NE,1) & GV & TO & 429 \\ PH(1(-1,J)=PH(1,J)+(SFXG/W1)*DX+2.*ETA([1,J)*(UH-U([1,J)]/DX \\ \hline \\ GO & TO & 425 \\ \hline \\ F(F(1,J)=NE,1) & GO & TO & 429 \\ PH(1,J)=PH(1,J)=OX+DX \\ \hline \\ F(F(1,J)=NE,1) & GU & TO & 425 \\ PH(1,J)=PH(1,J)+GX*DX \\ \hline \\ F(F(1,J)=NE,1) & GU & TO & 425 \\ PH(1,J)=PH(1,J)+GX*DX \\ \hline \\ F(F(1,J+1),NE,1) & GU & TO & 425 \\ PH(1,J)=PH(1,J)+SYGYEDY+2.*ETA([1,J)*V([1,J-1)/DY \\ \hline \\ GO & TO & 427 \\ \hline \\ F(F(1,J-1)=NH(1,J)-(SFYG/MP)*DY+2.*ETA([1,J)*(V(1,J-1)-VM)/DY \\ \hline \\ F(F(1,J-1)=PH(1,J)-(SFYG/MP)*DY+2.*ETA([1,J)*V(1,J)/DY \\ \hline \\ F(F(1,J-1)=PH(1,J)-(SFYG/MP)*DY+2.*ETA([1,J)*(V(1,J)/DY \\ \hline \\ F(F(1,J-1)=PH(1,J)-(SFYG/MP)*DY+2.*ETA([1,J)*(V(1,J)/DY \\ \hline \\ F(F(1,J)=1)=PH(1(1,J)+(SFYG/MP)*DY+2.*ETA([1,J)*(V(1,J)/DY \\ \hline \\ F(F(1,J)=NE,2) & DT & 403 \\ \hline \\ F(F(1,J)=NE,2) & DT & 405 \\ \hline \\ F(F(1,J)=NE,2) & DT & 406 \\ \hline \\ F(F(1,J)=NE,2) & DT & 406 \\ \hline \\ F(F(1,J)=NE,2) & D$
0422 0423 0424 0429 0425 0425 0426 0427 0426 0427 0428 0421 0420 C C C C C C C 0420 C C C C 0420 C C C C 0420 C C C C C 0420 0424	IF(FF(I+1, J)NE.1) GU TO 422 PH(I+1, J)=PH(I(1, J)+GX+DX+2.*ETA(I, J)*U(I-1.J)/DX GO TO 423 IF(F(I+1, J)=NE.1) GO TO 423 PH(I+1.J)=PH(I(1, J)-GX+DX-2.*ETA(I, J)*U(I, J)/DX GO TO 425 IF(F(I-1, J)=PH(I, J)+GX+DX+2.*ETA(I, J)*U(I, J)/DX GO TO 425 PH(I-1, J)=PH(I, J)+(S+G/W1)*DX+2.*ETA(I, J)*(UH-U(I, J))/DX GO TO 425 PH(I-1, J)=PH(I, J)+(S+G/W1)*DX+2.*ETA(I, J)*(UH-U(I, J))/DX GO TO 425 PH(I-1, J)=PH(I, J)+(S+G/W1)*DX+2.*ETA(I, J)*(UH-U(I, J))/DX GO TO 425 PH(I-1, J)=PH(I, J)+(S+G/W1)*DX+2.*ETA(I, J)*(V(I, J-1)/DY GO TO 427 IF(FF(I, J), NE.5) GO TO 427 PH(I, J+1)=PH(I, J)+(S+G/W1)*DY+2.*ETA(I, J)*(V(I, J-1)-VW)/DY If(F(I, J-1), NE.5) GC TO 421 PH(I, J-1)=PH(I, J)-(S+G/W1)*DY+2.*ETA(I, J)*(V(I, J-1)-VW)/DY If(F(I, J-1), NE.5) GC TO 421 PH(I, J-1)=PHI(I, J)+(S+G/W1)*DY+2.*ETA(I, J)*(VK-V(I, J))/DY GO TO 421 IF(FF(I, J), NE.5) GC TO 421 PH(I, J-1)=PHI(I, J)+(S+G/W1)*DY+2.*ETA(I, J)*(VK-V(I, J))/DY PH(I, J)=I(-FX)*I(1, -FY)*PHI(I, J)+(S+G/W1)*DY+2.*ETA(I, J)*(VK-V(I, J))/DY PH(I, J)=I(-FX)*I(1, -FY)*I(J)*DY CONTINUE PEGION 40 PRESSURE DENSITY CALCULATIONS IC=0 CONMAx=0.6 DO 403 J=2.JRARA1 IF(F(I, I), NE.2) CO TO 407 PHI(I+1, J)=PHI(I, J)+(S+Z)*FTA(I, J)*U(I-1, J)/DX OD 403 I=2.JRARA1 IF(F(I, I), NE.2) CO TO 407 PHI(I+1, J)=PHI(I, J)+(S+Z)*FTA(I, J)*U(I-1, J)/DX OD 403 I=2.JRARA1 IF(F(I, I), NE.2) CO TO 407 PHI(I+1, J)=PHI(I, J)+(SFSC/W)*PH(I, J)*U(I-1, J)/DX IF(F(I-1, J), NE.5) CO TO 407 PHI(I+1, J)=PHI(I, J)+(SFSC/W)*PH(I, J)*U(I)=I(J)/DX IF(F(I-1, J), NE.5) CO TO 407 PHI(I+1, J)=PHI(I, J)+(SFSC/W)*PH(I)*O(J)*DY(I)=I(J)/DX IF(F(I-1, J), NE.5) CO TO 407 IF(F(I-1, J), NE.5) CO TO 407 PHI(I+1, J)=PHI(I, J)=(SFSC/W)*PHI(I, J)*U(I)=I(J)+(J)/DX IF(F(I-1, J), NE.5) CO

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L 000 P14-00 A150 F0 A	PHI((L-1, J)=PHI(1, J)-GX+UX-2, +FTA(J, J)+U(1, J)/DX
$ \begin{array}{c} & = & = & = & = & = & = & = & = & = & $	1 <u>GU 1(1478</u> 0409 [FUCLT-1+1]-NL-5] (JU 1) 415
0.0.11/01         0.0.11/01           0.015         PUT(11-1)/PUT(1,J)-COPYX           0.017         0.017	PH1((1-1, J)=PH1([, J)+(SFXG/WM)*DX+2.*FTA(1, J)*(UW-U(1, J))/DX
0012         1111111         111111         1111111           0011         111111111         111111111111111111111111111111111111	<u>GU 1140-</u>
Be 20.1 [E2] (C] + 11 JPE (L] JPE (C) [C, 21]           Be 20.1 [L, 14] JPE (C) [L, 21] (C) 22.2 #C[14] (L] JPE (L]	0419 17(1)(1-1,1)=01(1),1)=01(1),403
2Mi(1, 1.8, 1.5 ml (1, 3), 1.5 ml (1, 4), 2.5 ml (1, 4), 1.5 ml (1, 4),	04.)8 16(7(1,1+1),1/2,1) CC 10.411
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	PHI(1,J+L)=PHI(1,J)+GY#0Y+2.#ETA(1,J)*V(1,J-1)/QY
Philliphilophilophilophilophilophilophilo	$0411 [f((1,1+1), 85,5)] \in 0 TC 410$
0.0.16 [F1(1,j-1), 2F1(1,j)]           0.11 [J-1], 2F1(1,j)]           0.13 [F1(1,j-1), 2F1(1,j)]           0.13 [F1(1,j-1), 2F1(1,j)]           0.14 [F1(1,j-1), 2F1(2,j)]           0.15 [F1,j-1], 2F1(1,j)]           0.16 [F1,j-1], 2F1(1,j)]           0.17 [F1,j]]           0.17 [F1,j]] <td>PHI(1, J+1)=PHI(1, J)-(SFYG/WH)*NY+2.*ETA(1, J)*(V(1, J-1)-VW)/NY</td>	PHI(1, J+1)=PHI(1, J)-(SFYG/WH)*NY+2.*ETA(1, J)*(V(1, J-1)-VW)/NY
60 ft / 40;           6413 ft(f(1, +1), +1) + f(s) / f(r, 0);           9411, j, -1) + f(r, 0);           9	$\begin{array}{c} 0410  [\text{EEE}(J,J-1),\text{NE},1)  \text{GO}(10,413) \\ 00111  \text{GO}(J-1),\text{SO}(J-1)  \text{GO}(J-1),\text{SO}(J-1),$
0413         1E(E(1,1,-L),2,5,2)         C0         TO         405           0413         1E(E(1,1,-L),2,4)         TO         TO         TO           403         PE(1,1,-L),2,4)         TO         TO         TO           403         PE(1,1,-L),2,4)         TO         TO         TO         TO           404         TO         TO         TO         TO         TO         TO           403         COUNTS         TO         <	
→         DPI(1, j=1)=P(1)=1, j=1/2, j=2, j=2, j=2, j=2, j=2, j=2, j=2, j=	0413 [Fif(1, J-1), \4.5) GO TO 405
→ 1         → 1 <td><math display="block">PP([1, j-1]=PP([1, j]+(SFYGZW) \neq (YFZZW) \neq (YFZW) \neq (YFZZW) \neq (YFZW) = (YFZW) = (YFZW) = (YFZW) \neq (YFZW) = (YFZW) =</math></td>	$PP([1, j-1]=PP([1, j]+(SFYGZW) \neq (YFZZW) \neq (YFZW) \neq (YFZZW) \neq (YFZW) = (YFZW) = (YFZW) = (YFZW) \neq (YFZW) = (YFZW) =$
IF(1)F%-#45,200 G.1 TO 412           CQRTUGL_01=01(Cl_01)*(Cl_01)*(Cl_02)*ABS(PRITAFE	*+(PHI(1,J+1)+PHI(1,J-1))///*0YS)+//(1,J)//
CDR 12=803(PP117=42=PP11(1_3))/Labs(PP10(4))2085(PP10(4))2085(PP10(4))) PEN(22)(PP117=11=11)(1_1)(1_1)(2(20,2))(1_1))(2(1_1))(2(2))	IF(ITEN.4E.10) CJ TO 412
IF (ICTN)LAIT.COMPAN: GP. IC. 412           412 PMIT.LIZELIZENT           413 PMIT.LIZELIZENT           414 PMIT.LIZELIZENT           415 PMIT.LIZELIZENT           403 CMIT.SF           404 CMIT.SF           405 PMIT.ST           405 CMIT.SF           406 CMIT.SF           407 CMIT.SF           408 CMIT.SF           408 CMIT.SF           409 CMIT.SF           409 CMIT.SF           400 SMIT.SF	$\frac{\text{CDR[J=4BS(PH1AFW-PH1(I, J))/(ARS(PH1AFW)+ARS(PH1(I, J))}}{*+0.255(H(I, -1), 0)(2+1)(2+1)(2+1)(2+1)(2+1)(2+1)(2+1)(2+1$
1         COMMAXELUTI           412         PHILLI, LIPHIPEZ           403         COMITSE           403         COMITSE           404         PETRORAX, GL, 200 TO 444           11         PETRORAX, GL, 200 TO 444           11         PETRORAX, GL, 200 TO 441           0414         PETRORAX, GL, 200 TO 440           0         PETRORAX, GL, 200 TO 540           0         PETRORAX, 200 TO 540           0         PETRORAX, 200 TO 500           11         PETRORAX, 200 TO 512           11         PETRORAX, 200 TO 512           11         PETRORAX	IEICONIJ.LT.CUNMAX) GO TE 412
412       DP111.112401943         403       CM11.32         403       LE=1C+1         417       LE=1C+1         418       LE=1C+1         417       LE=1C+1         418       LE=1C+1         417       LE=1C+1         418       LE=1C+1         419       LE=1C+1         411       LE=1C+1	1 COMMAX=CU4IJ
•3.2         1C.1C.1           IF (10, 0.1, C.2), CD (10, 0.44           IF (10, 0.2), CD (0.0, 0.0]           04(1, IF (CD?MAX, CJ, CDRV), GD TP, 4.0)           C           PCG (D4, 50, VELOCITY, CALCULATION           C           C           PCG (D4, 50, VELOCITY, CALCULATION           C           C           PCG (D4, 50, VELOCITY, CALCULATION           C           C           OS10, N=0           IC(DVM*A)           DO           N=W+1           N=F(F(1, 1), NF, 5), 50, 7C, 503           TU(N=0.0)           D(1, 1=2, 1RAP)           N=0           MA#+1           IF(F(1, 1), NF, 5), 50, 7C, 503           TU(N=0.0)           D(1, 1=2, 1RAP)           N=0           D(1, 1=2, 1RAP)           N=0           UABOVE=U(1, 1-1)           VIECON=U(1, 1-1)           VIECON=U(1, 1-1)           VIECON=U(1, 1-1)           VIECON=U(1, 1, 1-1)	
$ \begin{array}{c} 1F(A,B2,L(z,2), CD, 10, 414 \\ 1F(A,C)^{2}A(X,C), C, D(Y), 40, TP, 401 \\ \hline \\ $	402 1C=1C+1
0.0414 E1 COPYARL CONVOL           C           C           C           PEGINJ 50 VELOCITY CALCULATION           C           0500 M=0           0511 J=2, JPAR1           07           08 0 511 J=2, JPAR1           09 0 511 J=2, JPAR1           100 0 511 J=2, JPAR1           111 J=2, JPAR1           09 0 511 J=2, JPAR1           111 J=4, JPAR1           09 0 511 J=2, JPAR1           111 J=4, JPAR1           09 0 511 J=2, JPAR1           111 J=4, JPAR1	IF(NOR.LE.2) GO TO 414
$ \begin{array}{c} c \\ c$	0414 IF(COMMAX.GT.CONV) G0 TP 401
C       PECIDI 50       VELOCITY CALCULATION         0       5300.9E0	<u> </u>
□         0500 MEO           100 MTEO           00 511 J=2:JPAR1           00 511 J=2:JPAR1           00 511 J=2:JPAR1           00 511 J=2:JPAR1           01 511 J=2:JPAR1           NEMA1           IEFF(1,J).NE.5] 50 TC 503           JUKN=u35           1V(N)=u35           1V(N)=u35           0503 CCMTIMUE           0514 J=2:AND_CONTONE           0503 CCMTIMUE           0517 JN-RE.2:AND_FCT.JJ.NE.3] GO TO 529           04A0VE=0(1,J-1)           0518 UARCHUE           0519 UARCHUE           0510 TFF(1+1,J)-NE.2:AND_FCT.JJ.NE.3] GO TO 529           04A0VE=0(1,J-1)           0511 UARCHUE           0512 UARCHUE           0513 UTRACHUE           0514           1FFF(1+1,J)-EP:1:AO TO 513           1FFF(1+1,J)-EP:1:AO TO 514           1FFF(1+1,J)-1:AU:AO TO 514           1FFF(1+1,J)-1:AU:AO TO 515           0513 TURN=3.           0513 TURN=3.           0513 TURN=3.           0510 TURN=3.           0510 TURN=3.           0510 TURN=3.           0510 TURN=3.           0510 TURN=3.           05110 OS15.           0510 TU	<u>C</u> PEGIOU.50 VELOCITY_CALCULATION
$ \begin{array}{c} \cdot & 1 \int \Omega_{11} V V = 0 \\ \cdot & 0 \cap S = S = S = S = S = S = S = S = S = S$	0500 N=0
$\begin{array}{c} & 00 \ 511 \ J=2,JRAR1 \\ & 00 \ 511 \ J=2,JRAR1 \\ & N=W+1 \\ & IF(F(1,J),NE,5) \ 50 \ TC \ 503 \\ & TU(K) = VG \\ & V(K) = VG \\ & PH((1,J)=0, \\ & GO \ TO \ 532 \\ \hline \\ & 0503 \ CNTINUE \\ & IF(F(1,J),NE,2,AND,F(1,J),NE,3) \ 60 \ TO \ 529 \\ & UABOVE=U(1,J-1) \\ & VIE \ V(I,J-1) \\ & VIE \ V(I,J,J,K) \\ & VIE \ V(I,J,J) \\ & VIE \ V(I,J,J) \\ & VIE \ VIE $	· ICOUTEO
$\begin{array}{c} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 $	$\frac{1}{2}$ $\frac{1}$
$ \begin{array}{c} 1 \ F(I+[1,1), NF, 5) \ GO \ TC \ 503 \\ TV(K) = \forall 5 \\ PHI(1, J) = \emptyset . \\ GO \ TO \ 532 \\ \hline \\ \hline \\ GO \ TO \ 532 \\ \hline \\ \hline \\ \\ \\ \\ \hline \\ \hline \\ \hline \\ \\ \hline \\ \\ \hline \\ \\ \hline \\ \hline \\ \\ \hline \\ \\ \hline \\ \hline \\ \hline \\ $	N=N+1
$ \begin{array}{c} TU(k) = vG \\ TV(k) = vG \\ PH((1, J) = 0, \\ GQ, TY, 532 \\ \hline \\ \hline \\ GQ, TY, 532 \\ \hline \\ \\ \hline \\ GQ, TY, 532 \\ \hline \\ \\ \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $	IF(F(I,)).NF.5) 60 TC 503
PART(1, J)=0.         GQ TO 332         0503. CONTINUE         IF(F(1, J) + KE, 2, AND, F(1, J), NE, 3) GO TO 529.         UABOVE=U(1, J-1)         USECN=0U(1, J+1)         VIEV(1, J-1)         VIEV(1, J-1)         VIEV(1, J)	
$ \begin{array}{c} \hline & 0 \ TO \ 532 \\ \hline & 0 \ 503 \ CCMTNWE \\ \hline & Iff(I,J) \ ME, 2, \ AND, \ F(I,J), \ NE, 3] \ 60 \ TO \ 529 \\ \hline & UABOYE U(I,J) \ \\ & VIE \ V(I,J) \ \\ & VIE \$	PHI (1, J)=0.
$\begin{array}{c} 0503 \ CONTINUE \\ \hline IFIF(1,J): NE - 2: AND ET(I,J): NE - 31 GO TO 529 \\ \hline UAROVE U(I,J-1) \\ \hline VB = V(1,J-1) \\ \hline VB = V(1,J): Continue (Continue ($	<u> </u>
$ \begin{array}{c} 1 \text{ F}(F(1,j), j) \in \mathbb{Z}_{2}, \text{AVD}, \text{F}(1, J), \text{NE}, \text{3} j \in \mathbb{Q}  \text{TO}  529 \\ \hline \text{UABOVE=U}(1, j-1) \\ \hline \text{USELN} \in \mathbb{Q}(1, j-1) \\ \hline \text{VIE}_{2}(1, j-1) \\ \hline \text{VIE}_{2}$	0503 CONTINUE
$ \begin{array}{c} UA80VE=U(1, j-1) \\ USEL(h=U(1, j-1) \\ VT=V(1, j) \\ VT=V(1, j$	IF(F(1,J).NE.2.AND.F(1,J).NE.3) GO TO 529
0.510/W=0(1,-1-1)         VE=V(1,-1-1)         VB=V(1+1,-1-1)         VSE=V(1+1,-1-1)         VSE=V(1+1,-1-1)         VSE=V(1+1,-1,-1-1)         VSE=V(1+1,-1,-1-1)         VSE=V(1+1,-1,-1-1)         VSE=V(1+1,-1,-1-1)         VSE=V(1+1,-1,-1-1)         VSE=V(1+1,-1,-1-1)         PEF(1+1,-1,-1,-1,-1-1)         VSE=V(1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,-1	U480VE=U(1, J-1)
$ \begin{array}{c} \forall \P = \forall (1, J) \\ \forall T = \forall (1+1, J) \\ \forall S = \forall (1+1, J) \in O.4) & O TO 512 \\ \hline F \in f(1+1, J) \in O.4) & O TO 512 \\ \hline F \in f(1+1, J) \in O.4) & O TO 512 \\ \hline F \in f(1+1, J) \in O.4) & O TO 512 \\ \hline F \in f(1+1, J) \in O.4) & O \in F(1, J+1) \in O.4) & O TO 514 \\ \hline F \in F(1+1, J+1) \in O.4) & O \in F(1, J+1) \in O.4) & O \in TO 514 \\ \hline F \in F(1+1, J+1) \in O.4) & O \in F(1, J+1) \in O.4) & O \in TO 514 \\ \hline U S \in O = U(1, J) \\ \hline I & O TO 510 \\ \hline S = I & U(1) = U(1, J) \\ \hline O = I & O & I \\ \hline O = I & O \\ \hline O = I & O & I \\ \hline O = I & I \\ \hline $	VT=V(I,J-1)
$ \begin{array}{c} \forall VR = \forall (1+1, j-1) \\ \forall SR = \forall (1+1, j) \in O_{*}(1) \in O_{*}(2) \in O_{*}(2) \\ I \in [F(1+1, j), E_{*}(2) \in O_{*}(2) \in O_{*}(2) \in O_{*}(2) \\ I \in [F(1+1, j+1), E_{*}(2) \in O_{*}(2) \\ I \in [F(1+1, j+1), E_{*}(2) \in O_{*}(2) \in O_{*}(2)$	V8=V(1+J)
Utric(1+1, J).e0.4) GO TO 512             IF(F(1+1, J).e0.1) GO TO 513             IF(F(1+1, J).e0.5) GO TO 501             IF(F(1+1, J).e0.5) GO TO 514             IF(F(1+1, J).e0.5) GO TO 514             US(1) =00             US(1) =01             I GO TO 517             GO TO 517             GO TO 517             GO TO 517             S14 UPECPM=U(1,J)             I V3=0.             VRP=0.             GO TO 517             OS16 UPECPM=U(1,J)             I V3=0.             VRP=0.             GO TO 516             I (If(1+1, J-1).e0.1.e0.ef(1, J-1).e0.1) c0 TO 518             I (If(1+1, J-1).e0.1.e0.ef(1, J-1).e0.1)	$\frac{\sqrt{17} + \sqrt{(1+1) - 1}}{\sqrt{10}}$
$\begin{array}{c} 1 \text{ Fif } \left[ (1+1, J) = 0, 1 \right] & \text{GO TC 513} \\ 1 \text{ Fif } \left[ (1+1, J) = 0, 1, 0, 0, 1 \right] & \text{Fif } \left[ (1+1, J+1) = 0, 1 \right] & \text{GO TO 514} \\ 1 \text{ Fif } \left[ (1+1, J+1) = 0, 2, 0, 0, 0, 1 \right] & \text{Fif } \left[ (J+1, J+1) = 0, 2 \right] & \text{GO TO 514} \\ 1 \text{ Fif } \left[ (J+1, J+1) = 0, 2, 0, 0, 0, 0 \right] & \text{Fif } \left[ (J+1, J+1) = 0, 2 \right] & \text{GO TO 516} \\ 1 \text{ GO TO 516} \\ 1 \text{ GO TO 516} \\ 1 \text{ GO TO 517} \\ 1 \text{ GO TO 516} \\ 1 \text{ GO TO 517} \\ 1 \text{ GO TO 516} \\ 1  GO $	IF(F(1+1, J), EQ.4) GO TO 512
$\begin{array}{c} 1 + [+[1+1, j+1], \pm 0, 1, 0^{N}, F(1, j+1), \pm 0, -1) \ 6G \ T0 \ 514 \\ 1 + [+[1+1, j+1], \pm 0, \pm 0, \infty, C^{P}, F(1, j+1), \pm 0, -5) \ G(t) \ T0 \ 514 \\ 1 + [+[1+1, j+1], \pm 0, \pm 0, \infty, C^{P}, F(1, j+1), \pm 0, -5) \ G(t) \ T0 \ 516 \\ 1 + [+[1+1, j+1], \pm 0, \pm 0, \infty, C^{P}, F(1, j+1), \pm 0, \pm 0, 5) \ G(t) \ T0 \ 516 \\ 1 + [+[1+1, j+1], \pm 0, \pm 0, \infty, C^{P}, F(1, j+1), \pm 0, \pm 0, 5) \ G(t) \ T0 \ 516 \\ 1 + [+[1+1, j+1], \pm 0, \pm 0, \infty, C^{P}, F(1, j+1), \pm 0, \pm 0, 5] \ G(t) \ T0 \ 517 \\ 1 + [+[+[1+1, j+1], \pm 0, \pm 0, 5] \ G(t) \ T0 \ 517 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ T0 \ 518 \\ 1 + [+[+1, j+1], \pm 0, \pm 0, -5] \ G(t) \ 1 + [+1, j+1] \ 1 + [+1, -5] \ 520 \\ 1 + [+1, -1] \ 520 \ 518 \\ 1 + [+1, -1] \ 520 \ 518 \\ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 514 \ 1 + [+1, -1] \ 514 \ 1 + [+1, -1] \ 514 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 \ 1 + [+1, -1] \ 520 \ 518 $	IF(F((+1,J),E7,1) GO TC 513
111111111111111111111111111111111111	$\frac{[F(F(1+1, j), F(2, j)] G(0, 10, 50)]}{[F(F(1+1, j), F(2, j)] G(0, 10, 50)]}$
$ \begin{array}{c} IF[F([1+1,J+1],NF,4,0K,F(1,J+1],NF,4)] & OC TO 516 \\ U3EL0 (4=U[1,J]) \\ I & GO TO 516 \\ \hline \\ 512 TU(N) =: (1,J) + GY + 0T \\ \hline \\ GO TO 517 \\ \hline \\ 0513 TU(N) =: J, \\ \hline \\ 0501 TU(N) =: J, \\ \hline \\ 0514 U^{3}FO_{n-1} \\ \hline \\ VAP = O_{n-1} \\ \hline \\ 00 TO 516 \\ \hline \\ 5140 U3ELCW =: 2, \pm UW + U(1,J) \\ \hline \\ VBe =: V_{M} \\ \hline \\ 0516 IF(F(1+1,J-1), \pm 0.1, OR, F(1,J-1), \pm 0.1) G) TO 518 \\ IF(F(1+1,J-1), \pm 0.5, OR, F(1,J-1), \pm 0.5) GO TO 518 \\ \hline \\ IF(F(1+1,J-1), \pm 0.5, OR, F(1,J-1), EO, 5) GO TO 518 \\ \hline \\ IF(F(1+1,J-1), \pm 0.5, OR, F(1,J-1), EO, 5) GO TO 518 \\ \hline \\ IF(F(1+1,J-1), \pm 0.5, OR, F(1,J-1), NE, 4) GO TO 520 \\ \hline \\ UAB0VE =: U(1,J) \\ \hline \\ VI =: O_{n-1} \\ \hline \\ VI =: O_{n-1} \\ \hline \\ VI =: V_{n-1} \\ \hline \\ \hline \\ VI =: V_{n-1} \\ \hline \\ VI =: V_{n-1} \\ \hline \\ \hline \\ VI =: V_{n-1} \\ \hline \\ VI =: V_{n-1} \\ \hline \\ \hline \\ VI =: V_{n-1} \\ \hline \\ \hline \\ VI =: V_{n-1} \\ \hline \\ \hline \\ \hline \\ VI =: V_{n-1} \\ \hline \\ \hline \\ \hline \\ VI =: V_{n-1} \\ \hline \\ \hline \\ \hline \\ \hline \\ VI =: V_{n-1} \\ \hline \\ $	IF[F(1+1, J+1).EQ.5.(P.F(1, J+1).EQ.5) GU TO 5140
$ \begin{array}{c} 0.9510 \ 4=0(1,J) \\ i & 60 \ T \ 510 \\ \hline 512 \ TU(N) = 0. \\ 60 \ T \ 517 \\ \hline 0513 \ TU(N) = 0. \\ 60 \ T \ 517 \\ \hline 0501 \ TU(N) = 0. \\ \hline 0516 \ U3ELCW= 2. \pm UW-U(1,J) \\ \hline VRP = 0. \\ \hline 0516 \ IF(F(1+1,J-1). \pm 0.1.0R.F(1,J-1).E0.1) \ G0 \ T0 \ 518 \\ \hline IF(F(1+1,J-1). \pm 0.1.0R.F(1,J-1).E0.1) \ G0 \ T0 \ 518 \\ \hline 1F(F(1+1,J-1). \pm 0.5.0CK.F(1,J-1).E0.5) \ G0 \ T0 \ 518 \\ \hline 1F(F(1+1,J-1). \pm 0.5.0CK.F(1,J-1).E0.5) \ G0 \ T0 \ 518 \\ \hline 0516 \ UAENVE_{=-1}(1,J) \ C0.5 \\ \hline 00 \ T \ 520 \\ \hline 518 \ UAENVE_{=-1}(1,J) \ C0.5 \\ \hline 00 \ T \ 520 \\ \hline 518 \ UAENVE_{=-1}(1,J) \ C0.5 \\ \hline 00 \ T \ 520 \\ \hline 00 \ T \ 520 \\ \hline 518 \ UAENVE_{=-2}(1,J) \ C0.5 \\ \hline 00 \ T \ 520 \ T \ 510 \ T $	IF[F([+1, J+1).NF.4.0K.F(1, J+1).NF.4) OF TO 516
$ \frac{512 \text{ TU}(Y) = i(1, j) + 6Y + 0T }{60 \text{ Tr} 517 } \\ \frac{60 \text{ Tr} 517 }{0513 \text{ TU}(W) = J, } \\ \frac{60 \text{ Tr} 517 }{0501 \text{ TU}(W) = J, } \\ \frac{60 \text{ Tr} 517 }{0501 \text{ TU}(W) = J, } \\ \frac{60 \text{ Tr} 517 }{0501 \text{ TU}(W) = J, } \\ \frac{60 \text{ Tr} 517 }{1000 \text{ C}^2 - 0.00 \text{ C}^2 - 0$	
$ \begin{array}{c} G0 \ T\cap \ 5 7 \\ \hline 0513 \ TU(N)=3, \\ \hline 00 \ TO \ 5 7 \\ \hline 0501 \ TU(N)=3, \\ \hline 0501 \ TU(N)=3, \\ \hline 0501 \ TU(N)=3, \\ \hline 0501 \ 5 7 \\ \hline 0501 \ 5 7 \\ \hline 0501 \ 5 7 \\ \hline 0514 \ 016 \ CM=2, =000 \ CM=1, \\ \hline 0516 \ CM=1, \\ \hline $	512 TU(1)=1(1,J)+6Y+0T
$ \begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $	
$\begin{array}{c} 0501 \ \overline{TU(N)} = JG \\ \hline G0 \ T0 \ 517 \\ \hline G0 \ T0 \ 517 \\ \hline S14 \ U^{R}E^{O_{R}} = -U(1,J) \\ \hline V^{3} = 0. \\ \hline G0 \ T0 \ 516 \\ \hline S140 \ U^{5}E^{O_{R}} = 2.5U^{R} = U(1,J) \\ \hline V^{B} = V^{R} \\ \hline V^{B} = V^{R} \\ \hline 0516 \ IF(F(I+I,J-I),=0,1,0R,F(I,J-I),E0,I) \ G0 \ T0 \ 518 \\ \hline IF(F(I+I+J-I),E0,5,0R,F(I,J-I),E0,5) \ G0 \ T0 \ 5180 \\ \hline IF(F(I+I,J-I),E0,5,0R,F(I,J-I),E0,5) \ G0 \ T0 \ 5180 \\ \hline IF(F(I+I,J-I),E0,5,0R,F(I,J-I),E0,5) \ G0 \ T0 \ 5180 \\ \hline IF(F(I+I,J-I),E0,5,0R,F(I,J-I),E0,5) \ G0 \ T0 \ 5180 \\ \hline U^{A}BOVE=U(I,J) \\ \hline G0 \ T^{O} \ 520 \\ \hline 518 \ U^{A}BOVE=U(I,J) \\ \hline V^{I}F=0. \\ \hline G0 \ T^{O} \ 520 \\ \hline 5180 \ U^{A}BOVE=2, *U^{A}+U(1,J) \\ \hline V^{I}F=0. \\ \hline G0 \ T^{O} \ 520 \\ \hline 5180 \ U^{A}BOVE=2, *U^{A}+U(1,J) \\ \hline V^{I}F=V_{A} \\ \hline V^{I}F=V_{A} \\ \hline V^{I}F=V_{A} \\ \hline 520 \ SU^{A}I=(1^{A}(I,J)) *((U(I+1,J)+U(I-I,J)-2,0)*U(I,J))/DXS+ \\ * (U^{A}EIDU+U^{A}BOVE=2,0)*U(I,J)/DYS) +(FHI(I+1,J))/DXS+ \\ \hline \end{array}$	· 60 TO 517
$\begin{array}{c} GO TO 517 \\ \hline & 514 U^{n}EU^{n}H=U(1,J) \\ \hline & V3=0. \\ \hline & V3E=0. \\ \hline & GO TO 516 \\ \hline & 5140 U^{0}EUC^{w}=2.*U^{w}+U(1,J) \\ \hline & VBE=VW \\ \hline & VBE=VW \\ \hline & VBE=VW \\ \hline & 0516 IF(F(1+1,J-1).=0.1.0R.F(1,J-1).E0.1) GO TO 518 \\ \hline & IF(F(1+1,J-1).E0.5.0R.F(1,J-1).E0.5) GO TO 5180 \\ \hline & IF(F(1+1,J-1).KE.4.0K.F(1,J-1).NE.4) GO TO 520 \\ \hline & UABOVE=U(1,J) \\ \hline & GO TO 520 \\ \hline & 518 UABIVE=-U(1,J) \\ \hline & VIP=0. \\ \hline & GO TO 520 \\ \hline & 5180 UABOVE=2.*U^{4}+U(1,J) \\ \hline & VIP=0. \\ \hline & GO TO 520 \\ \hline & 5180 UABOVE=2.*U^{4}+U(1,J) \\ \hline & VIP=0. \\ \hline & GO TO 520 \\ \hline & 5180 UABOVE=2.*U^{4}+U(1,J) \\ \hline & VIE=VM \\ \hline & VIE=VM \\ \hline & VIE=VM \\ \hline & SUM1=(1A(1,J)*((U(1+1,J)+U(1-1,J)-2.0*U(1,J))/DXS+ \\ * (UBELOU+UABOVE=2.0^{2}U(1,J)/DYS) + (EHI(1,J)-PHI(1+1,J))/DXS+ \\ \hline & (UBELOU+UABOVE=2.0^{2}U(1,J)/DYS) + (EHI(1,J)-PHI(1+1,J)/DXS+ \\ \hline & (UBELOU+UABOVE=2.0^{2}U(1,J)/DYS) + (EHI(1,J)-PHI(1+1,J)/DYS) + \\ \hline & (UBELOU+UABOVE=2.0^{2}U(1,J)/DYS) + (EHI(1,J)-PHI(1+1,J)/DYS) + \\ \hline & (UBELOU+UABOVE=2.0^{2}U(1,J)/DYS) + \\ \hline & (UBELOU+UABOVE$	0501 TU(N)=JG
$\begin{array}{c} . 214 \ 0^{+} C(2^{+} - 0^{+}) (1, j) \\ \hline V3 = 0. \\ \hline 00 \ 10 \ 516 \\ \hline 5140 \ 09 E UCW = 2.4UW - U(1, j) \\ \hline VB = VW \\ \hline VPF = VW \\ \hline 0516 \ IF(F(1+1, j-1). = 0.1.0R.F(1, j-1).E0.1) \ C0 \ 10 \ 518 \\ \hline IF(F(1+1, j-1).E0.5.0R.F(1, j-1).E0.5) \ C0 \ 10 \ 5180 \\ i \ IF(F(1+1, j-1).KE.4.0R.F(1, j-1).KE.4) \ C0 \ T0 \ 520 \\ \hline UABOVE=U(1, j) \\ \hline C0 \ T^{\circ} \ 520 \\ \hline 518 \ UAB VE=-U(1, j) \\ \hline VIP = 0. \\ \hline G0 \ T^{\circ} \ 520 \\ \hline 5130 \ UABOVE=2.*U/4-U(1, j) \\ \hline VIP = 0. \\ \hline G0 \ T^{\circ} \ 520 \\ \hline 5130 \ UABOVE=2.*U/4-U(1, j) \\ \hline VIP = 0. \\ \hline 5130 \ UABOVE=2.*U/4-U(1, j) \\ \hline VIP = VM \\ \hline VIP = VM \\ \hline VIP = VM \\ \hline S20 \ SUM \ 1 = (1, (1, j) + ((U(1+1, j) + U(1-1, j) - 2.0 + U(1, j))/DXS + \\ + (URE(DU1+UABOVE - 2.0 + U(1, j))/DYS) + (EHI(1, j) - PHI(1+1, j))/DXS + \\ \hline \end{array}$	
$ \begin{array}{c} VRP = 0. \\ \hline G0 \ TO \ 516 \\ \hline 5140 \ U3ELCW = 2.*UW-U(1,J) \\ VB = VW \\ VPF = VW \\ \hline 0516 \ IF(F(I+I,J-I).=0.1.0R.F(I,J-I).E0.I) \ G0 \ TO \ 518 \\ \hline IF(F(I+I,J-I).E0.5.0R.F(I,J-I).E0.5) \ GO \ TO \ 5180 \\ (If(F(I+I,J-I).KE.4.0R.F(I,J-I).NE.4) \ GO \ TO \ 520 \\ \hline 0AB0VF=U(I,J) \\ \hline G0 \ T^{\circ} \ 520 \\ \hline 518 \ UAR IVE=-U(I,J) \\ VIP=0. \\ \hline GC \ T^{\circ} \ 520 \\ \hline 5180 \ UAB0VE=2.*U/4-U(1,J) \\ VIP=0. \\ \hline GC \ T^{\circ} \ 520 \\ \hline 5130 \ UAB0VE=2.*U/4-U(1,J) \\ VIP=0. \\ \hline CS \ UML=(1A(I,J)*((U(I+1,J)+U(I-I,J)-2.0*U(I,J))/DXS+ \\ * (UREINU+UAB0VE=2.0*U(I,J)/DYS) + (FHI(I+1,J)-PHI(I+1,J)/DXS+ \\ \hline \end{array} $	<u> </u>
GQ TO 516 5140 U3ELCW=2.≠UW=U(1,J) VB≥VW VPF=VW 0516 IF(F(I+1,J-1).=0.1.0R.F(I,J-1).EQ.1) GO TO 518 IF(F(I+1,J-1).±0.5.0R.F(I,J-1).EQ.5) GO TO 5180 (F(F(I+1,J-1).kE.4.0R.F(I,J-1).NE.4) GO TO 5180 (F(F(I+1,J-1).kE.4.0R.F(I,J-1).NE.4) GO TO 520 UABOVE=U(I,J) GO TO 520 518 UAR IVE==U(I,J) VI=0. VIP=0. GO TO 520 5180 UABOVE=2.*U/4-U(1,J) VI=0. VIP=0. GO TO 520 5180 UABOVE=2.*U/4-U(1,J) VI=V.4 VIE=V.4 VIE=V.4 S20 SUM1=:1A(1,J)*((U(1+1,J)+U(1-1,J)-2.0*U(1,J))/DXS+ *(UREIOU+UABOVE=2.0*U(1,J))/DYS)*(FHI(I+1,J))/DXS+	VRP=0.
VR: VW VR: VW O516 IF(F(I+I,J-I).=0.1.0R.F(I,J-I).E0.11 GO TO 518 IF(F(I+I,J-I).E0.5.0R.F(I,J-I).E0.5) GO TO 5180 (IF(F(I+I,J-I).KE.4.0R.F(I,J-I).NE.4) GO TO 5180 (UABOVE=U(I,J) GO TO 520 518 UAR IVE=-U(I,J) VIP=0. GO TO 520 5180 UABOVE=2.*U/4-U(I,J) VIP=0. GO TO 520 5180 UABOVE=2.*U/4-U(I,J) VIE=VA VIE=VA S20 SUM1:1A(I,J)*((U(I+1,J)+U(I-1,J)-2.0*U(I,J))/DXS+ *(UREIDU/+UABOVE=2.0*U(I,J)/DYS)+(FHI(I,J)-PHI(I+1,J))/DX54	
$\frac{VRF = V_M}{0516} \frac{VRF = V_M}{VIF = V_M} = 0.1.0R \cdot F(1, J-1) \cdot E0 \cdot 11 \ GO \ TO \ 518} = 0.16 \ F(F(1+1, J-1) \cdot E0 \cdot 5 \cdot CR \cdot F(1, J-1) \cdot E0 \cdot 5) \ GO \ TO \ 5180} = 0.000 \ F(F(1+1, J-1) \cdot E0 \cdot 5) \ GO \ TO \ 5180} = 0.000 \ F(F(1+1, J-1) \cdot E0 \cdot 5) \ F(F(1+1, J-1) \cdot E0 \cdot$	VB=VW
0516 IF(F(I+1,J-1).=0.1.0R.F(I,J-1).E0.1) G0 TO 518 IF(F(I+1,J-1).e0.5.0R.F(I,J-1).E0.3) GO TO 5180 IF(F(I+1,J-1).NE.4.0R.F(I,J-1).NE.4) GO TO 520 UABOVE=U(I,J) GO TO 520 518 UARIVE=-U(I,J) VIP=0. GO TO 520 5130 UABOVE=2.*U/4-U(1,J) VIP=0. GO TO 520 5130 UABOVE=2.*U/4-U(1,J) VIE=V.4 VIE=V.4 S20 SUM1=:1A(I,J)*((U(I+1,J)+U(I-1,J)-2.0*U(I,J))/DXS+ *(UREINI+UABOVE=2.0*U(I,J))/DYS)+(FHI(I,J)-PHI(I+1,J))/DX54	WA= 44A
If (f(1+1, J-1).NE, 4.0R.f(1, J-1).NE.4) G0 TO 2130         If (f(1+1, J-1).NE, 4.0R.f(1, J-1).NE.4) G0 TO 520         UABOVE=U(1,J)         G0 TO 520         518 UAR IVE=-U(1,J)         VT=0.         G0 TO 520         S18 UAR IVE=-U(1,J)         VT=0.         G0 TO 520         S18 UAR IVE=-U(1,J)         VT=0.         G0 TO 520         S18 UAR IVE=-U(1,J)         VT=V.4         VT=V.4         VT=V.4         VT=V.4         VT=V.4         S20 SUM1=:1A((1,J)*((U((+1,J)+U((-1,J)-2.0*U(1,J))/DXS)+         *(UREINI+UABOVE=2.0*U(1,J)/DXS)+(FHI(II,J)=PHI(1+1,J)/DX+GX	$\frac{0516 \text{ IF}(F(J+1, J-1), =0, 1, 0R, F(J+J-1), EQ, 1) \text{ GO TO } 518}{F(F(J+1, J-1), =0, 5, 0R, F(J+J-1), EQ, 5) \text{ CO TO } 518}$
UABOVE=U(I+J) GU T^ 520 518 UARIVE=U(I+J) VI=0. GO T' 520 5130 UABOVE=2.*U/4-U(1+J) VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=V-4 VI=0. VI=V.	IF(F(I+1,J-1).NE,4.0R.F(1,J-1).NE.4) G0 T0 520
$\begin{array}{c} & \text{GU T}^{\circ} \ \ 520 \\ \hline 518 \ \text{UAR IVE}=-\text{U(I,J)} \\ \hline \text{VIP=0.} \\ \hline \text{GO T}^{\circ} \ 520 \\ \hline 5130 \ \text{UABOVE=2.*U}^{\circ} \text{U-U(1,J)} \\ \hline \text{VIP=0.} \\ \hline \text{GO T}^{\circ} \ 520 \\ \hline 5130 \ \text{UABOVE=2.*U}^{\circ} \text{U-U(1,J)} \\ \hline \text{VIP=V.} \\ \hline \text{VIP=V.} \\ \hline \text{VIP=V.} \\ \hline \text{S20 SUMI=: 1 A(1,J) *((U(1+1,J)+U(1-1,J)-2.0*U(1,J))/DXS+} \\ \hline *(\text{URE(DU+UABOVE=2.0*U(1,J)})/DYS) *(FHI(I,J)-PHI(1+1,J))/DXSF \\ \hline \end{array}$	UABOVE=U(I+J)
$VI=0.$ $VI=0.$ $(0 T^{10} 520)$ $5130 UABOVE=2.*U/4+U(1+J)$ $VT=V.4$ $VT=V.4$ $VT=V.4$ $520 SUMI=(1A(1,J)*((U(1+1,J)+U(1-1,J)-2.0*U(1,J))/DXS+$ $*(UREI0U+UABOVE=2.0*U(1,J))/DYS)*(FHI(1+1,J))/DXS+$	$\frac{6010^{-} \frac{120}{220}}{518108105 = -11(1-1)}$
$\frac{VIP=0.}{(0 TP 520)}$ 5130 UABOVE=2.*U/4+U(1+J) VT=V-4 VT=V-4 520 SUML=(1A(1,J)*((U(1+1,J)+U(1-1,J)-2.0*U(1,J))/DXS+ *(UBE(DU+UABOVE=2.0*U(1+J))/DYS)+(FHI(1+J)-PHI(1+1,J))/DX+GX	VI=0.
$\frac{0(1 \text{ Th} 520)}{5130 \text{ UABOVE}=2 \cdot \text{W}^{4} + \text{U}(1 + \text{J})}$ $\frac{1}{\text{VT}^{4} + \text{V}^{4}}$ $\frac{1}{\text{VT}^{4} + \text{V}^{4}}$ $\frac{1}{520 \text{ SUM}[=(1 \wedge (1 + \text{J}) + ((1 + 1 + \text{J}) + ((1 + 1 + \text{J})) - 2 + 0 + ((1 + 1 + \text{J})) / 0 \times 5 + ((1 + 1 + \text{J})) / 0 \times 5 + ((1 + 1 + \text{J})) / 0 \times 5 + ((1 + 1 + \text{J})) / 0 \times 5 + ((1 + 1 + \text{J})) / 0 \times 5 + ((1 + 1 + \text{J})) / 0 \times 5 + ((1 + 1 + 1 + \text{J})) / 0 \times 5 + ((1 + 1 + 1 + \text{J})) / 0 \times 5 + ((1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +$	V1P=0,
VT=V- VT=V- VT=V- VT=VA 520 SUM1=(1A(1,J)*((U((+1,J)+U(1-1,J)-2+0*U(1,J))/DXS+ *(UBE(DU+UABOVE-2+0*U(1+J))/DYS)*(FHI(1+J)-PHI(1+1,J))/DX+GX	<u>60 TP 520</u> 5130 BABOVE=2.*BV+0(1)
VT*=VX 520 SUM1=(1A(I,J)*((U([+1,J)+U(I-1,J)-2.0*U(I,J))/DX5+ *(UBELOU+UABOVE-2.0*U(I,J)/DYS)+(FHI(I,J)-PHI(I+1,J))/DX+GX	VT=V4
<pre>&gt;20 SUML=c1A(1,J)*((01(+1,J)+b(I-1,J)-2.0*0(I,J))/DX5+ . *(UBELOU+UABOVE-2.0*0(I,J)/DY5)+(CHI(I,J)-PHI(I+1,J))/DX+GX</pre>	VTR=VA
· · · · · · · · · · · · · · · · · · ·	$\frac{520}{100} \frac{500}{100} \frac{510}{100} \frac{1}{100} \frac{1}{100$



SUM 2= (	UABOVE+UL[+J])*(VTR+VT}/4.~{UBELCW+U(1,J})*(VBP+VB)/4
527 IU(N)=	= J([, J) +91*(SUM1+SUY2/0Y+0.25*(U(1, J)+U(1-1, J))**2/DX
<u>*-0.254</u>	<pre>/(U([+1,])+')(1,J))**2/NX)</pre>
<u>517 VLFFI=</u>	
	[ _V ( [ + [ + ] ] )
<u>Ut=Ut</u>	
	[[,J+1]
UL = U( I	
<u>U31, =11</u>	<u>[[-[,]+]]</u>
	[,J+1], -0, -4] _60_11 521
	[,J+]].[0.1] <u>60 T0 522</u>
<u></u>	[,]+1],-2,-3, 60, 10, 502
	$[+]_{,j+1}_{,c}Q_{,l}_{,v}P_{,f}([+]_{,j})_{,c}P_{,l}(0,T) = 523$
	(+1,J+1), FU-7-30, P-F1 (+1,J), FU-73 (01 10 5230
	$[+]_{j,j}+[]_{n} [+]_{j,j}+[[+]_{j,j}]_{n} [n]_{n} [+]_{n} [$
E220 U01.201	
<u>&gt;230_V*1681</u>	<u> </u>
	· · · · · · · · · · · · · · · · · · ·
	n
501 TV/A1	221
<u></u>	620
0522 TV/N1=	-0
G0_T0	512
05.32 TV(N)=	- 7 / · · · · · · · · · · · · · · · · · ·
CO 11	532
523 VRICHI	(
UB2=0.	· · · · · · · · · · · · · · · · · · ·
0524 DE(EI)	I-1, J+11, EQ. 1.08. F(1-1, J). FQ. 1) GO TO 525
TELEL	I-1, J+11, FQ. 5. UR. F(1-1, J1, FQ. 5) GD TO 5250
IFLF()	I-1.J).F).6) GC TC 507
15(5()	[-1,J+1).VF.4.00.F([-1,J).NE.4) GO TO 526
VLEFT	=V(1,1)
GD TC	526
5250 VLFFT:	2.+ YW-V(1+J)
UL=UW	
URL=U	
<u>60 TJ</u>	526
525 VULFT=	
<u> 111=0.</u>	
UBL=0.	
-	
<u>. 60 TO</u>	526
0507 VEFET	
UL =0.	=v(1, J)
UL =0. U3L =0	=v(1,5)
UL =0. UL =0. U3L =0 526_SU41=	• • FTA(I,J)*((V([,J+1)+V(I,J-1)-2.0*V(I,J))/DYS
UL =0. UL =0. U3L =0 526 SUM1=1 ++(VR10	• • FTA(I,J]*((V([,J+1)+V(I,J-1)-2.0*V(1,J})/DYS GHT+VLFFT-2.0*V(I,J)/DXS)+(PHI(I,J)-PHI(I,J+1))/DY+GY
UL =0. UL =0. U3L =0 <u>526 SUM1</u> =1 *+(VK10 SUX2=	• • FTA(I,J]*({V([,J+1)+V(I,J-1)-2.0*V(1,J})/DYS GHT+VLFFT-2.0*V(I,J)/DXS)+(PHI(I,J)-PHI(],J+1)/DY+GY (UL+UBL]*(V(I,J)+VLEFT)/4(\R+UBR)*(V(I,J)+VPIGHT)/4.
ULE1. ULE1. U3L=0. U3L=0. 526_SU41=1 *+(V×10 SUX2= 528_TV(N)	• • FTA(I,J)*((V([,J+1)+V(I,J-1)-2.0*V(1,J))/DYS GHT+VLFFT-2.0*V(I,J))/DXS)+(PHI(I,J)-PHI(],J+1))/DY+GY (UL+UBL)*(V(I,J)+VLEFT)/4(UR+UBR)*(V(I,J)+VPIGHT)/4. =V(I,J)+DT*(SUM1+SUM2/DX+0.25*(V(I,J)+V(I,J-1))**2/DY
ULE1. ULE1. U3L=0. U3L=0. 526_SUM1=1 *+(VK1( SUX2= 528_TV(N): *-0.250	• • • FIA(I,J)*((V([,J+1)+V(I,J-1)-2.0*V(I,J))/DYS GHT+VLFFT-2.0*V(I,J)/DXS)+(PHI(I,J)-P4I(],J+L))/DY+GY (iLt+UGL1*(V(I,J)+VLEFT)/4 (UR+UBR)*(V(I,J)+VFIGHT)/4 =V(I,J)+DT*(SIM1+SU*2/DX+0.25*(V(I,J)+V(I,J-1))**2/DY *(V(I,J)+V(I,J+1))**2/DY)
UL = 0. UL = 0. U3L = 0. 526 SU <sup>M</sup> 1 = 1 *+(VR1: SUX2= 528 TV(N) *-0.25: G0 T0 0.5 X 5151	<pre>&gt;v(1, j) • FT4(1, j) *((V([, j+1)+V(1, j-1)-2.0*V(1, j))/DYS GHT+VLFFT-2.0*V(1, j))/DXS)+(PHI(1, j)-PHI(1, j+1))/DY+GY (UL+UGL)*(V(1, j)+VLEFT)/4(UR+UBR)*(V(1, j)+VPIGHT)/4. =v(1, j)+DT*(SUM1+SUV2/DX+0.25*(V(1, j)+V(1, j-1))**2/DY =v(1, j)+DT*(SUM1+SUV2/DX+0.25*(V(1, j)+V(1, j-1))**2/DY =v(1, j)+DT*(1, j+1))**2/DY) 532 532 532 532 533 533 533 533 533 533</pre>
526 SUM1=1 326 SUM1=1 326 SUM1=1 327 SUM2=1 328 TV (N)1 327 SUM2=1 328 TV (N)1 327 SUM2=1 328 TV (N)1 327 SUM2=1 328 TV (N)1 327 SUM2=1 328 SUM2=1 32	<pre>-v(1, J) - FT4(I, J) *((V([, J+1)+V(I, J-1)-2.0*V(I, J))/DYS GHT+VLFFT-2.0*V(I, J))/DXS)+(PHI(I, J)-PHI(I, J+1))/DY+GY (JL+USL)*(V(I, J)+VLEFT)/4(UR+UBR)*(V(I, J)+VPIGHT)/4. =v(I, J)+DT*(SUM1+SU*2/DY+0.25*(V(I, J)+V(I, J-1))**2/DY =v(I, J)+V(I, J+1))**2/DY] 532 I+1, J).VE.5) GO TO 504</pre>
050 F	=v(1,J) FT4(I,J)*((V([,J+1)+V(I,J-1)-2.0*V(1,J))/DYS GHT+VLFFT-2.0*V(I,J)/DXS)+(PHI(I,J)-PHI(I,J+1))/DY+GY (JL+U3L1*(V(I,J)+VLEFT)/4(UR+U3R)*(V(I,J)+VPIGFT)/4. =v(I,J)+DT*(SUM1+SUM2/0X+0.25*(V(I,J)+V(I,J-1))**2/DY =v(I,J)+V(I,J)+V(I,J+1))**2/DY 532 I+1,J).VE.5) GO TO 504 =UG =UG
UL=0. UL=0. U3L=0. 526_SU^41=1 *+(V×13 SUX2= 528_TV(N): *-0.25: G0_T0. 0529_IF(F( TU(N): G0_TV(N):	• • • FIA(I,J]*((V([,J+1)+V(I,J-1)-2.0*V(I,J))/DYS GHT+VLFFT-2.0*V(I,J))/DXS)+(PHI(I,J)-PHI(],J+1))/DY+GY (UL+UBL1*(V(I,J)+VLEFT)/4(UR+UBR)*(V(I,J)+VPIGHT)/4. =V(I,J)+DT*(SUM1+SUM2/DX+0.25*(V(I,J)+V(I,J-1))**2/DY *(V(I,J)+V(I,J+1))**2/DY) 532 I+1.J).VE.5) GO TO 504 =UG 5)5 =U(I,J)
0504 TU(N): 0529 IF(F( 0529 IF(F) 0529 IF(F) 0529 IF(F) 0504 TU(N): 0504 IU(N): 0505 IF(F)	• • • FIA(I,J)*((V([,J+1)+V(I,J-1)-2.0*V(I,J))/DYS GHT+VLFFT-2.0*V(I,J)/DXS)+(PHI(I,J)-PHI(I,J+1))/DY+GY (i]L+UGL1*(V(I,J)+VLEFT)/4 =V(I,J)+DT*(SUM1+SUM2/DX+0.25*(V(I,J)+V(I,J-1))**2/DY *(V(I,J)+DT*(SUM1+SUM2/DX+0.25*(V(I,J)+V(I,J-1))**2/DY *(V(I,J)+V(I,J+1))**2/DY) 532 =U(I,J)+V5.5) GO TO 504 =U(G 5)5 =U(I,J)
ULE0. ULE0. ULE0. U3L=0 526 SU <sup>M</sup> 1=1 *+(VR1 SUX2= 528 TV(N): *-0.25: G0 T0 0529 IF(F( TU(N): G0 T0 0504 TU(N): 0505 IF(F)	<pre>-v(1, j)v(1, j) - FTA(I, j) *((V([, j+1)+v(I, j-1)-2.0*V(I, j))/DYS FTA(I, j) *(V(I, j+1))/DY+GY (:jL+UBL)*(V(I, j)+VLEFT)/4 (UR+UBR)*(V(I, j)+VP(GHT)/4 =v(I, j)+DT*(SUM1+SU*2/DY) =v(I, j)+DT*(SUM1+SU*2/DY) 53? I+1.j).VE.5) GO TO 504 =UG 5)5 =U(I, j) I+1.NE.5) GO TO 506 =vG</pre>
0504 TU(N): 0504 TU(N): 0504 TU(N): 0505 IF(F( 0505 IF(F())))))))))))))))))))))))))))))))))	<pre>-v(1, j) FT4(1, j) *((V([, j+1)+v(1, j-1)-2.0*v(1, j))/DYS GHT +VLFFI-2.0*v(1, j))/DXS)+(PHI(1, j)-PHI(1, j+1))/DY+GY (:jL+USL1*(V(1, j)+VLEFT)/4(UR+UBR)*(V(1, j)+VPIGHT)/4. =v(1, j)+0T*(SUM1+SUM2/0X+0.25*(V(1, j)+V(1, j-1))**2/DY *(V(1, j)+V(1, j+1))**2/DY) 532 I+1, NE.5) GO TO 504 =UG 532 =U(1, j) I, NE.5) GO TO 506 =vG 532</pre>
0504 TV(N): 0506 TV(N): 0526 SUM1 = 0 0526 SUM1 = 0 **(VRI( SUX2= 528 TV(N): *-0,255 GO TO 0529 IF(F( TU(N): 0506 IF(F( TV(N): GO TU(N): 0506 TV(N):	<pre>-v(1, J)</pre>
0504 TU(N): 0504 TU(N): 0504 TU(N): 0504 TU(N): 0504 TU(N): 0504 TU(N): 0504 TU(N): 0504 TU(N): 0505 IF(F( TV(N): 0506 TV(N): 0506 TV(N): 0506 TV(N):	<pre></pre>
0504 TV(N): 0506 T(N) 0529 IF(F( 0529 IF(F( 0504 TU(N): 0505 IF(F( 1V(N): 0505 IF(F( 1V(N): 0505 IF(F( 1V(N): 0506 TV(N): 0506 TV(N): 0	<pre></pre>
UL = 0 + UL = 0 + SUX = - 526 SUM 1 = SUX = - 528 TV (N) - - 528 TV (N) - - - - - - - - - - - - - -	<pre>=v(1, j) = v(1, j) = v(1, j) *((V([, j+1)+v(1, j-1)-2.0*V(1, j))/DYS FTA(I, j) *(V(I, j+1))/DY+GY GTI *V_FT -2.0*V(1, j))/DXS)+(PHI(1, j) -PHI(1, j+1))/DY+GY (j]_+USL]*(V(I, j)+VEFT)/4 (UR+UBR)*(V(I, j)+VPIGFT)/4. = v(1, j)+DT*(SUM1+SUP2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+DT*(SUM1+2/DY)) 53? I+1.j).VE.5) GO TO 504 = UG = UG = UG = VG 532 = V(I, j) I+1.0201G0 TO 511 (11) (TU(N).TV(N).N=1.1020) T=1C0UVI+1 </pre>
UL = 0 + UL = 0 + SUM2 = 528 TV (N): *-0.25: GO TO 0529 IF (F ( TU(N): 0504 TU(N): 0504 TU(N): 0505 IF (F ( TV(N): GO TO 0506 TV(L): 532 IF (N.+ WP ITE ICCUN	<pre>-v(1, j) FT4(1, j) *((V([, j+1)+v(1, j-1)-2.0*v(1, j))/DYS GTT+vLFFI-2.0*v(1, j))/DXS)+(PHI(1, j)-PHI(1, j+1))/DY+GY (UL+UGL)*(V(1, j)+vLEFT)/4(UR+UGR)*(V(1, j)+VPIGFT)/4. =v(1, j)+0T*(SUM1+SUV2/0X+0.25*(V(1, j)+V(1, j-1))**2/DY *(V(1, j)+0T*(SUM1+SUV2/0X+0.25*(V(1, j)+V(1, j-1))**2/DY *(1, j)+0T*(SUM1+SUV2/0X+0.25*(V(1, j)+V(1, j-1))**2/DY *(1, j) I.+1020160_TO_511 (11) (TU(N), TV(N), N=1, 1020) T=ICOUNT+1</pre>
0504         101.20.           01.20.         031.20.           526         5041         11           \$	<pre>-v(1, j) FT4(1, j) *((V([, j+1)+v(1, j-1)-2.0*v(1, j))/DYS GdT *V_FFI-2.0*v(1, j))/DXS)+(PHI(1, j)-PHI(1, j+1))/DY+GY (:jL+USL)*(V(1, j)+vLEFT)/4(UR+UBR)*(V(1, j)+VPIG+T)/4. =v(1, j)+0T*(SUM1+SUV2/DX+0.25*(V(1, j)+V(1, j-1))**2/DY *(V(1, j)+V(1, j+1))**2/DY) 532 I+1, j).NE.5) GO TO 504 =UG 532 =U(1, j) I.J+1).NE.5) GO TO 506 =vG 532 =v(1, j) I.J0201GO TO 511 (11) (TU(N),TV(N),N=1,1020) T=ICOUNT+1 NJF</pre>
0504         101.00           01.00         0.00           526         50/41           526         50/41           \$00.70         10           \$100         10           \$28         TV(N):           \$29         15 (F)           60         10           0529         15 (F)           0504         TU(N):           0505         17 (F)           0506         TV(N):           532         15 (N)           \$32         16 (N)           \$32         17 (N)           \$511         CONTI	<pre></pre>
UILE0.           UILE0.           UILE0.           UILE0.           UILE0.           UILE0.           UILE0.           UILE0.           SUX1=0           526_SUM1=1           \$\$100000000000000000000000000000000000	<pre>&gt;v(1, j) FIA(I, j) *((V([, j+1)+v(I, j-1)-2.0*V(I, j))/DYS GHT+VLFFT-2.0*V(I, j))/DXS)+(PHI(I, j)-PHI(I, j+1))/DY+GY (UL+UBL)*(V(I, j)+VLEFT)/4 (UR+UBR)*(V(I, j)+VPIGHT)/4 =v(I, j)+DT*(SUM1+SUM2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+V(I, j+1))**2/DY) 532 I+1, j).VE.5) GO TO 504 =UG 5)5 =U(I, j) I.J.H).NE.5) GO TO 506 =VG 532 =V(I, j) I.J.H(N),TV(N),N=1,NN(j) D 11</pre>
UL = 0 + UL = 0 + SUX = - 526 SUM I = - SUX = - 528 TV (N) - - - - - - - - - - - - - -	<pre>&gt;v(1, j) FT4(I, j) *((V([, j+1)+v(I, j-1)-2.0*V(I, j))/DYS GT1 +VLFFT-2.0*V(I, j))/DXS)+(PHI(I, j)-PHI(I, j+1))/DY+GY (:jL+UGL)*(V(I, j)+VLEFT)/4 (UR+UGR)*(V(I, j)+VPIGFT)/4. =v(I, j)+DT*(SUM1+SUM2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+DT*(SUM1+SUM2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+DT*(SUM1+SUM2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+DT*(SUM1+SUM2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+DT*(N),NE1,D20) T=ICOUNI+1 **,p5 ((I) (Tj(h),TV(N),N=1,NNIj) D 11 540</pre>
0501         0121           0122         0122           0122         0122           0121         0122           0121         0122           0121         0122           0121         0122           0121         0122           0121         0122           0121         0121           0122         0121           0122         0121           0122         0121           0122         0121           0122         0121           0122         0121           0122         0121           0122         0121           0122         0121           0122         0121           0123         0121           0123         0121           0123         0121           0123         0121           0123         0121           0123         0121           0123         0121           0123         0121           0123         0121           0123         0121           0123         0121	<pre></pre>
0501         WLE1           UL=0.         UL=0.           UL=0.         UL=0.           526         SUM1=1           *+(VK1K         SUM2=           528         TV(N):           *-0.25:         GO TO           0529         IF(F(           TU(N):         GO TO           0504         TU(N):           0505         IF(F(           TV(N):         GO TO           0504         TU(N):           0505         IF(F(           TV(N):         GO TO           532         IF(N.)           532         IF(N.)           S0505         IF(E(           WPITE         ICCUN           N=0         S11           S11         CONTI           GO TC         540 N=0           M=0         M=0	<pre>&gt;v(1, j) FIA(I, j) *((V([, j+1)+v(I, j-1)-2.0*V(1, j))/DYS GHT+VLFFT-2.0*V(1, j))/DXS)+(PHT(I, j)-PHT(], j+1))/DY+GY (i)L+UGL1*(V(I, j)+VLFT)/4 (UR+UBR)*(V(I, j)+V)GhT)/4. =v(I, j)+DT*(SUM_1+SUM_2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+V(I, j+1))**2/DY) 532 I+1, j).VE.5) GO TO 504 =UG 5)5 =U(I, j) I.J-I).NE.5) GO TO 506 =vG 532 =v(I, j) I.JOECIGO TO 511 (11) (TU(N),TV(N),N=1,NN(j)) D 11 540</pre>
050 H 21           UL=0.           UL=0.           UL=0.           UL=0.           526 SUM1=1           *+(VR1:           SUX2=           528 TV(N):           *-0.25:           G0 T0           0509 IF(F(           TU(N):           0505 IF(F(           TV(N):           532 IF(N.)           \$528 IF(N.)           \$529 IF(N.)           \$529 IF(N.)           \$520 IF(N.)           \$520 IF(N.)           \$521 IF(N.)           \$521 IF(N.)           \$522 IF(N.)           \$521 IF(N.)           \$540 N=0 <td><pre>&gt;v(1, j) FIA(I, j) *((V([, j+1)+v(I, j-1)-2.0*V(1, j))/DYS GHT+VLFFT-2.0*V(1, j))/DXS)+(PHT(1, j)-PHT(1, j+1))/DY+GY (:]L+UGL1*(V(I, j)+VLEFT)/4 (UR+UGR)*(V(1, j)+VTGFT)/4. =v(1, j)+DT*(SUM1+SUM2/DX+0.25*(V(1, j)+V(1, j-1))**2/DY *(V(1, j)+V(1, j+1))**2/DY) 532 I+1, j).VE.5) GO TO 504 =:06 5)5 =U(1, j) I.J+1).NE.5) GO TO 506 =vG 532 =v(1, j) I.J+1).NE.5) GO TO 506 =v(1, j) I.J+1).NE.5) GO TO 507 =v(1, j) I.J+1).NE.5) G</pre></td>	<pre>&gt;v(1, j) FIA(I, j) *((V([, j+1)+v(I, j-1)-2.0*V(1, j))/DYS GHT+VLFFT-2.0*V(1, j))/DXS)+(PHT(1, j)-PHT(1, j+1))/DY+GY (:]L+UGL1*(V(I, j)+VLEFT)/4 (UR+UGR)*(V(1, j)+VTGFT)/4. =v(1, j)+DT*(SUM1+SUM2/DX+0.25*(V(1, j)+V(1, j-1))**2/DY *(V(1, j)+V(1, j+1))**2/DY) 532 I+1, j).VE.5) GO TO 504 =:06 5)5 =U(1, j) I.J+1).NE.5) GO TO 506 =vG 532 =v(1, j) I.J+1).NE.5) GO TO 506 =v(1, j) I.J+1).NE.5) GO TO 507 =v(1, j) I.J+1).NE.5) G</pre>
0001         0121           0120         0120           0120         0120           0120         0120           0120         0120           0120         0120           0120         0120           0120         0120           0120         0120           0120         0120           0120         0120           0120         0120           01200         0120           01200         0120           01200         0120           01200         0120           01200         0120	<pre></pre>
0501         0121           0122         0122           0122         0122           0121 <td><pre>&gt;v(1, j) FTA(I, j) *((V(I, j+1)+v(I, j-1)-2.0*V(I, j))/DYS GTI +VLFFT-2.0*V(I, j))/DXS)+(PHI(I, j)-PHI(I, j+1))/DY+GY (:jL+UGL)*(V(I, j)+VLEFT)/4 (UR+UGR)*(V(I, j)+VPIGFT)/4. =v(I, j)+DT*(SUM1+SUV2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+DT*(SUM1+SUV2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+UT(I, j+1))**2/DY) 532 I+1j).NE.5) GO TO 504 =UG 5)5 =U(I, j) I.J.NE.5) GO TO 506 =vG 532 =v(I, j) I.J.D201GO TO 511 (11) (TU(N).TV(N).N=1.1020) T=ICOUNI+1 NUE (I1) (TJ(N).TV(N).N=1.NNIJ) D 11 340 I.J=2, JEAVI I.J=2, JEAVI I.J=</pre></td>	<pre>&gt;v(1, j) FTA(I, j) *((V(I, j+1)+v(I, j-1)-2.0*V(I, j))/DYS GTI +VLFFT-2.0*V(I, j))/DXS)+(PHI(I, j)-PHI(I, j+1))/DY+GY (:jL+UGL)*(V(I, j)+VLEFT)/4 (UR+UGR)*(V(I, j)+VPIGFT)/4. =v(I, j)+DT*(SUM1+SUV2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+DT*(SUM1+SUV2/DX+0.25*(V(I, j)+V(I, j-1))**2/DY *(V(I, j)+UT(I, j+1))**2/DY) 532 I+1j).NE.5) GO TO 504 =UG 5)5 =U(I, j) I.J.NE.5) GO TO 506 =vG 532 =v(I, j) I.J.D201GO TO 511 (11) (TU(N).TV(N).N=1.1020) T=ICOUNI+1 NUE (I1) (TJ(N).TV(N).N=1.NNIJ) D 11 340 I.J=2, JEAVI I.J=2, JEAVI I.J=</pre>
050 H 21           UL=0.           UL=0.           UL=0.           UL=0.           SUM1=1           *+(VK1           SUM2=           528 TV (N):           *-0.252           GO TO           0529 IF (F (           TU(N):           0505 IF (F (           TV(N):           0505 IF (F (           TV(N):           0506 TV(K):           532 IF (N.)           \$32 IF (N.)           S11 CONTIN           %11F           3CONTIN           S40 N=0           M=0           D0 54           D0 54           M=0           D1 54           D2 54           N=N+1	<pre></pre>
UI         UI           UI         UI           UI         UI           SUM         II           \$26         SUM1           \$26         SUM1           \$28         SUM2           \$28         TV(N):           \$29         IF(F)           GO         TO           0529         IF(F)           TU(N):         GO           0505         IF(F)           0506         TV(N):           GO         TU(N):           532         IF(N)           \$532         IF(N)           \$511         CONTIN           \$511         CONTIN           \$60         TO           \$40         N=0           \$40         N=0           \$54         U(I)	<pre></pre>
USUN 121-0- UL=0- UL=0- UL=0- UL=0- UL=0- UL=0- UL=0- UL=0- SUX2= 526 SUM1=1 SUX2= 528 TV (N): 	<pre></pre>
0001         0100           01000         0100           01000         0100           01000         0100           01000         0100           01000         0100           01000         0100           01000         0100           01000         0100           01000         0100           01000         0100           01000         0100           01000         01000           01000         01000           010000         010000           0100000         0100000           010000000000         0100000000000000000000000000000000000	• • • FIA(I,J]*((V([,J+1)+V(I,J-1)-2.0*V(I,J))/DYS GHT+VLFFT-2.0*V(I,J))/DXS)+(PHI(I,J)-PHI(I,J+1))/DY+GY ((1,J)+DT*(SUM1+SUM2/5)+(0.25*(V(I,J)+V(I,J+1))**2/DY *(V(I,J)+V(I,J+1))**2/DY) 532 =U(I,J)+U(I,J)+V(I,J+1))**2/DY 532 =U(I,J) (1,J) NE.5) GO TO 504 =U(I,J) (1,J) (I,J) (1,J) (I,J) (I,J) (1,J) (I,J) (1,J) (I,J) (1,J) (I,J) (I,J) (1,J) (I,J)
050         10           01         01           03         12           526         50%1           \$26         50%1           \$10         526           528         TV (N):           \$28         TV (N):           \$28         TV (N):           \$60         T0           0529         IF (F (           TU (N):         0506           0505         IF (F (           TV (N):         60           0506         IF (F (           TV (N):         60           0506         IF (F (           TV (N):         60           0506         IF (F (           0506         IF (N):           532         IF (N):           \$32         IF (N):           \$40         N=0           M=0         01           \$40         N=0           M=0         01           \$44         N=0	<pre>FTA(I,J) FTA(I,J)*((V(I,J+1)+V(I,J-1)-2.0*V(I,J))/DYS GdT+VLFFI-2.0*V(I,J)/DXS)+(PHI(I,J)-PHI(I,J+1))/DY+GY ((1,J)+DT*(SUM1+SUM2/DX+0.25*(V(I,J)+V(I,J-1))**2/DY *(V(I,J)+V(I,J+1))**2/DY) 532 I+1,J).VE.5) GO TO 504 =:/G 5)5 =:U(I,J) I.J+1).NE.5) GO TO 506 =:VG 532 e:V(I,J) I.J+1).NE.5) GO TO 507 E:V(I,J) I.J+1).NE.5) GO TO 507 E:V(I,J).SU TO 507 E:V(I,J).SU TO 507 E:V(I,J).SU TO 507 E</pre>
0.000         0.000           0.000 <td></td>	
0.001         0.001           0.001 <td><pre></pre></td>	<pre></pre>
0001         0001           0001         0001           0001         0001           0001         0001           0001         0001           0001         0001           0001         0001           0001         0001           0001         0001           0001         0001           0001         0001           0001         0001           0001         001           0001         001           0001         001           0001         001           0001         001           0001         001           0001         001           0001         001           0001         001           0001         001           0001         001           0001         001           0001         001           001         001           001         001           001         001           001         001           001         001           001         001           001         001           001         001	
0504         UL         1           01         UL         2         UL         2           0526         SUM1 = 1         *+(VR11         1         2           528         TV(N1)         *-0.257         0         0         5           GO         TO         0529         1F(F(         TU(N1)         0         0         0         5         2         1F(F(         1         1         0         0         0         1         1         1         0         0         0         1         1         1         0         1	
0.000         0.000           0.0000         0.000           0.00000         0.000           0.0000000000         0.0000           0.00000000000000000000000000000000000	•         • <t< td=""></t<>
0.000         0.000           0.000         0.000           526         SUM1 ==           \$\$26         SUM1 ==           \$\$26         SUM2 ==           \$\$28         TV (N):           \$\$28         TV (N):           \$\$60         TO           0529         IF (F (           TU(N):         \$\$60           0505         IF (F (           TU(N):         \$\$60           0505         IF (F (           TV(N):         \$\$67           0506         TV(N):           \$\$760         TU(N):           \$\$77         \$\$78           \$\$10         0506           \$\$11         CONTIN           \$\$251         F(N,a)           \$\$12         F(N,a)           \$\$13         CONTIN           \$\$14         CONTIN           \$\$17         CONTIN           \$\$26         N=0           \$\$40         N=0           \$\$40         N=0           \$\$40         N=0           \$\$41         \$\$40           \$\$42         Ir (1,1)           \$\$43         Y           \$\$44         Y<	• • • • • • • • • • • • • •
0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.0000         0.000           0.0000         0.000           0.00000         0.0000           0.00000         0.0000           0.000000         0.0000           0.0000000         0.00000           0.00000000000         0.00000000           0.00000000000000000000000000000000000	
0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.000         0.000           0.0000         0.000           0.00000         0.0000           0.00000000000000000000000000000000000	<pre>&gt;</pre>
0.00         0.00           0.00 <td><pre>&gt; (1, J) &gt; (1, J) * ((V(I, J+1)+V(I, J-1)-2.0*V(I, J) //DYS GdI+VLFFI-2.0*V(I, J) //DXS)*((PHI(I, J)-D'H(I, J+1))/DY+GY ((I, J)+VLFFI-2.0*V(I, J) //DY+GY ((I, J)+VLFFI-2.0*V(I, J) //DY+GY ((I, J)+VLFFI-2.0*V(I, J) //DY+GY ((I, J)+VLFS) //DY+GY = ((I, J)+V(I, J+1))*2/DY &gt; ((I, J)+V(I, J)+2/DY = ((I, J) &gt; (I, J)+V(I, J)+2/DY = ((I, J) &gt; (I, J)+V(I, J)+2/DY = ((I, J) &gt; (I, J)+V(I), N=1, 1020) = ((I, J)+V(I), N=1, 1020) = ((I, J)+1)+V(I)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+V(I)+N=1, 1020) = ((I, I)+1)+V(I)+V(I)+N=1, 1020) = ((I, I)+1)+V(I)+V(I)+V(I)+V(I)+V(I)+V(I)+V(I)+V(I</pre></td>	<pre>&gt; (1, J) &gt; (1, J) * ((V(I, J+1)+V(I, J-1)-2.0*V(I, J) //DYS GdI+VLFFI-2.0*V(I, J) //DXS)*((PHI(I, J)-D'H(I, J+1))/DY+GY ((I, J)+VLFFI-2.0*V(I, J) //DY+GY ((I, J)+VLFFI-2.0*V(I, J) //DY+GY ((I, J)+VLFFI-2.0*V(I, J) //DY+GY ((I, J)+VLFS) //DY+GY = ((I, J)+V(I, J+1))*2/DY &gt; ((I, J)+V(I, J)+2/DY = ((I, J) &gt; (I, J)+V(I, J)+2/DY = ((I, J) &gt; (I, J)+V(I, J)+2/DY = ((I, J) &gt; (I, J)+V(I), N=1, 1020) = ((I, J)+V(I), N=1, 1020) = ((I, J)+1)+V(I)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+V(I)+N=1, 1020) = ((I, J)+1)+V(I)+V(I)+N=1, 1020) = ((I, I)+1)+V(I)+V(I)+N=1, 1020) = ((I, I)+1)+V(I)+V(I)+V(I)+V(I)+V(I)+V(I)+V(I)+V(I</pre>
0.00         0.00           0.00         0.00           526         SUM1 ==           \$	<pre>&gt;</pre>
0.001       0.001         0.002       0.001         0.002       0.001         0.002       0.001         0.002       0.001         0.002       0.001         0.002       0.001         0.002       0.001         0.001       0.001         0.	<pre>&gt;v(1, J) &gt;T(1, J)*((V(I, J+1)+V(I, J-1)-2.0*V(I, J) /DYS Gd1+VLFFI-2.0*V(I, J) /DXS)*(PHI(I, J)-DYI(I, J+1))/DY+GY (JL+U3L1*(V(I, J)+VLEFT)/4(UR+U3R)*(V(I, J)+VEGFT)/4 =V(I, J)+DY*(SINHSUM2/DYN+0.25*(V(I, J)+V(I, J-1))**2/DY *(V(I+J)+V(I, J+1))*2/DY1 532 =V(I, J)+V(I, J+1))*2/DY1 535 =U(I, J) +J+1).NE.5) GO TO 504 =06 535 =U(I, J) +J+1).NE.5) GO TO 506 =V6 532 =V(I, J) (11) (TU(N),TV(N),N=1,1020) T=ICOUNT+1 NUE (11) GT TO 542 =TU(N) =FV(N) 599 C3.ICOUNT) GU TO 543 (11) (TU(N),TV(N),N=1,1020) 544 1. J=2,JRA4 I. (TU(N),TV(N),N=1,1020) 544 I. (TU(N),TV(N),N=1,NNTJ) 544 I. J=2,JCOUNT) GU TO 543 I. J=2,JCOUNT) GU TO 541 S44 I. J (TU(N),TV(N),N=1,NNTJ) S44 I. J (TU(N),TV(N),N=1,NNTJ) S45 I. J (TU(N),TV(N),N=1,NNTJ) S45 I. J (TU(N),TV(N),N=1,NT S45 I. J (TU(N),TV(N),N=1,NT S45 I. J (TU(N),TV(N),N=1,NT S45 I. J (TU(N),TV(N),N=1,NT S45 I. J (TU(N),TV(N),N=1,NT S45 I. J (TU(N),TV(N),N=1,NT S45 I. J (TU(N),TV(N),N=</pre>

54	LCONTINUE	Q
	REWIND 11	-
	FREE-SURFACE VELOCITY CORRECTIONS	_
<u> </u>		-
054	ASSIGN 559 11. KR-1	-
	₽1 545 [=2,[B4f]	-
	1F(F(1,J).NF.3) 30 TO 546	-
·····	$\frac{[F(F(1+J-1), N(1+4)) - G(C-1(1+2)+47]}{[F(1+J-1), N(1+4)] - G(C-1(1+2)+47]}$	
·	1F(F(1+1,J),E).4) G0 TH 549	~
	IE(f([,J+1],E),4) GU IÙ 550	_
	$\frac{(j(1-1,j))}{(j(1-1,j))} = 0$	-
	V(1,J-1)=V(1,J)	-
054	B IF(F([+], J).MF.4) GO T ) 551	_
	16(F(1.1+1).FJ.4)_6( TO 553	-
	V(1, ))=U(1-1, )) V(1, (-1)-V(1, 1)	
		-
055	IF(F(I. I+1).E0.4) GO TO 552	_
	$V(I, J-L) = V(I, J) + \gamma Y * (U(I, J) - U(I-1, J)) / DX$	
055	? V(I,J)=.5+0Y+(U(I-1,J)-U(I,J))/0X	-
	V([,,J-1)=-V(],J)	_
	v(1, 1) = (v(1, 1) + v(1, 1-1))/2	-
	V([,J-1)=V([,J)	_
		-
054	V(3 + 1 + 1) = V(1 + 1)	-
	U(1,J) = (U(1,J) + U(1-1,J))/2.	_
	U(1-1, 1) = U(1, 3)	_
0.55	<u>GO TO 546 '</u>	-
	U(1,0)-(1(1,0)+0(1,-1,0)+0(1-1,0)+0(1,0)+0(1,0)+0(1,0)+0(1,0)+0(1,0)+0(1,0)+	-
	V([,J)=(V(I,J)+V([,J-1))/2.	_
	<u>V(1,J-1)=V(1,J)</u>	-
055	111 113 243	-
	V(1,J) = (V(1,J) + V(1,J-1))/2.	_
·······	V(1, J-1) = V(1, J)	-
054	7 IF(F(1+), J). NE.41 GO TC 555	-
	IF(F(I, J+1).NE.4) GU TIJ 556	ļ
*	<u></u>	-
·	V(1, J) = V(1, J-1)	-
	G0_T0_5%6	_
055	$\frac{V(I_{+}J) = V(I_{+}J-1)}{V(I_{+}J) = V(I_{+}J-1) + V(I_{+}J) +$	_
	U(I-1+J)=U(I+J)	-
	GQ TO 545	_
<u>055</u> 6	<u>5 IF(E(1-1,J),E),4) GO TO 558</u>	-
	$\frac{0(1,1)=0(1-1,1)-0(+(0(1,1)-0(1,1-1))/0)}{60 10 546}$	-
055	s U(1,J)=.j*9X*(V([,J-1)-V([,J])/DY	-
	<u>U(1-1, J)=-U(1, J)</u>	_
0559	5 TF(F(I-1,1),NF,4) G0 T0 559	-
	IF(F(I, J+1).EQ.4) GO TO 560	-
	$\frac{U(1-1,J)=U(1,J)+0X*(V(1,J)-V(1,J-1))/0Y}{0}$	_
0540	5U 11 540 ) U(1-1-J1=U(1-J)	-
	V(1,J)=V((,J-1)	-
		_
0555	V [1 + 1] = V [1 + 1] = V + 4 + 6 + 10 + 26 + 1 + 10 + 10 + 10 + 10 + 10 + 10 + 10	-
	CQ TQ 545	-
055	WRITE(5,28)1,J	_
0540	<u>GD 10 901</u>	-
<u>C</u>		-
C	IMPUSE RIGID WALL IND-SLIPI BOUNDARY CONDITIONS	-
<u> </u>	0.0 571 1=2-18431	-
	If (F(1, J) . EQ. 3) GO IN 572	•
	V(I,1)=,),0	-
	U(1,1) = -U(1,2)	-
57.	<u>- 90 - 10 - 272</u> 2 V(1,1)=V(1,2)	-
	11(1,1)=11(1,2)	-
573	V(1, J34() = 0.0	_
	<u>UT1+JOR(1=-UT1+JOR(1)</u>	-
		-
		2
		-

571	CONTINUE
	$\frac{1}{10} \frac{574}{1} J = 1.3BA^{2}$
	1E(1f(SYd, NE, 1), G) T(1, 575
	V(1,J)=V(2,J)
0671	<u>60 11 576</u>
0575	U(19A* • J) = 0 •
	V(1B4R, J)=-V(1BAK1, J)
	CONTINUE
0699	
C	
<u></u>	COMPUTE FORCES BETWEEN WHEFL AND SOLL
	SFX=0.
·	SFY=0.
	ASSIGN 653 10 KRE1
	D7 651 1=2+134x1
	IF(FF(1, J).NE.2) GO TO 651
	1F(F(1+1+1), NF, 5) G(; T() 551
	SAVE=ETA(1,J)
	$\frac{KFFP=FC(I,J)}{KF(I,J)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF(I,I)AF($
0653	SUM1=2.*0Y#FTA(1+J)*(U(1+J)+U(1-1+J)/DX
	IF(SUM1.LT.0.)) GO TO 654
0454	
0554	1F(SU42+LT+0+0) GC TP 655
	SUM 2=0.
0655	IF(PHI(1,J).LT.0.0) GO TO 555
	SUM4=PH(((,J)+KHOS+DY
	GII TG 657
0.655	SUN3=0.
0557	SUM = TAUXY(I, J) # DX
	SU:16=TA!JXY{[,J]+7Y
	EIA(1,J)=SAVE
	IF(F(I,J+1).NE.5) GO TO 660
-	CEV-CEV_ CIUE
	SFX=SFX-SUH2+SUH3
0550	IF(F[1,J-1).NF.5) GG TO 658
	SFX=SFX+SUM5
0658	IF(F(I+1,J). NE.5) GO TO 659
	SFX=SFX-SUI1+SUM4
0659	SEY=SEY-SUMS
	SFX=SFX+SUM1-SUM4
	SFY=SFY+SU46
0051	
	SFX=0.
- 04.1	SFY=2.+SFY
C	
C	REGION 80A- CHECK ESTIMATE OF WHEEL VELOCITY AGAINST
<u> </u>	CALCULATED VALUE, ADJUST ESTIMATE AND RE-CYCLE IF NECESSARY
<u> </u>	CONTRACT AND ADDRE ACCOUNTED THEATSCHAMMENTON AKTOTATE
	UWN=UW+(GX+SFx/W3)***T
	VMR=VM+(5Y+5FY/W))+01 C
	IF(SHX.VE.0.0) GD TO 810
	IF(SFXG.F0.0.0) GO TO 822
	SFXC=0.
	SFYG=Q.
0122	<u>61 [( 4)36</u>
	GN TO 305
0810	FRROPU=((SFX-SFXG)/SFX1*100.
	1F(A8S(3PRORU).1T.0.0001) 60 10 800
0800	\$rx1=\$FX
	SFXG1=SFXG
	SEXG=(SEX+SEXG)/2.
0805	X1=SFXG
	STXG-((SFX1+SFXG)-(SFX+SFXG1))/(SFXG-SFXG1+SFX1-SFX)
	5FX[=5FX]
	· · · · · · · · · · · · · · · · · · ·

# REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

0005	IF (SFY.NE.0.0) GU TO 819
	1E(SEYG.EQ.0.0) :0 TO 825
<u> </u>	
0425	595004eA
<u>V9</u>	CO TO 207
0819	1 BR/DP V=11 SEV-SEVC1755 V1×100-
0807	SFY1=SFY
	SEVCI=SEVC
·····	SFYG=(SFY+SFYG)//.
	GQ TC 807
0808	Y1=SFY:5 .
	\$EYG=((\$EY1=\$EYG)-(\$EY*\$EYG1))/(\$EYG-\$EYG1+\$EY1-\$EY)
	SFY1=SFY
	SFYG1=YL
0807	IF (AUS(EKRURU).LT.0.0001.AND.AUS(ERRORY).LT.0.0001) GO TO 804
	1F(A85(TCP-T).GT.(DT/2.)) GO TU 809
	WRITE (5,14) T, UAN, VWM, UG, VC, SFX, SFY, FRORI, ERRORY, IC
	WP (T* (5+21) SFX3+ SFYG
0809	IF(NOP.JE.10) (301 TO 804
	NOP=513+1 ·
	IF (ND3.NF.3) SU TO 4035
·····	<u>60 T7 4036</u>
0904	CONTINUE
<u> </u>	
<u></u>	REGION 80- CALCULATE MOVEMENT OF WHEEL AND TEST FOR SHIFT
<u> </u>	GREATER THAN ALLOWED
<u>c</u>	RE-CYCLE WITH REDUCED DT IF NECESSARY
Ç	
	$\frac{DXSF=(UV+UG)/2}{DXSF=(UV+UG)/2}$
	UYSF=((VW+VG)/2.)*CT
	<u>ISF= (4.*0) XSF )7.0X</u>
	<u>IF(ISF.E0.0.AND.JSF.LD.0) G0 10 857</u>
	WR11E15,1711
<u> </u>	
····-	Style=0
	WRITE (A. LG) DT. DTCP. DTPP. DTSP
	60 10 4036
857	CENTINUE
	IF(UW, 50, 0, 0) GC TO 6870
6870	1F(V8.F0.0.0) G0 T0 6868
6868	CONTINUE
	Uw=UG
	Vw=VG
	SFYG=SFX
-	SFYG=SFY
	SDXSF=SDXSF+DXSF
	SDY SF= SDY SF+DY SF
C	
٥	REGION 60 COMPUTE STRESS TENSOR OF FACH CELL
<u> </u>	FIND PRINCIPAL STRESSES AND DIRECTION
~	TEST YIELD CRITERIA
C	
<u> </u>	<u>Αν= ι</u>
C	MM=1 STNMAX=1.
<u>C</u>	MM=1 STNMAX=0. ASSIGN 615 TO KRET
C C 0600	MM=1 STNMAX=0. ASSIGN 615 TU KRET DU 601 J=2, JBAR1
C C 0600	MM=1       STNMAX=0,       ASSIGN 615 TU KRET       D0 601 J=2, JBAP1       01 601 J=2, JBAP1
C 0600	MM=1       STNMAX=0,       ASSIGN 615 T0 KRET       D0 601 J=2, JBAR1       D1 601 J=2, JBAR1       D1 601 J=2, JBAR1       D1 601 J=2, JBAR1       C
C 0600	MM=1         STNMAX=0.         ASSIGN 615 T0 KRET         D0 601 J=2, J8AR1         01 601 J=2, J8AR1         01 601 J=2, J8AR1         (d) T0 (611,612,613) MM         C         FC(1, J)=0         TAU(AVL_1L0,0)
C 0600 0611	MM=1         STEMAX=0.         ASSIGN 615 TU KRET         D0 601 J=2, J8AR1         D1 601 J=2, J8AR1         D1 601 J=2, J8AR1         Ch TO (611,612,613) MM         FC(1, J)=0         TAUXY(1, J)=0.0         E46(J=1) db 2 AND 5/J L1 ANS 21 CO TO (C)
C 0600 0611	MM=1         STNMAX=0.         ASSIGN 615 TU KRET         D0 601 J=2, J8AR1         01 70 (611, 512, 613) MM         C [[1, J]=0.0         TAUAY(I, J)=0.0         [[1, J]=0.0]
C 0600 0611	MM=1         STNMAX=0.         ASSIGN 615 TU KRET         D0 601 J=2, JBAP1         01 601 J=2, JBAP1         60 TO (611,612,613) MM         CC         FC(1, J)=0         TAUXY(1, J)=0.0         IF(F(1,J).NE.2.AND.F(1,J).NE.3) GO TO 601         UPP=(U(1,J+1)+U(1,J))/2.         UD = (U(1,J+1)+U(1,J))/2.
C 0600 0611	MM=1         STNMAX=0,         ASSIGN 615 T0 KRET         D0 601 J=2, JBAR1         D1 601 J=2, JBAR1         D1 601 J=2, JBAR1         C1 T0 (611,612,613) MM         C fc(1, J)=0         TAUKY(1, J)=0.0         IF(F(1,J)=NE.2.AND_F(1,J).NE.3) CO TO 601         URP=(U(1, J+1)+U(1, J))/2.         UUL=(U(1-1, J+1)+U(1-1, J))/2.         UUL=(U(1-1, J+1)+U(1-1, J))/2.
C 0600 0611	$\begin{array}{c} M^{M} = 1 \\ STNMAX = 0, \\ ASSIGN  615 \ TO  KRET \\ \hline D0  601  J = 2, JBAR \\ \hline D1  601  I = 2, JBAR \\ \hline I0  I0  (611, 612, 613)  MM \\ \hline C \\ FC(I, J) = 0 \\ \hline TAU(Y(I, J) = 0, 0) \\ \hline TAU(Y(I, J) = 0, 0) \\ \hline TF(F(I, J) = n, n_{E}, 2, AND = F(I, J) , NE, 3)  GO  TO  GO \\ \hline IF(F(I, J) = n, n_{E}, 2, AND = F(I, J) , NE, 3)  GO  TO  GO \\ \hline URP = (U(I, J + I) + U(I, J)) / 2, \\ \hline UD = (U(I - I, J + I) + U(I, J, J)) / 2, \\ \hline UD = (U(I - I, J) + U(I, J, I)) / 2, \\ \hline UA = I(U(I, J, I) + U(I, J, I)) / 2. \\ \hline UA = I(U(I, J, I) + U(I, J, I)) / 2. \\ \hline UA = I(U(I, I, I) + U(I, I, I) + U(I, I, I) ) / 2. \\ \hline UA = IO(I = I, I) + U(I, I, I) + U(I, I, I) ) / 2. \\ \hline UA = IO(I = I, I) + U(I, I, I) + U(I, I, I) ) / 2. \\ \hline UA = IO(I = I, I) + U(I, I, I) + U(I, I, I) ) / 2. \\ \hline UA = IO(I = I, I) + U(I, I, I) = IO(I, I) + U(I, I, I) ) / 2. \\ \hline UA = IO(I = I, I) + IO(I, I) + IO(I, I) ) / 2. \\ \hline IO(I = I) = IO(I = I) = IO(I = IO(I = I) = IO(I = I) = IO(I = I) = IO(I = IO(I = I) = IO(I = I) = IO(I = IO(I = I) = IO(I = IO(I = I) = IO(I = I) = IO(I = IO(I = I) = IO(I = IO(I = I) = IO(I = IO(I = IO(I = I) = IO(I = IO(I = IO(I = IO(I = IO(I = I)) = IO(I = IO(\mathsf$
C 0600 0611	MM=1         STNMAX=0.         ASSIGN 615 TU KRET         DU 601 J=2, JBAR1         01 601 J=2, JBAR1         01 601 J=2, JBAR1         01 601 J=2, JBAR1         01 001 J=2, JBAR1         Comparison         TAUXY(I, J)=0.0         TAUXY(I, J)=0.0         TAUXY(I, J)=0.0         C         JRP=(U(I, J+1)+U(I, J))/2.         UBL=(U(I-1, J+1)+U(I, J-1))/2.         UAP=(U(I, J-1, J)+U(I, J-1))/2.         UA=(U(I-1, J)+U(I-1, J-1))/2.         UA=(U(I-1, J)+U(I-1, J-1))/2.
C 0600 0611	$\begin{array}{c} H^{M}=1\\ STNMAX=0,\\ ASSIGN 615 TU KRET\\ \hline D0 601 J=2, JBAP1\\ \hline 01 10 (611,612,613) MM \\ \hline C (1,1)=0\\ \hline TAU4Y(1,J)=0,0\\ \hline TAU4Y(J=1,J)/2,0\\ \hline TAU4Y(J=1$
C 0600 0611	$\begin{array}{c} M^{M} = 1 \\ \texttt{STNMAX} = 0, \\ \texttt{ASSIGN 615 TU KRET} \\ \texttt{D0} 601 J = 2, J&\texttt{BAP1} \\ \texttt{O1} 601 J = 2, J&\texttt{BAP1} \\ \texttt{O1} 601 J = 2, J&\texttt{BAP1} \\ \texttt{O1} 10 (\texttt{G11},\texttt{S12},\texttt{G13}) \texttt{MM} \\ \texttt{C} \\ \texttt{FC1}, J = 0 \\ \texttt{C1} \\ \texttt{I} J = 0 \\ \texttt{I} \\ I$
C 0600 0611	MM=1         STNMAX=0,         ASSIGN 615 T0 KRET         D0 601 J=2, JBAP1         01 601 J=2, JBAP1         C         FC(1, J)=0         TALKY(1, J)=0.0         C         IF(F(1,J).wt.2.AND.F(1,J).NE.3) 60 TO 601         URP=(U(1,J+1)+U(1,J)/2.         UUL=(U(1,J+1)+U(1,J-1))/2.         UAP=(U(1,J)+U(1,J-1))/2.         UAL=(U(1,J)+U(1-1,J))/2.         VLA=(V(1,J)+V(1-1,J))/2.         VLA=(V(1,J)+V(1-1,J))/2.         VRA=(V(1+1,J-1)+V(1+J-1))/2.
C 0600 0611	MM=1         STNMAX=0.         ASSIGH 615 TU KRET         DU 601 J=2, JBAR1         D1 601 J=2, JBAR1         O1 0 (011,012,013)         MM = (01100 (011,012,013)         MM = (01100 (011,012,013)         TAUXY(I, J)=0.0         URP=(U(I, J+1)+U(I, J))/2.         UDL=(U(I-1, J)+U(I, J-1))/2.         UA=(U(I, J)+U(I, J-1))/2.         UA=(U(I, J)+U(I-1, J)+I)/2.         UA=(V(I, J)+V(I-1, J-1))/2.         VUA=(V(I, J)+V(I, J-1))/2.         VUA=(V(I, J)+V(I, J-1))/2.         VUA=(V(I, J)+V(I, J-1))/2.
C 0600 0611	HM=1         STNMAX=0.         ASSIGN 615 TU KRET         D0 601 J=2, J8AR1         01 601 J=2, J8AR1         (d) TO (611,612,613) MM         CC (1,1)=0         TAUXY(1, J)=0.0         URP=(U(1, J+1)+U(1, J))/2.         UDL=(U(1-1, J)+U(1, J-1))/2.         UA=(U(1-1, J)+U(1-1, J)-1)/2.         UA=(U(1, J)+V(1-1, J)-1)/2.         VLB=(V(1, J)+V(1-1, J)/2.         VRA=(V(1+1, J-1)+V(1+J-1))/2.
C 0600 0611	MM=1         STNMAX=0.         ASSIGN 615 TU KRET         D0 601 J=2, JBAP1         01 70 (611,612,613) MM         C         FG(1, J)=0         TAUXY(1, J)=0.0         TAUXY(1, J)=0.0         TAUXY(1, J)=0.0         TAUXY(1, J)=0.0         TAUXY(1, J)=10.0         UAP=(U(1, J+1)+U(1, J-1))/2.         UUL=(U(1-1, J)+U(1-1, J))/2.         UA=(U(1, J-1)+V(1-1, J))/2.         UA=(V(1, J-1)+V(1-1, J))/2.         VRA=(V(1+1, J-1)+V(1-1, J))/2.
C 0600 0611	MM=1         STNMAX=0.         ASSIGN 615 TU KRET         D0 601 J=2, JBAP1         01 601 J=2, JBAP1         01 601 J=2, JBAP1         01 601 J=2, JBAP1         01 001 J=2, JBAP1         01 001 J=2, JBAP1         01 001 J=2, JBAP1         01 001 J=2, JBAP1         01 01 J=2, JBAP1         01 01 J=2, JBAP1         01 01 J=2, JBAP1         01 01 (011, 611, 612, 613) MM         C         FC(1, J)=0         TAUXY(1, J=0.0         C         IF(F(1,J).NE.2, AND.F(1,J).NE.3) GO TO 601         UPP=(U(1,J+1)+U(1,J)/2.         UU1=(U(1,J+1)+U(1,J)/2.         UAP=(U(1,J)+U(1,J-1))/2.         UAP=(U(1,J)+U(1,J-1))/2.         UA=(U(1,J)+U(1-1,J))/2.         UA=(U(1,J)+U(1-1,J))/2.         UA=(V(1,J)+V(1-1,J))/2.         VUN=(V(1,J)+V(1-1,J))/2.         VRA=(V(1+1,J-1)+V(1,J-1))/2.

	VR8=(VL1+1,J)*V(1,1)/2,
	IF(IE(1.J).NE.2) GO TO 616
	IE(F(I+I, J), NE+1) 60 TO 618
	VRA=0.
	VR8=0,
	<u>60 TO 617</u>
0618	IF(f(I+1+J),NF,5) 60 TO 617
	<u>U3P = UG</u>
	UAMENG
	Vº8±VG
0617	IF(F(1-1,J).NE.1.OR.F(1-1,J).NE.6) GO TO 620
	UAL=0.
	<u>Udt =0.</u>
0620	IF(F(I-1,J).NE.5) GO TO 619
	UAL=UG
<u> </u>	UAL =IIG
0619	16(6(1, (+1), NE, 1) CO TO 622
<u> </u>	UBR=0.
	U9L=0.
	<u>VRB=0.</u>
	<u>VLB=0,</u>
0(22	
0044	URR=UG
	U3L=00
	VRB=VG
	VL8=VG
0621	IF(F(I,J-1).NE.1) GC TO 624
	V8A=D.
· · · · · · · · · · · · · · · · · · ·	ν(Δ=0.
	GD TO 623
0624_	IF(F(1, J-1).NE.5) GC_T() 623
	UAP =UG
	10 = 10 C
	VR A=VG
	VLA=VG
	GO TP 623
0616	<u>IF(FF(I+1,J-1).NE.1) GO TO 627</u>
0627	V(A=V)
	U4L=U6
	VLA=V/3
0625	IF(FE(I+1,J+1).NE.1) GO TO 626
0676	15/55/1-1-(+))-NE-11 GO TO 623
0020	
	VL 9=VG
0673	IF(F(1.J).NE.3) GO TC 628
	SUM1=0.
	SUB2=0.
;	TE(E(1-1.1).NE.4) G0 T0 605
	IF(F(1+1, J).FQ.4.08.F(1, J+1).FQ.4) GO TO 503
······································	SUMI=.5*(U(I.J+L)+U(I-1,J+1)-U(I,J)-U(I-1,J))/DY
	SUM2=.5+(V(I+1,J)+V([+1,J-1)-V(I,J)-V(I,J-1))/DX
0505	TELETT, 1+11, EC. 41 60 TO 603
	$\frac{1}{1} \frac{1}{1} \frac{1}$
	SUM 2=.5*(V(I, J)+V(I, J-1)-V(I-1, J)-V(I-1, J-1))/DX
	GN Tr 603
0605	IF(F(1, J+1), EQ.4) 60 TO 503
	$SUM I= \frac{1}{2} (V(I + J + I) + U(I - I + J + I) - U(I + J) - U(I - I + J)) / DY$
	59#2=145A=VLA+VK0=VLB1/12+40A1
0604	1F(F(1+1,J),NF.4) GU TO 607
	IF(F(I,J+1).Né.4) GP TO 608
	1F(F(1-1, J), F0.4) AN TO (03
	SU(1=.5*(U(1,J)+U(1-1,J)-U(1,J-1)-U(1-1,J-1))/DY
	$SU''^{2}=.5+(V(I_{+}J)+V(I_{+}J-1)-V(I-1_{+}J)-V(I-1_{+}J-1))/DX$
0400	<u>16111-1. (). 6). 4). 60. 50. 50. 50. 50. 50. 50. 50. 50. 50. 5</u>
0008	SUM 1= (138-UAR+JBL-UAL)/(2.*0Y)
	SUM2=. >*(V(1, J)+V([, J-1]-V(1-1, J)-V(1-1, J-1))/DX

0407 16(1) (1 1) 15 (1 CO TO 400
SUM2=(VPA-VLA+VR3-VL0)/(2.+0X)
<u> </u>
9610 SUM1=.5*(U(1,1)+U(1-1,1)-U(1,J-1)-U(1-1,J-1))/DY
$SU^{3} = 5^{4} (V(1+1, 1) + V(1+1, 1-1) - V(1, 1-1)) / 0X$
SUM1-(1)3P-UA0104(-0AL)7(2.*04)
$= \frac{50 + 2 = .5 + (v(1+1+J) + v(1+1+J-1) - v(1+J-1))/Dx}{50 + 2 = .5 + (v(1+1+J) + v(1+1+J-1)) - (1+J-1)/Dx}$
<u> </u>
0628 SUM1=(J3R-UAP+UAL-UAL)/(2.*0Y)
SUR2=(VRA-VLA+VRB-VLB)/(2.+DX)
0603  sub  = 2  s(ETA(1, 1)  s + 2)  s(1)(1)(1 - 1)(1 - 1)(1)  s + 2)
$\frac{1}{1}$
SIPAIR(L)=ABS(SIRN)
IF(STRAIN(IJ.LI.SINMAX) GO TO E29
STN*AX*STRAIN(1)
0629_CONTINUE
ETA(1, J) = ETA(2
TAUXY(1+J)=2+7*ETA(1+J)*STRN
IE(SU23.LT.(EKU1.J)**2))60_T0_601
IF(STRAL1(1)+LE+5A%AE)_CU_T(1-60]
CALL SPLINS (MNPTS, MNCVS, MYAX, NS, NCVS, MS, STRAN, STRES, STRAIN, EPS,
*PRDXI V, STRESS, SSL, SS2, S2, S3, DELY, H, IW, ITG)
fTA(1, 1)=0, $fRA(1, 1)/STRA(1)$
IF(STR)_GE.0.01 B0 T0 and
680 FAUXY(1,J)=STRESS(1,1)
FC([,J)=1
60 T3 501
0512 1E(E(1,1), NE, 2, AVD, E(1,1), NE, 3) CD TO 675
SIG 4AX(1, J)=0.0
CO T(' 501
0613 IF(F(I,J).NE.2.AND.F(I,J).NF.3) G0 T0 677
$S16K6Y(1, 1)=2, 2\pm 5T6(1, 1)\pm (V(1, 1)-V(1, 1-1))/DY$
0077 ETA(1, J)=0.
<u>S[GMAY(1, J)=0.0</u>
601 CONTINUE
601_CONTINUE
C STORE STRESSES ON TAPE
C STORE STRESSES ON TAPE
601 CONTINUE       C       C       C       C       C       C       C       LE(AdS(TSP-T), GL_(CT/2, 1), GD_LO_673
601 CONTINUE           C           C           STORE STRESSES ON TAPE           C           IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673
601 CONTINUE C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TU(670.671.672) MM
601 CONTINUE C C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TO(670.671.672) MP 0670 WRITE(9)T
601 CONTINUE C C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TO(570.671.672) MM 0670 WRITE(9)T WRITE(9)TAUXY
601 CONTINUE C C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TU(570.671.672) MM 0670 WRITE(9)TAUXY GO TC 673
601 CONTINUE C C C TF(A2S(TSP-T).GT.(CT/2.)) GO TO 673 GO TO(670.671.672) MM O670 WRITE(9)T WRITE(9)TAUXY GO TO 673 O671 WRITE(9)SIG"AX
601 CONTINUE C C C TF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TO(670.671.672) MP O670 WRITE(9)TAUXY GO TO 673
601 CONTINUE C C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TU(570.671.672) MM 0670 WRITE(9)TAUXY GO TO 673 0671 WRITE(9)SIGMAX GO TO 673 0672 WRITE(9)SIGMAX
601 CONTINUE C C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TU(570.671.672) MM O670 WRITE(9)TAUXY GO TC 673 O671 WRITE(9)SIGMAX GO TC 673 O671 WRITE(9)SIGMAX GO TC 573 O672 WRITE(9)SIGMAX FND FUE 9
601 CONTINUE C C C TF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TO(670.671.672) MP 0670 WRITE(9)T WRITE(9)TAUXY GO TO 673 0671 WRITE(9)SIGMAX GO TO 673 0672 WRITE(9)SIGMAX FND FILE 9 SECOND
601 CONTINUE C C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TU(570.671.672) MM 0670 WRITE(9)TAUXY GO TU 673 0671 WITE(9)SIGMAX GO TU 673 0672 WRITE(9)SIGMAX FND FILE % ISP=TSP+DTSP NSD=NSCH1
601 CONTINUE C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TU(570.671.672) MM O670 WRITE(9)TAUXY GO TU 673 O671 WRITE(9)TAUXY GO TU 673 O671 WRITE(9)SIGMAX GO TU 673 O672 WRITE(9)SIGMAX FND FILE 9 SIGMA SUBJECT SUBJEC
601 CONTINUE C C STORE STRESSES ON TAPE C IF(A2S(TSP-T).GT.(CT/2.)) GO TO 673 GO TO(670.671.672) MM O670 WRITE(9)TAUXY GO TO 673 O671 WRITE(9)SIG"AX GO TO 673 O671 WRITE(9)SIG GAX GO TO 673 O672 WRITE(9)SIG GAY FND FILE 9 SP=TSP+DTSP NSP=NSP+1 WRITE(6.25)T.NSP
601 CONTINUE C C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TU(570.671.672) MP 0670 WRITE(9)TAUXY GO TU 673 GO TO
601 CONTINUE C C STORE STRESSES ON TAPE C IF (AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TU(670.671.672) MM 0670 WRITE(9)TAUXY GO TU 673 0671 WRITE(9)SIGMAX GO TO 673 0671 WRITE(9)SIGMAX GO TO 673 0672 WRITE(9)SIGMAX GO TO 573 0672 WRITE(9)SIGMAX SD FILE 5 TSP=TSP+DTSP NSP=NSP+1 WRITE(6.25)T.NSP 0673 CUNTINUE
601 CONTINUE C STORE STRESSES ON TAPE C IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673 GO TU(670.671.672) MM O670 WAITE(9)TAUXY GO TU 673 O671 W7ITE(9)SIG"AX GO TU 673 O671 W7ITE(9)SIG 1AY FND FILE 9 ISP=TSP+DTSP NSP=NSP+1 W7ITE(6.25)T.NSP O673 CUNTI 4UF MM=M'1+1 IF(MM.LE.3) GO TO 600
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673         GO TO(570.671.672) MM         0670 WAITE(9) T         WRITE(9) TAUXY         GO TO 673         0671 W71TE(9) SIGMAX         GO TO 673         0672 WRITE(9) SIGMAX         GO TO 673         0672 WRITE(9) SIGMAX         SO TO 673         O672 WRITE(9) SIGMAX         SO TO 673         O673 CONTINUE         WRITE(5,25) IL, WSP         0673 CONTINUE         MH=M'1+1         IF(MM.LE.3) GO TO 600
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673         GD TU(570.671.672) MM         0670 WRITE(9) TAUXY         GD TU 673         GO TU 673         GO TU 673         GO TU 673         O671 WRITE(9) TAUXY         GO TU 673         0671 WRITE(9) SIGMAX         GO TU 673         O672 WRITE(9) SIGMAX         GO TU 673         O672 WRITE(9) SIGMAX         GO TU 673         O672 WRITE(9) SIGMAX         GO TU 673         O673 WRITE(9) SIGMAX         WRITE(9) SIGMAX         WRITE(9) SIGMAX         MR TIE(9) SIGMAX         MR TIE(6,25) T.NSP         MR TIE(6,25) T.NSP         MM=M'1+1         IF(MM.LE.3) GO TO 600         C         C         C ALCULATE THE CELL CISCREPANCIES
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673         GO TU(570.671.672) MM         0670 WAITE(9) T         WRITE(9) TAUXY         GO TU 673         0671 W7 ITE(9) SIG MAX         GO TU 673         0671 W7 ITE(9) SIG MAX         GO TU 673         0672 WRITE(9) SIG MAX         FND FILE 9         ISP=TSP+0TSP         NSP=NSP+1         MR=M'1+1         IF(MM.LE.3) GO TO 600         C         C         C         C         C
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673         GO TO(570.671.672) MP         0670 WRITE(9)T         WRITE(9)TAUXY         GD TO 673         GO TO 673         GO TO 673         GO TO 673         O670 WRITE(9)SIG GAX         GO TO 673         O672 WRITE(9)SIG GAY         .         FND FILE 9         ISP=TSP.075P         NSP=NSP1         WRITE(6.25)T.VSP         0673 CUNTIAUE         MM=M'1+1         IF(MM.LE.3) GO TO 600         C
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673         GD TU(570.671.672) MM         0670 WAITE(9) T         WRITE(9) TAUXY         GD TC 673         0671 WRITE(9) TAUXY         GD TC 673         0671 WRITE(9) SIGMAX         GO TC 673         0672 WRITE(9) SIGMAX         GO TC 53         0673 CUNT(405         MREMONIA
601 CONTINUE         C         STORE_STRESSES_ON_TAPE         C         IF(AdS(TSP-T).GT.(DT/2.)) GO_TO_673         GO_TO(670.671.672) MP         0670 WAITE(9)TA         WRITE(9)TAUXY         GO_TO_673         0671 W7TTE(9)STG"AX         GO_TO_673         0672 WRITE(9)STG"AX         GO_TO_673         0672 WRITE(9)STG TAY         YSP=TSP+DTSP         NSP=NSP+1         WRITE(6.25)T.NSP         0673 CUNTI 4UF         MRMM1+1         IF(MM.LE.3) GO_TO_600         C         C         IDMAX=0
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673         GO TO(570.671.672)MP         0670 WRITE(9)T         WRITE(9)TAUXY         GD TO 673         GD TO 673         O671 WRITE(9)SIG GAX         GO TO 673         O672 WRITE(9)SIG GAX         GD TO 673         O672 WRITE(9)SIG MAX         SO TO 673         O672 WRITE(9)SIG MAX         SO TO 673         O673 WRITE(9)SIG MAY         FND FILE 9         NSPENSPH1         WRITE(6,25)T.WSP         O673 CUNTINUE         MM=M'1+1         IF(MM.LE.3) GO TO 600         C         C         IDMAX=0         JOMAX=0         DMAX=0.
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(DT/2.)) GO TO 673         GD TU(570.671.672) MM         0670 WAITE(9) T         WRITE(9) TAUXY         GD TC 673         0671 WRITE(9) ISUGYAX         GO TC 673         0672 WRITE(9) SIGYAX         GO TC 673         0673 WRITE(9) SIGYAX         GO TC 673         0672 WRITE(9) SIGYAX         GO TO 673         0672 WRITE(9) SIGYAX         GO TO 50         NSP=SPENDE         NSP=SPENDE         NSP=SPENDE         WRITE(6,25) T.NSP         0673 CUNTI4UF         MM=M'1+1         IF(MM.LE.3) GO TO 600         C         C         IDMAX=0         JUMAX=0         DMAX=0         DMAX=0         DMAX=0         DY 4035 J=2, JBAR1
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(DT/2.)) GO TO 673         GO TO(570.671.672) MP         0670 WRITE(9)TAUXY         GO TO 673         0671 WRITE(9)TAUXY         GO TO 673         0672 WRITE(9)SIG"AX         GO TO 573         0672 WRITE(9)SIG"AX         GO TO 573         0672 WRITE(9)SIG TAY         FND FILE 5         NSP=NSP+1         WRITE(6.25)T.NSP         0673 CUNTI 4UF         MRMM-1+1         IF(MM.LE.3) GO TO 600         C         C         IDM AX=3         JOMAX=7         DMA X=0.         D1 4035 J=2, JBAP1
601 CONTINUE         C         SIDRE_SIRESSES_ON_TAPE         C         IF(AdS(TSP-T).GT.(ET/2.)) GO_TO_673         GD_TO(570.671.672.1407         0670 WAITE(9)T         WRITE(9)TAUXY         GD_TO 673         0671 WRITE(9)TAUXY         GD_TO 673         0671 WRITE(9)SIG(AX         GD_TO 673         0672 WRITE(9)SIG(AX         GD_TO 673         0672 WRITE(9)SIG(AX         GD_TO 673         0672 WRITE(9)SIG(AX         GD_TO 673         0672 WRITE(9)SIG(AX         GD_TO 673         O673 CUNTINUE         NSP=NSP+1         WRITE(6.25)T.VSP         0673 CUNTIAUE         MM=M'1+1         IF(MM.LE.3) GO TO 600         C
601 CONTINUE C STORE STRESSES ON TAPE C IF(AdS(TSP-I).6T.(ET/2.)) GO TO 673 GO TO(570.671.672) MP O670 WRITE(9)T WRITE(9)TAUXY GO TO 673 O671 WRITE(9)SIG"AX GO TO 673 O672 WRITE(9)SIG TAY FND FILE 5 ISP=TSP+DTSP NSP=NSP+1 MR IE(6,25)I.NSP O673 CUNT(4UF MM=M'1+1 IF(MM.LE.3) GO TO 600 C C C IDMAx=0 DMAx=0 DMAx=0 DMAx=0 D(1,j)=0 ADMAx=2
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(DT/2.)) GO TO 673         GO TP(1670.671.672) MP         0670 MaltE(9)TAUXY         GO TP 673         0671 MaltE(9)TAUXY         GO TP 673         0672 MaltE(9)SIG:AX         GO TP 673         0672 MaltE(9)SIG:AX         GO TP 673         0672 MaltE(9)SIG:AX         SD FILE 9         NSP=NSP+1         MAPTE(6.25)T.VSP         NSP=NSP+1         MAM=M1+1         IF(MM.LE.3) GO TO 600         C         C         C         OM AX=0         OM AX=0         OT 4035 J=2, JBAR1
601 CONTINUE         C       STORE STRESSES ON TAPE         C       IF(AdS(TSP-T).GT.(DT/2.)) GO TO 673         GO TU(570.671.672) MM       0         0670 MaltE(9)T       WRITE(9)TAUXY         GO TU(673       0         0671 MaltE(9)SIGMAX       GO TO 673         0671 MaltE(9)SIGMAX       GO TO 673         0672 MaltE(9)SIGMAX       GO TO 673         0672 MaltE(9)SIGMAX       GO TO 673         0673 CUNT(4UE       SETSPEDSP         NSPENSP+1       MAMMIHI         If(MALE.3) GO TO 600       C         C       CALCULATE THE CELL CISCREPANCIES         C       CALCULATE THE CELL CISCREPANCIES         C       IDMAX=0         D3 4035 J=2, JBAR1       D1 4035 J=2, JBAR1         01 (J)=0       AMMAX=0.         C       IF(F(L,J)=NE-2-AMD.FE(L,J)=NE-2) GO TO 4035
601 CONTINUE         C       STORE STRESSES ON TAPE         C       IF (AdS(TSP-T).GT.(DT/2.1) GO TO 673         GO TU(570.671.672) MP       0670 M21TE(9)T         WRITE(9)TAUXY       0670 M21TE(9)SIG:XX         GO TO 673       0671 M21TE(9)SIG:XX         GO TO 673       0672 M21TE(9)SIG:XX         GO TO 673       0672 M21TE(9)SIG:XX         GO TO 673
601 CONTINUE         C         STORE_STRESSES_ON_TAPE         C         IF(AdS(TSP-T).GT.(CT/2.)) GO_TO_673         GO_TUL570.671.672.492         0670 M21[E(9)1         WRITE(9)TAUXY         GO_TO_673         0671 M21E(9)SIG*AX         GO_TO_673         0672 MRIE(9)SIG*AX         GO_TO_673         0672 MRIE(9)SIG*AX         GO_TO_673         0672 MRIE(9)SIG*AX         GO_TO_673         0673 CUNT(MUE         MSP=NSP+1         WRITE(6,25)TENSP         0673 CUNT(MUE         MM=M'1+1         IF(M4.LE.3) GO_TO_600         C         C         C (ALCULATE THE CELL CISCREPANCIES         C         IDMAX=0         DMA X=0         DMA X=0         DMA X=0.         DMA X=0.         DMA X=0.         O(1, J)=0         ADMAX=0.         D(1, J)=0         ADMAX=0.         D(1, J)=0(U(1, 1)-U(1-1, J))/DX)+t(V(1, J)-V(1, J-1))/DY)
601 CONTINUE         C         STORE_STRESSES_ON_TAPE         C         IF(AdS(TSP-T).GT.(CT/2.)) GO_TO_673         GO_TU1570.671.672) MP         0670 M21TE(9)TAUXY         GO_TC_673         0671 W21TE(9)SIG'AX         GO_TC_673         0672 M21TE(9)SIG'AX         GO_TC_673         0672 M21TE(9)SIG'AX         GO_TC_673         0672 M21TE(9)SIG'AX         GO_TC_673         0673 CUNT1E(9)SIG'AX         MSP=NSP+1         MSP=NSP+1         MSP=NSP+1         MM=M'1+1         IF(MMLE.3) GO_TO_500         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         C         CALCULATE THE CELL CISCREPANCIES         C         C         DMAX=0         DMAX=0         O(1,4035 J=2,JBAP1         O(1,4035 J=2,JBAP1 <td< td=""></td<>
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(CT/2.)) GO TO 673         GO TU(570.671.672) MP         0670 MRITE(9)T         WRITE(9)TAUXY         GO TO 673         0671 WRITE(9)SIG"AX         GO TO 673         0671 WRITE(9)SIG"AX         GO TO 673         0672 WRITE(9)SIG"AX         GO TO 673         MSP=TSP+075P         NSP=NSP+1         WRITE(6.25)T.VSP         0673 CUNT(40 <sup>±</sup> )         MR=M1+1         IF(MM.LE.3) GO TO 600         C         C         IDMAX=0         DMAX=0.         OUT 4035 J=2.JBAPI         OD 404x=0.         OUT (J=0         ADMAX=0.         OUT (J=0         ADMAX=0.         OUT (J=0.         ADMAX=0.         OUT (J=0.         ADMAX=0.         IF((F(I,J).CO.1) AD:(AV=-L(I,J) AD:(A)=(I,J-1))/DY)         ADMAX=0.(I,J)
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF (Ads(TSP-T).GT.(CT/2.)) GO TO 673         GO TU(570.671.672) MP         0670 WRITE(9) TAUXY         GO TO 673         0671 WRITE(9) SIGVAX         GO TO 673         0671 WRITE(9) SIGVAX         GO TO 673         0672 WRITE(9) SIGVAX         GO TO 673         0672 WRITE(9) SIGVAX         SPETSPHOTSP         NSP=NSP+1         WR TE(6.25) I.VSP         0673 CUNIT 405         MM=M+1         IF (MM.LE.3) GO TO 600         C         C         IDMAX=0         JOMAX=0         DMAX=0.         DY 4035 J=2, JBARI         DO 4035 J=2, JBARI
601 CONTINUE C C STORE STRESSES ON TAPE C IF(AdS(ISP-I).GT.(CT/2.)) GO TO 673 GO TU(570.671.672) MP 0670 WAITE(9) TAUXY GO TU 673 GO TU 673 0671 W2 ITE(9) SIG WAX GO TU 673 0671 W2 ITE(9) SIG WAX GO TU 673 0672 WR ITE(9) SIG WAX FND FILE 5 ISP=TSP+DTSP NSP=NSP+1 W2 ITE(6.25) I.VSP 0673 CUNIT4UF M4=M1+1 IF(EMA.LE.3) GO TO 600 C C C C C C C C C C C C C C C C C C
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(DT/2.)) GO TO 673         GO TU(570.671.672) MP         0670 WAITE(9) IAUXY         GO TU 673         0671 WRITE(9) IAUXY         GO TU 673         0671 WRITE(9) SIG(AX         GO TO 673         0672 WRITE(9) SIG (AY         FND FILE %         150 F150 F0 F30         NSP=NSP+1         WRITE(6,251T.VSP         0673 CUNTINUE         MA=M'1+1         IF(AM.LE.3) GO TO 600         C         C         C         OMAX=0         DMAX=0         DMAX=0         DMAX=0.         MDMAX=0.         MDMAX=0.         IF(IF(I,J).AFE.2.AJD.F(I,J).NE.2) GO TO 4035         P(I,J)=0         MMMAX=0.         IF(IF(I,J).AFE.2.AJD.F(I,J).NE.2) GO TO 4035         P(I,J)=(U(I,I).DU(I-1,J))/DX)+((V(I,J)-V(I,J-1))/DY)         ADMAX=1.
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IF(AdS(TSP-T).GT.(ET/2.)) GO TO 673         GO TO GT.(GT.GT.).GT.(ET/2.)) GO TO 673         GO TO GT.GT.GT.(GT.).GT.(ET/2.)] GO TO 673         GO TO GT.GT.GT.GT.(GT.).GT.(GT.).GT.GT.GT.GT.GT.GT.GT.GT.GT.GT.GT.GT.GT.
601 CONTINUE         C         STORE STRESSES ON TAPE         C         IFIAdS(TSP-TJ.GT.(ET/2.)) GO TO 673         GO TU(670.671.672) MM         0670 MATTE(9) TA         WATTE(9) TA         GO TU 673         GO TU 673 <t< td=""></t<>

4015	CINTINIE
C_	
C	TEST FOR TIME TO PRINT CELL VARIABLES ON LINE
C	
·····	II (AUS(ICP-1).GI. (DI/2.)) GG TO 720
*	00 4033 J=MJS+NJF
	DD 4033 I=NIS,NII
	HPLIF (6.4002) L, J.X(L), Y(J), W(L,J), #Y(L,J), B(L,J), PHILL-J), R(L,J).
	<pre>%%IGMAX(1+J)+\$16MAY(1+J)+IAUXY(1+J)+F(1+J)+F(1+J)+F(1+J)+KC(1+J)</pre>
40.53	WPITF(6+4031)T
0720	CONTINUE
C	
<u>ç</u>	REGION TO PARTICLE MOVEMENT
<u> </u>	N/1=1020
	00 721 M=1, MPARL
	IF(M.LE. MPAR) GO TO 722
	NN=MPPR
0722	<u>KEAU(14)([XK(N], IYK(N), N=1, NN]</u>
•*·	XK(N) = T XK (M)
	YK(N)=TYK(N)
	<u>I=XK(N)/DX+2.0</u>
	J=TK(N)/UY+/) 51-1
	Fjaj
<u>.</u>	EX=XX(N)/DX+2.0-FI
	FY=YK(V)/DY+2.0-FJ
	<u></u>
	<u>U1=U(1-1,J)</u>
	U2=U(1,J)
	IF(FY_LT.0.5) GR TO 703
	37-(17)(J)-TK(N)/UT U3=()(1-1+1+1)
	U4=U(1,J+1)
	IF(FF(1-1, J).NE.1) GO TO 704
	<u>U3=UN</u>
	60 tJ 705
0704	IF(FE(I-1,J+1).NE.1) 60 TO 705
	US=U1 1F(F5(1+1,1),NF,1) 60 T0 705
0105	U4=UN
	U2=I/w
	GO T-7 707
0706	1+(+=(1+1+1+J+1)+N++1) GU TO 707
	GO TO 707
0703	SY= (YK(N)-YPL (J-1))/DY
<b>_</b>	$U_{J} = U(I - I_{J} - I_{J})$
	19-0(1+J-1) 16(57(1-)-(1-N5-1) CO TO 708
	U3=UW
	11=UN
0708	1/3=111
0709	[E(FE(1+1,J).NF.1) GG TG 710
	N4=UM
<u> </u>	
0710	1F(FF(1+1,J-1).NE.1) GO TO 707
	U4=U2
707	UX=(0.5+5X)*().5+5Y)*U1+(0.5-5X)*(0.5+5Y)*U2
·	*+(0,)+)X/*(0,)-)Y/#U3+(0,)-)X/#(0,)-)Y/#U4
	SY=(Y(J)-YK(N))/DY
<u> </u>	V1=V(1,J-1)
	<u>V2=V(1,J)</u>
	18177341799537597777711 SX#(X2)171-XX10170X
	V3=V(1+1,J-1)
	V4=V([+],J)
	IF(FF(I, J-1), VE.1) GO TO 712
	V 1= V W V   = V W
	Gi) T <sup>1</sup> 713
0712	1/(Ff([+1, J-1].NG.1) GO TO 713
0713	17155119JTL7+NC+17-00-516-714 V4=VN
	V2=VW
·····	
······	

<u> </u>
0714 [F(FE(1+1,J+1),NE+1) CO TO 715
<u>V4=v2</u>
<u> </u>
711 SX = (XK(N) - XPL(I-1))/DX
V3 = y(1 - 1 - J - 1)
<u>V4=v(I-1, j)</u>
<u>17(+F(1,J-1),NE,1) 60 TO 716</u>
<u>V3=v</u> K
V  =VK
60 10 717
0716 IF(Ft(I-1,J-1).NE.1) GO TO 717
V3=V1
0717 (F(FF(1,J+1).NE.L) GD TD 718
V4 = vW
V2=JH ',
60 19 715
0718 [F(FF(I-1+J+1),NE+1) GU T) 715
V4=V?
715 VK = (0.5+5X) + (0.5+5Y) + V1 + (0.5+5X) + (0.5-5Y) + V2
++(0,5-SX)+(0,5+SY)+V3+(0,5-SX)+(0,5-SY)+V4
701 CONTINUE
$W_{11}T_{1$
721 CONTINUE
4Ft IPD 14
2FWIAD 15
······································
C COMPLIES COOPDINATES OF DARTICLES ASTER SUISTING
DO 9/7 1-1. IDAD
00 547 J# LIDER D0 647 I-1 IBAD
<u> </u>
N#=1020
UI 841 ME1, MPARI
IFIM.LE. PAPI GO TO 842
0842_35AD[15](XK(Y],YK(N),N=1,NN)
00 811 N=1,00
IF((XK(N)-DXSE).LT.0.0.0R.(YK(N)-DYSE).GT.YT) GC:TO B11
KPLUM=KPLUM+1
KPLM=KPLM+1
TXK (KPLUM)=XK (N)-DXSF
$TYK(KPLUM) = YK(N) - \partial YSF$
I=TYK(KPLUP)/0X+2.0
J=TYK(KPLUN)/NY+2.0
IF(F(1,J).NF.5) 30 TO 844
II = (TXK(KPLUN) + DXSF)/DX + 2.
IF(F(II,J), E0.5) GO TO 845
TXK(KPLUA)=TXK(KPLUM)+DXSF
GO TO 844
0845 JJ=(TYK(KPLUP)+0YSF)/PY+2.
IF(F(I,JJ)+0.5) GD TC 846
TYK (KPLIM) = TYK (KPLUM) + DYSF
G0 T0 844
0846 WEITEL6.60)
WRITE(0.59)(. 1. TXK(KP)(M). TYK(KP)(M). F(1.1). F(1.1)
COLTE 901
0844 CONTAILE
CD TO TO TO
01 W 11 111
KDI IN-A
- <u>811 CONTINUE</u>
- <u>811 CONTINUE</u> <u>841 CONTINUE</u> <u>814 UNE</u>
811 CONTINUE 841 CONTINUE 813 N=KPLUM 613 N=KPLUM
811 CONTINUE           841 CONTINUE           813 N=KPLUM           C
811 CONTINUE           841 CONTINUE           813 N=KPLUM           C           K=KPLM           C
811 CONTINUE       841 CONTINUE       813 N=KPLUM       C       K=KPLM       C
BII CONTINUE 841 CONTINUE 813 N=KPLUM C K=KPLM C C C CONTRUL THE DISPLACEMENT OF SHIFTING COCRDINATES LESS THAN C HALF CELL WIDTH EACH TIME
811 CONTINUE         841 CONTINUE         813 V=KPLUM         C         K=KPLM         C         C         C         C         C         C         C         C         C         C         C         C         HALF CELL WIDTH EACH TIME         C
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C         CONTRAL THE DISPLACEMENT OF SHIFTING COCRDINATES LESS THAN         C         HALF CELL WIDTH EACH TIME         C         CNX=NX
811 CONTINUE       841 CONTINUE       813 N=KPLUM       C       K=KPLM       C       CONTRAL THE DISPLACEMENT OF SHIFTING COCRDINATES LESS THAN       C       HALF CELL WINTH EACH TIME       C       CNX=NX       CNY=NY
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C <t< td=""></t<>
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C <t< td=""></t<>
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C         CONTRUE THE DISPLACEMENT OF SHIFTING COCRDINATES LESS THAN         C         HALF CELL WIDTH EACH TIME         C         CNX=NX         CNY=NY         XKNX=SCHLCY=1.01*DXK         YKNY=YO+(CNY=1.01*DXK         YKNY=YO+(CNY=1.01*DYK         S1X=XP+SIXSE
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C         MALF CELL WIDTH EACH TIME         C         CNX=NX         CNY=NY         XKNX=KO+LCNY-1,01*DXK         YKNY=YJ+(CNY-1,0)*DYK         S1X=XP+S0XSE         SNY=YI+S0YSE
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C         MALF CELL WIDTH EACH TIME         C         CNX=NX         CNY=RIY         XKNX=X2+(CPY-1.0)*DXK         YKNY=Y0+(CNY-1.0)*DYK         SIX=XP+SIXSE         SNY=Y1+SDYSE         M={ S4X-XkNX}/DXK-XSEPAR
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C         CONTROL THE DISPLACEMENT OF SHIFTING CORDINATES LESS THAN         C         HALF CELL WIDTH EACH TIME         C         CNX=NX         CNY=RIY         XKNX=X2+1CPY-1.01*DXK         YKNY=YJ+(CNY-1.01*DYK         SIX=XP+SIXSE         SMY=Y1+SDYSE         M= [ S4X-XK.NX] /DXK-XSEPAR         IF (M)M23+810+326
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C         C         WALF CELL WINTH EACH TIME         C         CNX=NX         CNY=NY         XKNX=KY+1CPY-1.0) *DXK         YKNY=YY+(CY-1.0)*DYK         S1X=XP+SIXSE         SNY=YT+SDYSE         M={ S4X-XKNX/DXK-YSEPAR         If (M)#23.010.326         OH26 XSEPAP=XSEPAP-1.
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C         MALF CELL WINTH EACH TIME         C         CNX=NX         CNY=NY         XKNX=X7+1CPX-1,01*DXK         YKNY=YJ+1CNY-1.01*DYK         S1X=XP+SNXSF         SMY=Y1+SDYSF         M={S4X=XKNX}/DXK+YSFPAR         IF(M)H23,810,326         OR26         XSFPAP=XSFPAP-1.
811 CONTINUE         841 CONTINUE         813 V=KPLUM         C         K=KPLM         C         CONTRUE THE DISPLACEMENT OF SHIFTING COCRDINATES LESS THAN         C         U         C         CNX=NX         CNY=NY         XKNX=Y7+(CPY-1.0)*DXK         YKNY=YJ+(CNY-1.0)*DYK         SNY=Y1+SOYSF         M={ S4X-XK.NX}/DXK-YSFPAR         IF(M)H2B+BL0+326         OH26
811 CONTINUE         841 CONTINUE         813 V=KPLUM         C         K=KPLM         C         Six=         Six =
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C         UNTRELIMENT OF SHIFTING COCRDINATES LESS THAN         C         HALF CELL WIDTH EACH TIME         C         CNX=NX         CNY=NY         XKNX=KY+1CPY-1.01*DYK         SNY=YT+SDYSE         M={SAX=XKNX}/DXK-YSEPAR         IF(M)H23.6U.0.326         OH26 XSEPAP=XSEPAP-1.
811 CONTINUE         841 CONTINUE         813 N=KPLUM         C         K=KPLM         C         MALF CELL WIDTH EACH TIME         C         CNX=NX         CNY=NY         XKNX=KOPLONY=1,01*DXK         YKNY=YJ+(CNY-1,0)*DXK         YKNY=YJ+(CNY-1,0)*DYK         SIX=XP+SDXSF         SMY=YI+SDYSF         M={S4X=XKNX}/DXK+YSFPAR         IF(M)H23,810,326         0H26

	GD TO 816
0876	CUNTINE
	YP=Y0-SDY SF
	XP=X0+(CNX+XSFPAR)+0XK=S0XSF
	00 814 ICY=1+NY
	N=R+1
<u> </u>	Txk (N) = <p< th=""></p<>
	<u>Tyk.(N) = yp</u>
	<u>XK(\)/DX+2.0</u>
	J= TYK (N) / DY+2.0
	KC([,J]=KC([,J]+L
	IFIN.LI.10201 G0 FG 815
	$\frac{4R[1^{2}(14) (12K(M), 19K(N), N=1, 1020)}{4R[1^{2}(14) (12K(M), 19K(N), N=1, 1020)]}$
014	
014	VIET INDE
014	
010	TE(1), 1, 200, 200, 27
0.0.29	
0527	CUNTIAUF ·
	YP=YC+(CNY+YSFPAS) *CYK-SDYSF
	XP=XQ+XSFP AR * DXK~ SDXSF
	D0-818 ICX=1,NX
	N=N+1
,	TXK (N) = XP
	TYK (N) = YP
	I=TXK(\)/DY+2.]
	J=TYK { 4} / DY+2.0
	KC(I,J)=KC(I,J)+1
	IF(N.LT.1020) 60 TO 817
	WRITF(14) $(TX < (N), TY < (N), N=1, 1020)$
	N=0
<u>817</u>	K=K+1
	XP=X0+0XK
818	
	YSFPAP=YSFPAR+1.0
80.30	
	MBB-V2AU-V3AV/102.0
······································	MDAD1-MOAD41 ((
	WRITE(14) (TYK(N), TYK(N), N=1, 4088)
	REWIGN 14
	REWIND 15
C	
<u>C</u>	STORE PARTICLE COURDINATES ON TAPE 10
<u>с</u> С . с	STORF PARTICLE COURDINATES ON TAPE 10
с ¦ С . с	STORF PARTICLE COURDINATES ON TAPE 10
с с с	STORF PARTICLE COORDINATES ON TAPE 10         IF(ABS(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT
C C C 0836	STORF PARTICLE COORDINATES ON TAPE 10 IF(ABS(TPP-T).GT.(CT/2.)) GC TO 834 ASSIGN 834 TO KPFT CONTINUE
C C C 0836	STORF PARTICLE COORDINATES ON TAPE 10           IF(ABS(TPP-T).GI.(ET/2.)) GC TO 834           ASSIGN 834 TO KPFT           CONTIMUE           D4TB(1)=T
C C C 0836	STORF PARTICLE COORDINATES ON TAPE 10           IF(ABS(TPP-T).GT.(ET/2.)) GC TO 834           ASSIGN 834 TO KPFT           CONTINUE           DATB(1)=T           DATB(2)=KBAR
C C C 0836	STORF PARTICLE COORDINATES ON TAPE 10           IF(A35(TPP-T).GI.(ET/2.)) GC TO 834           ASSIGN 834 TO KPET           CONTINUE           DATB(1)=T           DATB(2)=KBAR
C C C 0836	STORF PARTICLE COORDINATES ON TAPE 10           IF(ABS(TPP-T).GI.(CT/2.)) GC TO 834           ASSIGN 834 TO KPFT           CONTINUE           DATB(1)=T           DATB(2)=KBAR           DATB(2)=IBAR
C C C 0836	STORF         PARTICLE         COORDINATES         ON         TAPE         10           IF(ABS(TPP-T).GI.(ET/2.))         GC         TO         834         ASSIGN         ASSIGN
C C C 0836	STORF         PARTICLE         COORDINATES         ON         TAPE         10           IF (ABS(TPP-T).GI.(ET/2.))         GC         TO         834         ASSIGN         ASSIGN<
C C C 0836	STORF         PARTICLE         COORDINATES ON TAPE 10           IF (ABS(TPP-T).GI.(ET/2.))         GC TO 834           ASSIGN 834 TO KPFT         -           CONT(P)E         -           DATB(1)=T         -           DATB(2)=KBAR         -           DATB(4)=JBAR         -           DATB(5)=XR         -           DATB(5)=XR         -           DATB(6)=YT         -
C C C 0836	STORF PARTICLE COORDINATES ON TAPE 10         IF(A3S(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPET         CONTINUE         DATB(1)=T         DATB(2)=KBAR         DATB(3)=I8AR         DATB(5)=KR         DAT3(5)=KR         DAT3(5)=YT         DATB(2)=KW         DATB(2)=K         DATB(2)=K         DAT3(5)=YT         DATB(2)=X         DAT3(2)=-Y
C C C 0836	STORF         PARTICLE         COORDINATES ON TAPE 10           IF(A3S(TPP-T).GI.(CT/2.))         GC TO 834           ASSIGN 834 TO KPET           CONTINUE           DATB(1)=T           DATB(2)=KBAR           DATB(3)=IBAR           DAT3(5)=XR           DAT3(5)=YR           DAT3(6)=YT           DAT3(2)=JW
C C C 0836	STORF         PARTICLE         COORDINATES ON TAPE 10           IF(ABS(TPP-T).GI.(ET/2.))         GC TO 834
	STORF PARTICLE COORDINATES ON TAPE 10         IF (ABS(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINDE         DATB(1)=T         DATB(2)=KBAR         DATB(3)=IBAR         DATB(4)=JBAR         DAT3(5)=XR         DATB(2)=KJ         DATB(2)=KJ         ASSIGN 834 TO KPFT
C C C 0836	STORF PARTICLE COORDINATES ON TAPE 10         IF (A95(TPP-T).GT.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(2)=K BAR         DATB(1)=IBAR         DATB(1)=K         DATB(1)=VK         DATB(1)=UK         DATB(1)=VK
	STORF PARTICLE COORDINATES ON TAPE 10         IF(A3S(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPET         CONTINUE         DATB(1)=T         DATB(2)=K BAR         DATB(3)=IBAR         DATB(5)=KR         DATB(5)=KR         DATB(5)=KR         DATB(6)=YT         DATB(7)=4X         DATB(1)=UN         DATB(1)=VN         DATB(12)=DX         DATB(12)=DY         DATB(12)=DY
	STORF PARTICLE COORDINATES ON TAPE 10         IF(A3S(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(2)=K BAR         DATB(2)=K R         DATB(3)=TBAR         DAT3(5)=XR         DAT3(5)=XR         DAT3(6)=YT         DAT3(2)=CA         DAT3(2)=CA         DAT3(2)=CA         DAT3(2)=CA         DAT3(1)=UW         DAT3(1)=UW         DAT3(12)=DX         DAT3(12)=DX         DAT3(12)=DX         DAT3(13)=TPP         DAT3(15)=IWHEEL
	STORF PARTICLE COORDINATES ON TAPE 10         IF(ABS(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(2)=KBAR         DATB(2)=KBAR         DATB(3)=IBAR         DATB(5)=XR         DATB(5)=XR         DATB(5)=XR         DATB(6)=YT         DATB(6)=YT         DATB(6)=YT         DATB(2)=X         DATB(2)=X         DATB(1)=UW
	STORF PARTICLE COORDINATES ON TAPE 10         IF (ABS(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(2)=KBAR         DATB(3)=IBAR         DATB(5)=XR         DATB(5)=XR         DATB(7)=4X         DATB(7)=7M         DATB(1)=UW         DATB(1)=UW         DATB(1)=UW         DATB(1)=DX         DATB(1)=IWHEEL         DATB(1)=FSYN
	STORF PARTICLE COORDINATES ON TAPE 10         IF(A3S(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPET         CONTINUE         DATB(1)=T         DATB(2)=K BAR         DATB(2)=K BAR         DATB(3)=IBAR         DATB(5)=KR         DAT3(5)=KR         DAT3(5)=KR         DATB(2)=K BAR         DAT3(5)=KR         DAT3(1)=UW         DAT3(1)=UW         DAT3(1)=DX         DAT3(1)=DX         DAT8(1)=FKN         DAT8(1)=FKN         DAT8(1)=FKN         DAT8(1)=FKN         DAT8(1)=FKN         DAT8(1)=FFN         DAT8(1)=DX         DAT8(1)=EXN         DAT8(1)=FFN         DAT8(1)=FFN         DAT8(1)=FFN         DAT8(1)=FFN         DAT8(1)=FFN         DAT8(1)=FFN         DAT8(1)=FFN         DAT8(1)=FFNO         DAT8(1)=FFNO         DAT8(1)=UNO
	STORF PARTICLE COORDINATES ON TAPE 10         IF(A3S(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPET         CONTINUE         DATB(1)=T         DATB(2)=K BAR         DATB(3)=IBAR         DATB(5)=KR         DATB(5)=KR         DATB(5)=YT         DATB(6)=YT         DATB(7)=AK         DATB(7)=AK         DATB(1)=UN         DATB(1)=VN         DATB(12)=DX         DATB(13)=IWHEL         DATB(13)=IWHEL         DATB(15)=FYN         DATB(15)=WN         DATB(12)=VN         DATB(13)=UN         DATB(13)=UN         DATB(13)=UN         DATB(11)=VN         DATB(12)=VN         DATB(13)=UN         DATB(13)=UN         DATB(14)=DTPP         DATB(15)=IWHEL         DATB(16)=UNO         DATB(16)=UNO         DATB(16)=UNO         DATB(16)=UNO         DATB(16)=UNO
	STORF PARTICLE COORDINATES ON TAPE 10         IF (ASS(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(2)=K BAR         DATB(2)=K BAR         DATB(3)=IBAR         DATB(4)=JBAR         DAT3(5)=KR         DAT3(5)=XR         DAT3(6)=YT         DATB(7)=K         DAT3(2)=CM         DAT3(1)=UW         DAT3(1)=UW         DAT3(1)=UW         DAT3(12)=DX         CAT3(12)=DX         DAT3(12)=DX         DAT3(12)=DX         DAT8(11)=VH         DAT3(12)=DX         DAT8(13)=IMHEEL         DAT8(13)=IMHEEL         DAT8(13)=VHO         DAT8(13)=VHO         DAT8(13)=IMHEEL         DAT8(14)=DTP<
	STORF PARTICLE COORDINATES ON TAPE 10         IF (ASS(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPET         CONTINUE         DATB(1)=T         DATB(2)=KBAR         DATB(2)=KBAR         DATB(5)=KR         DAT3(5)=KR         DAT3(5)=KR         DAT3(5)=KR         DAT3(2)=KBAR         DAT3(2)=KX         DAT3(2)=KX         DAT3(2)=KX         DAT3(2)=KX         DAT3(2)=KX         DAT3(2)=KX         DAT3(2)=K         DAT3(2)=K         DAT3(1)=UW         DAT3(12)=DX         DAT8(12)=DX         DAT8(12)=DX         DAT8(12)=CM         DAT8(12)=CM         DAT8(12)=UW         DAT8(13)=UW         DAT8(13)=UW         DAT8(13)=UW         DAT8(13)=UW         DAT8(13)=UW         DAT8(13)=UWO         DAT8(13)=UWO         DAT8(13)=UWO         DAT8(13)=UWO         DAT8(13)=UWO         DAT8(13)=UWO         DAT8(12)=WO         DAT8(2)=WO         DAT8(2)=WO
	STORF         PARTICLE         COORDINATES ON TAPE 10           IF (ASS(TPP-T).GI.(ET/2.))         GC TO 834
	STORF PARTICLE COURDINATES ON TAPE 10         IF (A9S(TPP-T).GT.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(2)=K&AQ         DATB(2)=K&AQ         DATB(2)=K&AQ         DATB(3)=IBAR         DATB(5)=KR         DATB(5)=KR         DATB(5)=KR         DATB(5)=KR         DATB(5)=KR         DATB(7)=AX         DATB(7)=AX         DATB(7)=AX         DATB(10)=UW         DATB(10)=UW         DATB(10)=UW         DATB(11)=VH         DATB(12)=DX         DATB(12)=DX         DATB(13)=DY         DATB(14)=DTPP         DATB(15)=IFSYM         DATB(15)=IFSYM         DATB(16)=UWO         DATB(16)=UWO         DATB(16)=UWO         DATB(16)=UWO         DATB(16)=UWO         DATB(16)=UWO         DATB(19)=VKA         DATB(19)=VKA         DATB(19)=VKA         DATB(19)=VKA         DATB(2)=SOXSF         DATB(2)=SOXSF         DATB(2)=SOXSF         DATB(2)=SOXSF
	STORF PARTICLE COORDINATES ON TAPE 10         IF (A95(TPP-T).GT.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(2)=K3AR         DATB(2)=K3AR         DATB(2)=K3AR         DATB(3)=IBAR         DATS(5)=XT         DAT3(5)=XR         DAT8(7)=VX         DAT8(7)=VX         DAT8(1)=T         DAT8(1)=T         DAT8(1)=XW         DAT8(1)=VW         DAT8(1)=VW         DAT8(1)=UW         DAT8(1)=UW         DAT8(1)=VW         DAT8(1)=VWO         DAT8(1)=VWO         DAT8(1)=VWO         DAT8(1)=VWO         DAT8(2)=SDXSF         DAT8(2)=SDXSF         MAT8(2)=SDXSF         MAT8(2)=SDXSF         MAT8(2)=SDYSF         MRT8(2)=SDYSF
	STORF PARTICLE COORDINATES ON TAPE 10         IF (ASS(TPP-T).GT.(CT/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(1)=T         DATB(2)=K GAR         DATB(3)=I GAR         DATB(3)=I GAR         DATB(5)=XR         DATB(5)=XR         DATB(6)=YT         DATB(7)=KX         DATB(7)=K         DATB(7)=K         DATB(7)=K         DAT3(10)=UW         DAT3(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=UM         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=A         DATB(12)=WA         DATB(12)=WA         DATB(13)=DY         DATB(14)=DTPP         DATB(15)=IFSYN         DATB(15)=IFSYN         DATB(15)=IFSYN         DATB(15)=IFSYN         DATB(15)=IFSYN         DATB(15)=IFSYN         DATB(15)=FAO         DATB(12)=WA
	STORF PARTICLE COORDINATES ON TAPE 10         IF (A3S(TPP-T).GI.(CT/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTIMPE         DATR(1)=T         DATR(1)=T         DATB(2)=KBAR         DATR(1)=T         DATB(2)=KBAR         DATB(2)=KBAR         DATR(1)=T         DATB(2)=KBAR         DATB(2)=KBAR         DATB(2)=KBAR         DATB(2)=KBAR         DATB(2)=KBAR         DATB(1)=T         DATB(2)=KBAR         DATB(2)=KBAR         DATB(2)=KBAR         DATB(2)=KBAR         DATB(2)=KBAR         DATB(1)=KR         DATB(1)=KR         DATB(1)=KR         DATB(1)=KR         DATB(1)=KR         DATB(1)=KR         DATB(1)=KR         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=DX         DATB(12)=CR         DATB(12)=CR         DATB(12)=CR         DATB(12)=CR         DATB(12)=CR         DATB(12)=CR         DATB(12)=CR         DATB(12)=CR         DATB(12)=CR      <
	STORF PARTICLE COORDINATES ON TAPE 10         IF (ABS(TPP-T).GT.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTIMPSE         DAT8(1)=T         DAT8(2)=KBAR         DAT8(3)=TBAR         DAT8(3)=TBAR         DAT8(5)=XR         DAT8(5)=XR         DAT8(5)=XR         DAT8(2)=KBAR         DAT3(5)=XR         DAT8(2)=X         DAT8(2)=K         DAT8(2)=X         DAT8(2)=X         DAT8(2)=X         DAT8(2)=X         DAT8(2)=X         DAT8(1)=VN         DAT8(1)=VNO         DAT8(1)=VNO         DAT8(1)=VNO         DAT8(2)=SDXSF         DAT8(2)=SDXSF         DAT8(2)=SDYSF         MN=1020         INC         IN=(10) DAT8         NN=1020         IN         IN=VDAN </th
	STORF PARTICLE COORDINATES ON TAPE 10         IF (A3S(TPP-T).GT.(CT/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINDE         DAT8(1)=T         DAT8(2)=K8AR         DAT8(1)=T         DAT8(1)=T         DAT8(2)=K8AR         DAT8(1)=T         DAT8(1)=XR         DAT8(1)=XR         DAT9(1)=BAR         DAT9(1)=X         DAT8(1)=YT         DAT8(1)=XR         DAT8(1)=XR         DAT8(1)=XR         DAT8(1)=XR         DAT9(1)=UN         DAT3(1)=UN         DAT8(1)=VN         DAT8(1)=DX         DAT8(1)=DX         DAT8(1)=DY         DAT8(1)=DY         DAT8(1)=DY         DAT8(1)=TPP         DAT8(1)=TPP         DAT8(1)=TYN         DAT8(1)=VNO         DAT8(1)=VNO         DAT8(1)=VNO         DAT8(1)=VNO         DAT8(1)=TSYN         DAT8(1)=TSYN         DAT8(1)=NNO         DAT8(2)=SNXSF         DAT8(2)=SNXSF         DAT8(2)=SNXSF         DAT8(2)=SNXSF         DAT8(2)=SNXSF         DAT8(1)=SNE(50 TO 835
С С С 0836	STORF PARTICLE COORDINATES ON TAPE 10         IF (ABS(TPP-T).GT.(ET/2.)) GC TO 834         ASSIGN 834 TO KRFT         CONTIPUE         DATB(1)=T         DATB(2)=KBAR         DATB(2)=KR         DATB(2)=KR         DATB(2)=KR         DATB(2)=KR         DATB(2)=KR         DATB(2)=KR         DATB(2)=VK         DATB(1)=VW         DATB(1)=VW         DATB(1)=VW         DATB(1)=VHEEL         DATB(1)=VHO         DATB(1)=VHO </th
С С С 0836	STORF PARTICLE COORDINATES ON TAPE 10         IF (ASS(TPP-T).GT.(CT/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(2)=K&BAR         DATB(3)=IBAR         DATS(5)=XR         DATS(5)=XR         DATS(1)=T         DATS(1)=YT         DATS(1)=V         DATS(1)=DV         DATS(1)=V         DATS(1)=V         DATS(1)=V         DATS(1)=V         DATS(
C C C 0836	STORF PARTICLE COURDINATES ON TAPE 10         IF(ABS(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(1)=T         DATB(2)=KBAR         DATB(2)=KR         DATB(2)=KR         DATB(2)=KR         DATB(2)=KR         DATB(2)=KR         DATB(2)=KR         DATB(1)=FR         DATB(2)=KR
С С С 0836	STORF PARTICLE COURDINATES ON TAPE 10         IF(ASS(TPP-T).GT.(ET/2.)) GC TO 834         ASSIGN 834 TO KPET         CONTINUE         DATB(1)=T         DATB(2)=K 3AR         DATB(1)=K 4AR         DATB(1)=K 4AR         DATB(1)=K 4AR         DATB(1)=FX 4         DATB(2)=FX 4         DATB(2)=FX 4
С С С 0836	STORF PARTICLE COURDINATES ON TAPE 10         IF(ASS(IPP-T).GT.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINTE         DATB(1)=T         DATB(2)=K&AR         DATB(3)=IBAR         DATB(4)=JBAR         DATS(5)=XR         OATS(5)=YT         DATB(1)=T         DATB(2)=K&AR         DATS(5)=XR         OATS(5)=YT         DATB(7)=-XY         DATS(1)=YT         DATS(2)=X         DATS(1)=YT         DATS(1)=XW         DATS(1)=XW         DATS(1)=YT         DATS(1)=YT         DATS(2)=XW         DATS(2)=XW         DATS(1)=YT         DATS(1)=YT         DATS(2)=XW
С С С 0836	STORF PARTICLE COURDINATES ON TAPE 10         IF(ASS(TPP-T).GT.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINE         DATB(1)=T         DATB(2)=K6AR         DATB(3)=I6AR         DATB(3)=I6AR         DATB(1)=XR         DATB(1)=XR         DATS(5)=XR         DATS(5)=XR         DATS(6)=YT         DATS(1)=XR         DATS(2)=SOX         DATS(2)=XR         DATS(2)=SOX
С С С 0836	STORF PARTICLE COORDINATES ON TAPE 10         IF (ASS(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPFT         CONTINUE         DATB(11=T         DATB(2)=KBAR         DATB(3)=IRAR         DATB(3)=IRAR         DATB(3)=IRAR         DATB(3)=IRAR         DATB(1)=T         DATB(2)=KBAR         DATB(3)=IRAR         DATB(3)=IRAR         DATB(1)=V
C C C 0836	STORF PARTICLE COORDINATES ON TAPE 10         IF (A25(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPET         CONTINUE         DATB(1)=T         DATB(2)=K&AR         DATS(2)=K&AR         DATS(3)=IBAR         DATS(3)=K&AR         DATS(3)=K&AR         DATS(3)=K&AR         DATS(3)=K&AR         DATS(3)=K&AR         DATS(3)=K         DATS(3)=K         DATS(3)=X         DATS(4)=DAR         DATS(3)=X         DATS(1)=VN         DATS(1)=VN         DATS(1)=INFEL
С С С 0836	STORF PARTICLE COORDINATES ON TAPE 10         IF (ASS(TPP-T).GI.(ET/2.)) GC TO 834         ASSIGN 834 TO KPT         CONTINDE         DATB(1)=T         DATB(2)=KBAR         DATB(3)=IBAR         DATB(3)=IBAR         DATS(5)=XR         DATS(6)=YT         DATS(1)=XX         DATS(2)=XA         DATS(2)=X         DATS(1)=UN         DATS(1)=VN         DATS(2)=N         DATS(2)=N         DATS(2)=N         DATS(2)=N         DATS(2)=N         DATS(2)=N
С С С 0836	STORF PARTICLE COURDINATES ON TAPE 10         IF (A\$S(TPP-T).GT.(CT/2.)) GC TO 834         ASSIGV 834 TO KPET         CONTIPUE         DATB(1)=T         DATB(2)=K 8AR         DATB(3)=10AR         DATB(1)=T         DATB(1)=AR         DATB(1)=T         DATB(1)=T         DATB(1)=T         DATB(1)=AR         DATB(1)=AR         DATB(1)=AR         DATS(1)=AR         DATS(2)=AR         DATS(2)=AR         DATS(2)=AR         DATS(2)=AR         DATS(2)=AR         DATS(2)=AR     <

## REPRODUCIBILITY OF THE ORIGINAL PATT IS POOR

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HRITF(6,26)T,NPP
<u> </u>
C REGION 90- PEFLAG CELLS
0020 m 021 1-2,19481
IF(F(I,J)_NF-31 G0 T1 850
IF(AC(I,J),NE.O) GD TO 821
F(I,J)=4
0830 [F(F(1-1, J). NE.4) GO TO 831
U(I-1, I)=0.
<u>0831 IF(F(I,J+1)-NE-4) GC TO R32</u>
0832 [5[5] $1 = 1$ ] NE 4) CO TO POL
V([,J-1]=0.
<u>60 10 321</u>
0850 1F(F(1,J).NF.+) GO TE 821
$\frac{PHI(1, j)=0}{100000000000000000000000000000000000$
FC(I+J)=2
00 823 J=2.13621
IF(KC(1, 1), F0, 0) G0 TC 823
IF(F(1, 1), ME.2) GO T(! 851
IF(F(1+1,J).NE.4.AND.F(1-1,J).NE.4.AND.F(1,J+1).KE.4.AND.
$+ \{[1, j-1], NE_4, j_6, j_1, NE_4, j_6, j_1, NE_4, j_6, j_6, j_6, j_6, j_6, j_6, j_6, j_6$
$- \Gamma(1+J)=$
G0 11 823
851 IF(F(I+J)-NF+3) 60 TO 823
SUMPHIEO.
15(F(1+1, 1) = 0, A, 1) = F(1+1, 1) = 0, A, 0 = F(1+1+1) = 0, A, 0 = 0
*F(1, J-1), f0.4) 60 10 223
IF(F(I+1, J).NE.2) GO TO 852
SUMPHI=SUMPHI+PHI((+1,J)
0852 [E([-1-1.1]-NE-2] G0 T5 853
SUMFHI=SUMPHI+PHI((-1,-))
N=N+1
0853 IF(F(1,J+1)-NE,2) GO TO 854
0854 15(5(1,1-1),N5,2) 60 10 855
SUMPHI=SUAPHI+PHI((1,J-1)
N=N+1
0855 F(1+,J)=2
15(A, 50, 0) CU TO 856
PHI(1, J)=SUMPHI/FPN
G0 T1 823
0856 IF(FE(I+J).NE.2) GO TO 823
ARITE(6,6); + J, F([, J), FE([, J), KC(1, J)
C
C RE-IMPOSE BOUNDARY CONDITIONS TO FREE SURFACE
ASSIGN 880 TC KRET
0830 CONTINUE
C
C ESTABLISH ETA FOR FORMERLY EMPTY CELLS
C
$\frac{1}{10000000000000000000000000000000000$
IF(FC(1,J).NE.2) 824,611
0824 CENTINUE
C IEST FOR TIME TO PRINT CELL VARIABLES
ASSIGN ROL TO KPET
0802 CONTINIE
HRITE(5,11) T.SEX, SEY
WRITH (5,18) 1,5DX5F,5DY5F

INTERA 2315 AUDIAL ALDUAL CONVAY
HRITEIO, SAIT AAL/DAU, AL/PRAV, LUNGAA
MELT 10 227 TA 11 AFT 3 LEAD KRAP
NULE O
15(ABS(TCP-T),CT,(PT/2,1),C0,T0,R0)
0ATA(4)=S(Y)SE
$f_{A}TA(5) = YSEPAR$
DATA(17)=J6AR
DATA(1+)=YT 7
DATA(20) = WX 1
DATA(21)=NY
DAT4(22)=8w
DATA(23)=DX
DATA(24)=DY
DATA(25)=DXSF
DATA (26) = CYSF
DATA(27)=ERKORU
DATA(20) = EPRORV
0.4TA(2y) = 1C
bATA(30) = SUHR
Q4T4(31)=5FXG
DATA(32) = SFYG
DATA(34) = IFSYA
M18(30)-610
DATA( 27) - V-0
147 A1 201 - 00 0 0
DATA(39)=RH3S WRITE(8)DATA,U,V
DATA(39)=RH3S WRITE(3)DATA+U+V END FILE 3 UNITE(3)DATA+U+FILE 5
DATA(39)=RHDS WRITE(3)DATA.U.V END FILE 3 WRITE(13)DATA.PHI.ETA.F.FE
DATA(39)=RHDS           WRITE(3)DATA,U,V           END FILE 3           WRITF(13)DATA,PHI,ETA,F,FE           END FILE 13
DATA(39)=RH3S WRITE(3)DATA,U,V EMD FILE 3 WRITE(13)DATA,PHI,ETA,F,FE END FILE 13 TCP=TCP+DTCP
DATA(39)=RH3S WRITE(3)DATA+U+V EMD FILE 3 WRITF(13)DATA,PH1+ETA+F+FE END FILE 13 TCP=TCP+DTCP NCS=3CS+1 UDD FILE 1020 F MDC
DATA(39)=RH3S WRITE(3)DATA+U+V END FILE 3 WRITF(13)DATA,PHI+ETA+F+FE END FILE 13 TCP=TCP+DTCP NCS=VCS+1 WRITE(0,4030)T+NCS
DATA(39)=RH3S WRITE(8)DATA,U,V END FILE 3 WRITF(13)DATA,PHI,ETA,F,FE END FILE 13 TCP=TCP+DTCP NCS=TCS+1 WRITE(6,4030)T,NCS G0 TO KRET
DATA(39)=RH3S           WRITE(8)DATA,U,V           EMO FILE 3           WRITF(13)DATA,PHI,ETA,F,FE           END FILE 13           TCP=TCP+DTCP           NCS=VCS+1           WRITE(6,4030)T,NCS           GO TO KRET           OS01 CONTINUE
DATA(39)=RH3S WRITE(3)DATA.U,V EMD FILE 3 WRITF(13)DATA.PHI.ETA.F.FE END FILE 13 TCP=TCP+DTCP NCS=3CS+1 WRITE(0.4030)T.NCS G0 TO 4RET 0801 CONTINUE C
DATA(39)=RHDS         WRITE(3)DATA+U,V         END FILE 3         WRITF(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=NCS+1         WRITE(6,4030)T,NCS         G0 TO <ret< td="">         0801 CONTINUE         C         C         C</ret<>
DATA(39)=RHDS         WRITE(8)DATA,U,V         EMD FILE 3         WRITE(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         G0 TO <ret< td="">         0801 CONTINUE         C         END PROBLE-1         C</ret<>
DATA(39)=RHDS         WRITE(8)DATA,U,V         EMO FILE 3         WRITF(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         G() TO <ret< td="">         0801 CONTINUE         C         IF((TL-T).GT.(DT/2.)) GO TO 300</ret<>
DATA(39)=RHDS         WRITE(3)DATA,U,V         END FILE 3         WRITF(13)DATA,PH1,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         G0 ID 4RET         C         C         IF((TL-T).GT.(DT/2.)) G0 T0 300         0901 CALL SECUND(BTIME)
DATA(39)=RHDS         WRITE(3)DATA+U+V         END FILE 3         WRITF(13)DATA,PH1+ETA+F+FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T+NCS         G0 TO <ret< td="">         O801 CONTINUE         C         IF((TL-T).GT.(DT/2.)) GD T0 300         0901 CALL SECUND(BTIME)         WRITE(5,12)STIME</ret<>
DATA(39)=RHDS         WRITE(8)DATA,U,V         EMD FILE 3         WRITE(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         G0 TO <ret< td="">         0801 CONTINUE         C         END PROBLE4         C         IF((TL-T).GT.(DT/2.)) GO TO 300         0901 CALL SEGUND(BTIME)         WRITC(5,12)STIME         GO TO 4000</ret<>
DATA(39)=RHDS         WRITE(8)DATA,U,V         EMO FILE 3         WRITE(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         GO TO KRET         0801 CONTINUE         C         IF((TL-T).GT.(DT/2.)) GO TO 300         0901 CALL SECUND(BTIME)         WRITE(5,12)STME         GO TO 4000         9909 CONTINUE
DATA(39)=RHDS         WRITE(8)DATA,U,V         END FILE 3         WRITF(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         GO TO KRET         O801 CONTINUE         C         IF((TL-T).GT.(DT/2.J) GD TO 300         0901 CALL SECUND(BTIME)         WRITC(5,12)STIME         GO TO 4000         9909 CONTINUE
DATA(39)=RHDS         WRITE(3)DATA+U+V         END FILE 3         WRITF(13)DATA,PH1+ETA+F+FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(0,4030)T+NCS         GO TO 4RET         O801 CONTINUE         C         IF((TL-T).GT.(DT/2.)) GO TO 300         0901 CALL SECUND(BTIME)         WRITE(0,12)STIME         GO TO 4000         9909 CONTINUE         STOP         END
DATA(39)=RHDS         WRITE(8)DATA,U,V         END FILE 3         WRITE(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         G0 TO <ret< td="">         0801 CONTINUE         C         END PROBLE4         C         IF((TL-T).GT.(DT/2.)) GO TO 300         0901 CALL SECUND(BTIME)         WRITE(5,4000         9909 CONTINUE         GO TO 4000         9909 CONTINUE         END</ret<>
DATA(39)=RHDS         WRITE(8)DATA,U,V         EMO FILE 3         WRITE(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=3CS+1         WRITE(6,4030)T,NCS         GO TO KRET         0801 CONTINUE         C         IF((TL-T).GT.(DT/2.)) GO TO 300         0901 CALL SECUND(BTIME)         WRITE(5,12)STME         GO TO 4000         9909 CONTINUE         STOP         END
DATA(39)=RHDS         WRITE(3)DATA,U,V         END FILE 3         WRITF(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         GO TO KRET         0801 CONTINUE         C         IF((TL-T).GT.(DT/2.J) GO TO 300         0901 CALL SECUND(BTIME)         WRITE(5,12)STIME         GO TO 4000         9909 CONTINUE         STOP         END
DATA(39)=RHDS         WRITE(8)DATA,U,V         END FILE 3         WRITF(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(0,4030)T,NCS         G0 TO <ret< td="">         0801 CONTINUE         C         C         IF((TL-T).GT.(DT/2,J) GO TO 300         0901 CALL SECUND(BTIME)         WRITC(3,12)STIME         G0 TO 4000         9909 CONTINUE         STIDP         END</ret<>
DATA(39)=RHDS         WRITE(8)DATA,U,V         END FILE 3         WRITE(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         G0 TO <ret< td="">         O801 CONTINUE         C         END PROBLE4         C         If((TL-T).GT.(DT/2.)) GD TO 300         0901 CALL SECUND(BTIME)         WRITE(1.2)STIME         G0 TO 4000         9909 CONTINUE         STOP         END</ret<>
DATA(39)=RHDS         WRITE(3)DATA,U,V         ENO FILE 3         WRITF(13)DATA,PHI,ETA,F,FE         ENO FILE 13         TCP=TCP+DTCP         NCS=CS+1         WRITE(0,4030)T,NCS         GO TO KRET         0801 CONTINUE         C         C         IF((TL-T).GT.(DT/2.)) GO TO 300         0901 CALL SECUND(BTIME)         WRITE(0,12)STME         GO TO 4000         9909 CONTINUE         STOP         END
DATA(39)=RPDS         WRITE(8)DATA,U,V         END FILE 3         WRITF(13)DATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         G0 TO <ret< td="">         0801 CONTINUE         C         END PROBLE4         C         IF((TL-T).GT.(DT/2.J) GO TO 300         0901 CALL SECUND(BTIME)         WRITE(5,12)STIME         G0 TO 4000         9909 CONTINUE         STOP         END</ret<>
DATA139)=RHDS         WRITE(8)OATA.U.V         END FILE 3         WRITF(13)DATA.PH1.ETA.F.FE         END FILE 13         TCP=TCP+DTCP         NCS=*CS+1         WRITE(6.4030)T.NCS         G0 TO <ret< td="">         OBOL CONTINUE         C         C         IF((TL-T).GT.(DT/2.)) GD TO 300         0901 CALL SECUND(BTIME)         WRITE(5.12)STIME         G0 TO 4000         9909 CONTINUE         STOP         END         END</ret<>
UATA(29) = RPDS         WRITE(8) DATA.J.V         EMD FILE 3         WRITF(13) DATA.PHI.ETA.F.FE         END FILE 13         TCP=TCP+0TCP         NCS=VCS+1         WRITE(6,4030)T.NCS         GO 10 KRET         0801 CONTINUE         C         C         IF((TL-T).GT.(DT/2.)) GO TU 300         0901 CALL SECUND(8TIME)         WRITE(5,12)STIME         GO TO 4000         9909 CONTINUE         STOP         END
OATA(29)=RHOS         WRITE(8)OATA,U,V         END FILE 3         WRITF(13)OATA,PHI,ETA,F,FE         END FILE 13         TCP=TCP+DTCP         NCS=VGS+1             'NRITE(6,4030)T,NCS         GO TO <ret 2.))="" 300="" 4000="" 9909="" c="" call="" cd="" continue="" end="" end<="" go="" if((tl-t).gt.(dt="" o801="" o901="" proble-4="" secund(btime)="" stop="" td="" to="" write(5,12)stime=""></ret>
DATA139)=RHDS WRITE(3)DATA.U.V END FILE 3 TCP=TCP+DTCP NCS=VCS+1 WRITE(6,4030)T,NCS GOID CRET 0801 CONTINUE C C C IF((TL-T).GT.(DT/2.)) GO TO 300 0901 CALL SECUND(BTIME) WRITE(5,12)STIME GO TO 4000 9909 CONTINUE STOP END
DATA139) = RH3S         WRITE(3) DATA.U.V         END FILE 3         TCP=TCP+DTCP         NCS=VCS+1         WRITE(5,4030)T.NCS         G0 TO <ret< td="">         0801 CONTINUE         C         IF((TL-T).GT.(DT/2.J) GO TU 300         0901 CALL SECURD(BTIME)         WRITE(5,125)TME         G0 TO 4000         9909 CONTINUE         G0 TO 4000         STOP         END         STOP         END         STOP         END         WD         STOP         END         STOP         END</ret<>
0ATA139)=RH')S         WRITE(3)DATA,U,V         EMOFILE 3         WRITF(13)DATA,PH1,ETA,F,FE         EMOFILE 3         TCP=TCP+0TCP         NCS=NCS+1         HRITE(0,4030)T,NCS         GO 10 CRET         0801 CONTINUE         C         C         END PROBLE4         C         If((TL-T),GT.(DT/2,1) GD TO 300         0901 CALL SECUND(BTIME)         WRITE(5,12)STIME         GO TO 4000         999 CONTINUE         STOP         ENU
OATA139)=PH'DS         WRITE(3)OATA.U.V         EMOFILE 3         WRITF(1310ATA.PHI.ETA.F.FE         ENDFILE 13         TCP=TCP+0TCP         NCS=VCS+1         'NRITE(6.4030)T.NCS         GO TO KRET         0801 CONTINUE         C         C         C         IF((TL-T).GT.(0T/2.1)) GD TO 300         0901 CALL SECUND(BTIME)         WRITE(5.12)STIME         GO TO 4000         9909 CONTINUE         STOP         END
0ATA(139) = RPDS           WRITE(3)0ATA,U,V           END FILE 3           WRITF(13)0ATA,PHI,ETA,F,FE           END FILE 13           TCP=TCP+DTCP           NCS=3CS+1           NRITE(0+4030)T_NCS           GG TO 4RET           0401 CONTINUE           C           END PROBLE4           C           IF((TL-T).GT.(DT/2.J) CO TO 300           0901 CALL SECUND(BTIME)           WRITE(5,12)STIME           GO TO 4000           9909 CONTINUE           STOP           END
0ATA(139) = RP:DS           WRITE(3) DATA.U.V           END FILE 3           WRITE(13) DATA.PHI.ETA.F.FE           END FILE 13           TCP=TCP+DTCP           NCS=3CS+1           WRITE(5,4030)T.NCS           G(1 10 KRET           0801 CONTINUE           C           GO TO 4000           9909 CONTINUE           STOP           END
0ATA(139) = PPOS         WRITE(3) OATA+U,V         END FILE 3         WRITF(13) OATA,PHI,ETA,F,FE         END FILE 3         TCP=TCP+DTCP         NCS=VCS+1         WRITE(6,4030)T,NCS         GO TO <ret< td="">         Od01 CONTINUE         C         C         TF((TL-T).GT.(DT/2.J) CO TO 300         0901 CALL SECUND(BTIME)         WRITE(5,12)STIRE         GO TO 4000         9909 CONTINUE         STOP         END         END         STOP         END         STOP         END         MD         END         STOP         END</ret<>
UATA1391=RP3S           WRITE(8)DATA.U.V           END FILE 3           WRITF(13)DATA.PH1.ETA.F.FE           END FILE 3           TCP=TCP+DTCP           NCS=VCS+1           NRIFE(6.4030)T.NCS           G0 TO <ret< td="">           0801 CONTINUE           C           C           END PROBLE4           C           IF((TL-T).GT.(DT/2.)) GO TO 300           0901 CALL SECUND(BTIME)           WRITE(5.12)STIME           GO TO 4000           9909 CONTINUE           STOP           END</ret<>
UATA1391=RP3S           WRITE(8)DATA.U.V           EMD FILE 3           WRITF(13)DATA.PHJ.ETA.F.FE           ENO.FILE 3           TCP=TCP+0TCP           NCS=VCS+1           'WRITE(0:4030)T.NCS           GR TO 4RET           '0801 CONTINUE           C           C           END PROBLE4           C           IF(1TL-T).GT.(DT/2.)) CO TO 300           0901 CALL SECUR(ETIPE)           WRITE(1::::::::::::::::::::::::::::::::::::
0ATA(139)=RHOS           WRITE (8) DATA, U, V           EMD FILE 3           WRITE (13) DATA, PHI, ETA, F, FE           ENO. FILE 13           TCP=TCP+DTCP           NCS=VCS+1           WRITE (6, 4030) T, NCS           GO TO 4RET           0001 CONTINUE           C           END FILE 5           MRITE (6, 4030) T, NCS           GO TO 4RET           0001 CONTINUE           C           END PROBLE4           C           IF((TL-T).6T.(DT/2.)) GO TO 300           0501 CALL SECUNCETIME1           WRITE (2.12)9TIPE           GO TO 4000           9502 CONTINUE           STOP           END
0ATA1391=APUS           WRITE (8) DATA.PUT.ETA.F.FE           WRITF (13) DATA.PUT.ETA.F.FE           WRITF (13) DATA.PUT.ETA.F.FE           ENO FILE 3           TCP=TCP+DTCP           NCS=VCS+1           WRITE (6.4030)T.NCS           GC           C           C           C           C           END PROBLE4           C           IF((TL-T).GT.(DT/2.1) GO TO 300           0901 CALL SECURNERTIFE1           WRITE (5.12)9TIME           GO OPOL           9909 CONTINUE           STIP           ENU
0ATA1391=APDS           WRITE (3) DATA.P.V.V           EMO FILE 3           WRITF (13) DATA.P.HT.ETA.F.FE           ENO FILE 3           TCP=TCP+DTCP           NCS=VCS+1           WRITE (6:, 4030)T.NCS           GO TO KRET           OBOL CONTINUE           C           END FILE 3           TCP=TCP+DTCP           NCS=VCS+1           WRITE (5:, 4030)T.NCS           GO TO KRET           OBOL CONTINUE           C           END PROBLE4           C           If ((TL-T).GT.(0T/2.1) GO TO 300           0901 CALL SCUND (BTIME)           WRITE (5:,12)STIME           GO TO 4000           9909 CONTINUE           STOP           END
0ATA1391=APUS           WRITE (3) DATA.PUT.ETA.F.FE           WRITF (13) DATA.PUT.ETA.F.FE           WRITF (13) DATA.PUT.ETA.F.FE           WRITF (13) DATA.PUT.ETA.F.FE           WRITF (14) DATA.PUT.ETA.F.FE           ENO FILE 3           TCP=TCP+DTCP           NCS=VCS+1           WRITE (6, 4030)T.NCS           GO TO <ret< td="">           0801 CONTINUE           C           C           END PROBLE4           C           If (11-T).GT.(DT/2.)) GO TO 300           0901 CALL SECURD(BTIPE)           WRITE (5,12)STIME           GO TO 4000           9909 CONTINUE           STOP           END</ret<>
0ATA1591=RH35           WRITE(8)0ATA.U.V           END FILE 3           WRITE(8)0ATA.PHI.ETA.F.FE           END FILE 13           TCP=TCP+DTCP           NCS=*CS+1           WRITE(6.4030)T.NCS           GR 10 <ret< td="">           0801 CONTINUE           C           C           END FILE -4           C           OBOI CONTINUE           C           C           FF((TL-T).GT.(DT/2.)) GD T0 300           0901 CALL SECUNCET(ME)           WRITC(5.1251)PE           GO TO 4000           9909 CONTINUE           STOP           STOP           END</ret<>
OATA1391=RH05           WRITE(3)DATA.U.V           END FILE 3           WRITF(13)OATA.PHI.ETA.F.FE           END FILE 13           TCP=TCP+DTCP           NCS=*CS+1           WRITE(6.4030)T+NCS           GR TO CONTINUE           C           C           END FILE 5           WRITE(10.4020)T+NCS           GR TO CARET           0001 CONTINUE           C           C           END FILE 5           WRITE(10.10172.1) CO TO 300           0901 CALL SECUND(BTIME)           WRITE(10.12)*TIPE           GO TO 4000           9909 CONTINUE           STOP           END
0ATA1591=RH05           MRITE (8) 0ATA, 04V           END FILE 3           WRITF(13) 0ATA, PHI, ETA, F, FE           END FILE 13           TCP=TCP+0TCP           NCS=*CS+1           'RRITE(6, 4030)T, NCS           GR 10 (RET)           0801 CONTANUE           C           C           EAD FILE 3           'RRITE(6, 4030)T, NCS           GR 10 (RET)           0801 CONTANUE           C           C           EAD FILE 3           OBOL CONTANUE           C           C           Ff(11-T).GT.(0T/2,1) GD TO 300           0901 CALL SECUNCETIME1           OG 0T 4000           9005 CONTANUE           GO 70 4000           9005 CONTANUE           END

NUMBER AND A DESCRIPTION OF A DESCRIPTIO
DIMENSION VENDISE VENDISE MACYSE TEMAXE OF VENDISE MACYSE
LSP (MMPTS, AML VS) , ST (MMPTS, MNCVS), SS1 (MCVS, MAAX), SS (MMCVS, MAAX) ,
AH(INPIS) , SS2(MNCVS, MMAX), PRUXIN(MNCVS) .
2 9(5), nfl SnY (50), H2(50), C(50)
<u>EPSLAELPS</u>
3 00 51 [=3,4]
H(1) = X(1+1) - X(1)
[+1]=[.[.
$51 DF(Y(I_*K) = (Y(J_*K) - Y(I_*K)) / H(I)$
4 (u) 52 I=2,N1
$\frac{1}{1} = \frac{1}{1} = \frac{1}$
(1) + (2) + (1) + (2)
52 C(1) = 3.4 DELSOV(1)
S>(1+K)=0.0
S2(N,K)=0.0 :=
CMEGA=1+0717968
<u>5 ETA=0.</u>
<u>6 DN 10 1#2,NL</u>
<u></u>
$\frac{1}{7} \frac{1}{\sqrt{2}} \frac$
8 TF (ABS(W)-ETA) 10.10.9
9 ETA=ABS(W)
10 52{(+K)=52{1+X}+4
13 [F (LTA-EPSLN) 14.5.9
<u>14 D7 53 I=1,41</u>
· _ [ ] ≒ [+1
$\frac{53}{53} \frac{53}{53} 53$
1 15 J= J+ J
16 191
<u>54 IF (T(1)-X(1)) 58,17,55</u>
<u>56 IF (T(J)-X(I)) 60,17,57</u>
A4 EDRMAT (14, 74HTH ABCUMENT OUT DE BANCEL
TTTOR AT TTYET IST ANOTHER OUT OF ANALET
GC TO 61
<u> </u>
GO TO 61 59 I=N 60 CONTINUE
GC TO 61 1 59 I=N 60 CONTINUE IN=-I
GP ID 61 59 I=N 60 CDNIINUF IW=-I I=I-1
GC IN 61 1 59 I=N K. 60 CONTINUE IW=-I I = I-1 17 DO 110 K=1.NCVS
GD ID 61 1 59 I=N K. 60 CDNINUUF IW=-I 1 I=I-1 17 DD 110 K=1,NCVS HTI=T(J)-X(I) IV=-I
GD In 61       1 59 I=N       60 CONTINUE       IN=-I       I=I-1       17 DD 110 K=1.NCVS       HT1=T(J)-X(I)       II=I+1       HI = I + 1
GD ID 61 1 59 I=M K 60 CONTLNU <sup>F</sup> IW=-I I = I-1 17 DD 110 K=1+NCVS HT1=T(J)-X(I) II=I+1 HT2=T(J)-X(II) PROD=I-IL \$ HT2
GQ ID 61 1 59 I=M K. 60 CONTINUE IW=-I 7 I=I-1 17 DD 110 K=1.NCVS HT I=T(J)-X(I) II=I+1 HT2=T(J)-X(I) PRCD=I-T1 \$ HT2 SS2(K,J)=S2(I,K)+H11\$S3(I,K)
GQ ID 61 1 59 I=M R. 60 CONTINUE 1 with the second seco
GQ JD 61 - 59 J=M K - 60 CDNILNUF - 1W=-1 - 1=I-1 - 17 DD 110 K=1.NCVS - HT1=T(J)-X(I) - HT2=T(J)-X(I) - HT2=T(J)-X(J
G() IN 61 1 59 I=M K 60 CONTINUE IW=-I I = I-1 17 DO 110 K=1.NCVS HT1=T(J)-X(I) II=I+1 HT2=T(J)-X(II) PROD=I-I1 * HT2 SS2(K,J)=S2(I,K)+S2(I,K) DELSOS=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS(K,J)=Y(I,K)+HT1*S3(J,K) DELSOS=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS1(K,J)=DELY(I,K)+(HT1+HT2)*DELSOS SS1(K,J)=DELY(I,K)+(HT1+HT2)*DELSOS+PROD*S3(I,K)/6.0
GQ ID 61 59 I=N K 60 CDNIINUF IW=-I IW=-I I I=I-1 17 DD 110 K=1,NCVS HT1=T(J)-X(I) II=I+1 HT2=T(J)-X(I) PROD=T-I + HT2 SS2(K,J)=S2(I,K)+HT1+S3(I,K) DEL SOS(S2(I,K)+S2(I,K)+SS2(K,J))/5. SS(K,J)=Y(I,K)+HT1+S3(I,K) DEL SOS SS1(K,J)=DELY(I,K)+(HT1+HT2)*DEL SOS SS1(K,J)=DELY(I,K)+(HT1+HT2)*DEL SOS+PRDD+S3(I,K)/6.0 IO CONTIAUE
GQ IN 61 1 59 I=M K. 60 CONTINUE IW=-I IW=-I 1 I=I-1 17 DD 110 K=1.NCVS HT1=T(J)-X(IJ) II=I+1 HT2=T(J)-X(IJ) PROD=I-T1 & HT2 SS2(K,J)=S2(I.K)+HT1*S3(I.K) DELSOS=(S2(I,K)+K)+HT1*S3(I.K) DELSOS=(S2(I,K)+K)+HT1*S2(K,J))/5. SS(K,J)=Y(I,K)+HT1*OELY(I,K)+PRDD*DELSOS SS1(K,J)=DELY(I,K)+HT1*DELSOS+PRDD*S3(I,K)/6.0 110 CONTINUE 61 CINTINUE
GQ IA 61 1 59 I=M 60 CONTINUE IW=-I IW=-I 1 I=I-1 17 DD 110 K=1.NCVS HT1=I(J)-X(I) II=I+1 HT2=I(J)-X(I) PROD=T-I + HT2 SS2(K,J)=S2(I,K)+HT1*S3(I,K) DELSOS=(S2(I,K)+S2(II,K)+SS2(K,J))/5. SS(K,J)=Y(I,K)+HT1*S2(I,K)+PROD*DELSOS SS1(K,J)=DELY(I,K)+(HT1+HT2)*DELSOS+PRDD*S3(I,K)/6.0 IQ CONTINUE S1 CONTINUE IF (J,IT,M)CO TO 105 IF (J,IT,M)CO TO 105 IF (J,IT,M)CO TO 105 IF (J, OPETURAN
GD ID 61 1 59 I=M K 60 CDNILNUF IW=-I 7 I=I-1 17 DD 110 K=1.NCVS HT 1=T(J)-X(I) II=I+1 HT2=T(J)-X(I) 9RCD=+T1 < HT2 SS2(K,J)=S2(I,K)+S2(I,K) DELSDS=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS(K,J)=Y(J,K)+HT1+S3(I,K) DELSDS=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS(K,J)=Y(J,K)+HT1+OELY(I,K)+PRDD*DELSOS SS(K,J)=Y(J,K)+HT1+OELY(I,K)+PRDD*DELSOS SS(K,J)=DELY(I,K)+(HT1+HT2)*DELSOS+PRDD*S3(I,K)/6.0 II0 CDN I MUK 51 C IN I MUK IF(J,IT.M)60 ID 105 IF(LIG.GT.0) PFTURN DD1 20 K=1.NCVS
GQ ID 61 59 I=M K 60 CONTINUE IW=-I 7 I=I-1 17 DD 110 K=1.NCVS HT1=T(J)-X(I) II=I+1 HT2=T(J)-X(I) PROD=I-TL \$ HT2 S\$2(K,J)=\$2(I,K)+HI1\$\$3(I,K) DEL\$SS=(\$2(I,K)+\$2((I,K)+\$S2(K,J))/5. S\$(K,J)=Y(I,K)+HT1\$DELY(I,K)+PRUD\$DEL\$O\$ S\$(K,J)=Y(I,K)+HT1\$DELY(I,K)+PRUD\$DEL\$O\$ S\$(K,J)=DELY(I,K)+(HT1+HT2)*DEL\$O\$ S\$(K,J)=DELY(I,K)+(HT1+HT2)*DEL\$O\$ S\$(K,J)=DELY(I,K)+(HT1+HT2)*DEL\$O\$ 10 CONTINUE 1F(J,IT.M)GO TO 105 IF(IG.GT.0)PFTURN DOI 120 K=1.NCV\$ 20 PROXIM(K) =0.0
GC IN 61 59 I=W K 60 CONTINUE IW=-I 7 I=I-1 17 DO 110 K=1.NCVS HTI=T(J)-X(I) II=I+1 HT2=T(J)-X(II) PRCD=T-I1 + HT2 SS2(K,J)=S2(I,K)+S2(I,K) DELSD=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS1(K,J)=Y(I,K)+HT1+S3(I,K) DELSDS=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS1(K,J)=DELY(I,K)+HT1+S3(I,K) 61 CINTINUE IF(J,IT.M)CO TO 105 IF(IG.0T.0)PFIURN ON 120 K=1.NCVS 20 PROXIM(K)=0.0 07 42 [=1,M]
GQ ID 61 1 59 I=W K 60 CDNTINUE IW=-I 1 I=I-1 17 DD 110 K=1.NCVS HT1=T(J)-X(I) II=I+1 HT2=T(J)-X(II) PROD=I-I1 + HT2 SS2(K,J)=S2(I,K)+S7(II,K)+SS2(K,J))/5. SS(K,J)=Y(I,K)+HT1+S3(I,K)+SS2(K,J)/5. SS(K,J)=Y(I,K)+HT1+OELY(I,K)+PROD+DELSOS SS1(K,J)=DELY(I,K)+(HT1+HT2) + DELSOS+PRDD+S3(I,K)/6.0 IQ CONTINUE IF(J,I,Y)GO TO 105 IF(IG.GT.0)PFIURN 00 I20 K=1,NCVS 20 PROXIM(K)=0.0 D7 62 I=1,N1 If(J=I+1)
GQ ID 61 1 59 1=% 60 CONTINUE IW=-1 7 I=I-1 17 DD 110 K=1.NCVS HT1=T(J)-X(I) II=I+1 HT2=T(I)-X(I) PRCD=HT1 + HT2 SS2(K,J)=S2(I,K)+S2(I,K) DEL SOS=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS(K,J)=Y(I,K)+HT1+S2(J,K) DEL SOS=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS1(K,J)=DELY(I,K)+(HT1+HT2)*DEL SOS SS1(K,J)=DELY(I,K)+(HT1+HT2)*DEL SOS+PRDD*S3(I,K)/6.0 I10 CONTINUE 1F(J,IT,Y)CO TO 105 IF(J,IT,Y)CO TO 105 IF(IG.607.0)PFIURN DD1 20 K=1,NCVS 20 PROXIM(K)=PRCXIN(K)+.5*H(I) *(Y(I,K)+Y(II,K))-H(I) **3*(
GQ ID 61 1 59 I=M K 60 CONTINUE IW=-I 7 I=I-1 17 DD 110 K=1.NCVS HT I=I(J)-X(I) II=I+1 HT 2=I(J)-X(I) PRCD=1-I * HT2 SS2(K,J)=S2(I,K)+S2(I,K)+S3(I,K) DELSDS=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS(K,J)=Y(I,K)+HT1*S3(I,K) DELSDS=(S2(I,K)+S2(I,K)+S2(K,J))/5. SS(K,J)=Y(I,K)+HT1*OELY(I,K)+PROD*DELSOS SS1(K,J)=DELY(I,K)+(HT1+HT2)*DELSOS+PROD*S3(I,K)/6.0 IQ CONTINUE IF(J,IT,M)CO TO 105 IF(J,IT,M)CO TO 105 IF(IIG.GT.0)PFIURN DD 120 x=1,NCVS 20 PROXIM(K)=0.0 D7 /2 I=1,M1 I[=1+1] 62 PR(XIN(K)=PR(XIN(K)+.5*H{I} *(Y(I,K)+Y(II,K))-H{I} *3*( IS2(I,K)+S2(II,K))/24.
GQ ID 61 1 59 I=M K 60 CONTINUE IW=-I 7 I=I-1 17 DD 110 K=1.NCVS HT 1=T(J)-X(I) II=I+1 HT 2=T(J)-X(I) 9 PR00=1-11 + HT2 SS2(K,J)=S2(I,K)+S2(I,K)+SS2(K,J))/5. SS2(K,J)=S2(I,K)+S2(I,K)+SS2(K,J))/5. SS(K,J)=Y(J,K)+HT1+OELY(I,K)+PR0D*DELSQS SS(K,J)=Y(J,K)+HT1+OELY(I,K)+PR0D*DELSQS SS(K,J)=V(J,K)+(HT1+HT2)*DELSQS+PR0D*S3(I,K)/6.0 I10 CONTINUE 61 CINTINUE 1F(J,IT.M)GD ID 105 IF(IG.GT.0)PFIURN 00 120 K=1,NCVS 20 PR0XIM(K)=0.0 07 62 I=1,N1 If(=I+1) 62 PRCXIN(K)=PRCXIN(K)+.5*H(I) *(Y(I,K)+Y(II,K))-H(I) **3*( IS2(I,K)+S2(II,K))/24. 120 CONTINUE
GQ ID 61 1 59 I=M K 60 CONTINUE IW=-I 1 I=I-1 17 DD 110 K=1.NCVS HT1=T(J)-X(I) II=I+1 HT2=T(J)-X(I) PROD=I-I + HT2 SS2(K,J)=S2(I,K)+S3(I,K) DELSOS=(S2(I,K)+S2(II,K)+S2(K,J))/5. SS(K,J)=Y(I,K)+HT1+S3(I,K) DELSOS=(S2(I,K)+S2(II,K)+S2(K,J))/5. SS(K,J)=Y(I,K)+HT1+S3(I,K)+S2(K,J))/5. SS(K,J)=Y(I,K)+HT1+S3(I,K)+S2(K,J))/5. SS(K,J)=Y(I,K)+HT1+S3(I,K)+S2(K,J))/5. SS(K,J)=Y(I,K)+S3(I,K)+S3(I,K)/6.0 II0 CONTINUE 16 CONTINUE 17 CONTINUE 20 PROXIM(K)=PRCXIN(K)+.5*H(I) *(Y(I,K)+Y(II,K))-H(I) **3*( 18 CONTINUE 19 CONTINUE 20 PROXIM(K)=PRCXIN(K)+.5*H(I) *(Y(I,K)+Y(II,K))-H(I) **3*( 19 CONTINUE 20 CONTINUE PETUPN SOD
GO ID 61         1 59 I=N         60 CONTINUE         IW=-I         IW=-I         I=I-1         17 DD 110 K=1.NCVS         HTI=T(J)-X(I)         II=I+1         HT2=T(J)-X(I)         PROD=FT1 + HT2         SS2(K,J)=S2(I,K)+HT1*S3(I,K)         DELS0S=(S2(I,K)+S2((I,K)+S2(K,J))/5.         SS1(K,J)=Y(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=Y(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=Y(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=Y(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=Y(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=Y(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=Y(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=Y(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=DELY(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=DELY(I,K)+HT1*0ELY(I,K)+PROD*DELS0S         SS1(K,J)=DELY(I,K)+ST         HI         CONTINUE         OD         JS2(I,K)=DEPLY(I,K)+S*H(I)         Y(I,K)+S2(II,K)+S*H(I)         Y(I,K)+S2(II,K)+S*H(I)         Y(I,K)+S*I(I,K)+S*H(I)         S2(I,K)+S2(II,K)/24.         '120 CONTINUE         PFTUPN         PFTUPN         FNO
G0 JD 61 1 59 I=M 60 CDNILNUF IW=-I II=I-1 17 DD 110 K=1.NCVS HTI=T(J)-X(I) II=I+1 HT2=T(J)-X(I) PROD=I-II + HT2 SS2(K,J)=S2(I,K)+S2(I,K) DELSOS=(S2(I,K)+S2(I,K)+SS2(K,J))/5. SS(K,J)=Y(I,K)+HT1*S2(I,K)+PRUD*DELSOS SS1(K,J)=DELY(I,K)+HT1*DELY(I,K)+PRUD*DELSOS SS1(K,J)=DELY(I,K)+(HT1+HT2)*DELSOS+PRDD*S3(I,K)/6.0 110 CDN INUE 61 CINTINUE IF(J,I,T,M)G0 TD 105 IF(IG.G7.0)PFIURN DD 120 K=1,NCVS 20 PROXIM(K)=0.0 D7 42 I=1,M1 If=I+1 62 PRCXIN(K)=PRCXIN(K)+.5*H(I) *(Y(I,K)+Y(II,K))-H(I) **3*( IS2(I,K)+S2(II,K))/24. '120 CDNILN'E PFIUPN FND
G0 T0 61 1 59 1=N 60 CONTINUF IW=-1 I=1-1 1 TOD 110 K=1.NCVS HT1=T(J)-X(I) HT2=T(J)-X(I) PRCD=t-T1 & HT2 S2(K,J)=S2(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S2(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(I,K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(K)+S2(I,K)+S2(K,J))/5. S5(K,J)=S1(K,J)=S2(K,J)/5. S5(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K,J)=S1(K
GO ID 61         1 59 I=M       F.         GO CONTINUÉ       F.         IM#=1       I         I=I-1       I         IT DD 110 K=1.NCVS       HI=I(J)-X(I)         HT=I(J)-X(I)       I         I=I+1       HT=I(J)-X(I)         PP0D=I-T1 * HT2       SS2(K,J)=S2(I,K)+S1(I),K)+SS2(K,J))/5.         SS2(K,J)=Y(I,K)+S1(I),K)+SS2(K,J))/5.       SS(K,J)=Y(I,K)+HT1*S3(I,K)+PRUD*DELSOS         SS1(K,J)=P(I,K)+HT1*OELY(I,K)+PRUD*DELSOS       SS1(K,J)=DELY(I,K)+(HT1+HT2)*DELSOS+PRDD*S3(I,K)/6.0         ILO CONTINUE       IF(IGAGTA)PFIURN         OI 120 CA=1.N(VS       IF(IGAGTA)PFIURN         OI 120 CA=1.N(VS       IS2(I,K)+S1(I,K)+S*H(I) *(Y(I,K)+Y(II,K))-H(I) **3*(         IS2(I,K)+S2(II,K))/24.       'I20 CONTINK(K)=PRCXIN(K)+.5*H(I) *(Y(I,K)+Y(II,K))-H(I) **3*(         PF UPN       PF UPN         FND       FND
GG ID 61         1       59 I=M         60 CONTINUE         IW=-I         I=I-1         IT DD IL0 K=1.NCVS         HT1=T(J)-X(I)         II=I+1         HT2=T(J)-X(I)         PRODELTI * HT2         SS2(K,J)=S2(I,K)+S1(I,K)+S2(K,J)/5.         SS2(K,J)=Y(I,K)+HT1*S3(I,K)         DELSOS=(S2(I,K)+S2((I,K)+S2(K,J))/5.         SS1(K,J)=DELY(I,K)+HT1*S2(I,K)+PRUD*DELSOS         SS1(K,J)=DELY(I,K)+(HT1+HT2)*DELSOS+PRND*S3(I,K)/6.0         110 CONTINUE         61 CINTINE         IF(J_AIT_M)GO ID IOS         IF(J_AIT_M)GO ID IOS         IF(IG.GT.0)PFIURN         D01 L20 X=1.NCVS         20 PROXIM(K)=0.0         D0 / 22 I=1.NCVS         20 PROXIM(K)=PNCXIN(K)+.5*H(I) *(Y(I,K)+Y(II.K))-H(I) **3*(         IS2(I,K)/224.         '120 CONTINUE         PFTUPN         FND
G0 I0 61 59 I=M K 60 CONTINUE IW=-1 1 I=I-1 1 T DD 110 K=1.NCVS HTI=T(J)-X(I) II=I+1 HT2=T(J)-X(I) PRCD=-FI1 * HT2 SS2(K,J)=22(1.K1+HT1*S3(1,K) DEL50S=[52(1,K1+S2((1,K)+S52(K,J))/5. SS1(K,J)=22(1,K1+S2((1,K)+S52(K,J))/5. SS1(K,J)=22(1,K1+S2((1,K)+S52(K,J))/5. SS1(K,J)=22(1,K1+S2((1,K)+S52(K,J))/5. SS1(K,J)=22(1,K1+S2((1,K)+S52(K,J))/5. SS1(K,J)=22(1,K1+S2((1,K)+S52(K,J))/5. (I) CONTINUE IF(UG.G1.0)PFTURN 01 (20 K=1,MCVS 20 PR0XIM(K)=0.0 D) 52 (=1,M1 I(=1+1 62 PR(XIN(K)=PRCXIN(K)+.5\$H(I) *(Y(I,K)+Y(I1,K))-H(I) **3*( IS2(1,K)+S2(I1,K))/24. '120 CONTINUE PFTUPN FND
G0 I7 61         59 I=M         iw=-1         Iw=-1         I T DD I10 K=1, MCVS         HTI=T(J)-X(I)         II=I+1         HT2=T(J)-X(II)         PR0b=HI * HI2         SS2(K,J)=S2(I,K)+FI*S3(I,K)         DELSDS=(S2(I,K)+FI*S3(I,K)+S52(K,J))/5.         SS(K,J)=Y(J,K)+HI*S3(I,K)+S52(K,J))/5.         SS1(K,J)=S2(I,K)+HI*S3(I,K)+S52(K,J))/5.         SS1(K,J)=S2(I,K)+HI*S3(I,K)+S52(K,J))/5.         SS1(K,J)=S2(I,K)+HI*S3(I,K)+S52(K,J))/5.         SS1(K,J)=S2(I,K)+HI*S3(I,K)+S52(K,J))/5.         SS1(K,J)=Y(J,K)+HI*S3(I,K)+S52(K,J))/5.         SS1(K,J)=Y(J,K)+HI*S3(I,K)+S52(K,J))/5.         S2(K,J)=Y(J,K)+HI*S3(I,K)+S52(K,J))/5.         S1(K,J)=OELY(I,K)+HI*S3(I,K)+S52(K,J))/5.         S2(K,J)=Y(J,K)+HI*S3(I,K)+S52(K,J))/5.         S2(K,J)=Y(J,K)+HI*S3(I,K)+S54(I)         Y120 CONTINUE         PEND         FND         FND
GO ID 61         \$9 I=M         \$60 CDNHINUF         IW=-1         'I=T-1         17 DD 110 K=1.NCVS         HT1=T(J)-X(I)         II=I+1         HT2=T(J)-X(I)         PPR0=I-TI + HT2         S2(K,J)=2(I,K)+HI1*53(I,K)         DEL SDS=(S2(I,K)+S2(LI,K)+S2(K,J))/5.         SS(K,J)=Y(I,K)+HI1*0ELY(I,K)+PRODEDEL SOS         SS(K,J)=Y(I,K)+SUPPOPUELSOS+PREDDESS(I,K)/6.0         110 CONTINUE         61 CINTINUE         61 CINTINUE         62 PROPUENTIK(K)=0.0         00 120 K=1NRVS         20 PROPUENT(K)=0.0         01 20 K=1NRVS         01 120 K=1NRVS         20 PROPUENT(K)=0.0         01 20 K=1NRVS         11=1+1         11=1+1         62 PR(KINK)=PRCXIN(K)=+SEH(I) *(Y(I,K)+Y(II,K))-H(I) **3*(         120 CONTINE         PF UPN         F40
GO ID 61         59 I=N         60 CDNII YUF         Id#=1         17 DO 110 K=1.NCVS         HI=IL1         17 IT         17 DO 110 K=1.NCVS         HI=IL1         II=IL1         II=IL1         S2(K,J)=S2(I,K)+S2(I,K)         S2(K,J)=S2(I,K)+S2(I,K)+S2(X,J)/5.         S2(K,J)=S2(I,K)+S2(I,K)+S2(S,J)/5.         S1(K,J)=S2(I,K)+S2(I,K)+FRUD*DELS0S         S1(K,J)=P(I,K)+HI1*S2(I,K)+PRUD*DELS0S+PRUD*S3(I,K)/5.0         10 CONTINUE         61 CINTINE         If (J=I,K)         10 CONTINUE         11 (I=I+1)         62 PR0XIN(K)=0.0         10 CONTINE         20 PR0XIN(K)=0.0         11 (I=I+1)         62 PR(XIN(K)=PPCXIN(K)+.5*H(I) *(Y(I,K)+Y(II.K))-H(I) **3*(I)         120 CONTINE         PF TUPN         FN0         FN0
GO ID 61       * 59 I=W       N==1       Iw=-1       I=I-1       17 DD 110 K=1.NCVS       HT1=T(J)-X(I)       II=I+1       HT2=T(J)-X(I)       PPDD=r-T1 = HT2       S2CK+JI=S2CI+K1+HT1*S3CI+K)       DELSDS=(52CI+K1+K1+K5S2(K,J))/5.       SSIK+JI=S2(I+K)+F72(I+K)+PR0DFDELSOS       SSIK+JI=Y(I+K)+HT1*0ELY(I+K)+PR0DFDELSOS       SSIK+JI=T(I+K)+HT1*0ELY(I+K)+PR0DFDELSOS       SSIK+JI=T(I+K)+HT1*0ELY(I+K)+PR0DFDELSOS       SSIK+JI=T(I+K)+HT1*0ELY(I+K)+PR0DFDELSOS       SSIK+JI=T1+K)       OD(I20 K=1,NK)       YICODTINK       61 CINTINF       IF(J+K)       IF(J+K)       SOK       SSIK+JI=T1+       *00 120 K=1,NK(VS       20 PR0XIM(K)=PRCXIM(K)+*5*H(I) *(Y(I+K)+Y(II+K))-H(I) **3*(       1S2(I+K)=SRCXIM(K)+*5*H(I) *(Y(I+K)+Y(II+K))-H(I) **3*(       SS2(I+K)=SSIT+X)/24.       *120 CONTINNE       PF-MON
60 ID 61         1 59 I=M         k=-1         I=I-1         1 I=T.0         1 I=T.0         1 I=T.0         1 I=T.0         1 I=T.0         1 I=T.0         1 I=T.1         PROD=FI1 & HT2         SS2(K, J)=S2(I,K)+HI10(S3(I,K))         DELSOS=(S2(I,K)+S3(I,K)+K)         DELSOS=(S2(I,K)+S3(I,K)+K)         DELSOS=(S2(I,K)+S3(I,K)+K)         SS1(K,J)=SDELY(I,K)+HT10(S3(I,K)+K)         OD CONTAUX         61 CONTAUX         62 CONTAUX         63 CONTAUX         64 CONTAUX         65 CONTAUX         65 CONTAUX         66 CONTAUX         67 CONTAUX         68 CONTAUX         69 CONTAUX         61 CONTAUX         62 CONTAUX
GC TO 61 1 59 I=N k 60 CONTINUE IW=-1 1 = I-1 17 DO 110 K=1.NCVS HT I= (1)-X(I) II=I+1 HT2=T(I)-X(II) PPC0=-FIL + HT2 SS2(K,J)=S2(I,K)+S2(I,K)+S2(K,J))/5. SS(K,J)=S2(I,K)+S2(I,K)+S2(K,J))/5. SS(K,J)=SELY(I,K)+HT1+S3(I,K) DELS0S=(52(I,K)+S2(I,K)+PR00*DELS0S SS1(K,J)=DELY(I,K)+HT1+HT2)*DELS0S+PR00*S3(I,K)/6.0 ILO CDNIIWE 61 CDNIIWE 1F(UIG.GI.O)PFIDEN 01 120 K=1,NVS 20 PR0XIM(K)=0.0 0) 52 I=1,M II=I+1 62 PN(XIN(K)=PHCXIN(K)+.5*H(I) *(Y(I,K)+Y(II,K))-H(I) **3*( IS2(I,K)+S2(II,K))/24. 'I20 CONTINUE PFIDEN FN0 II II II II II II II II II I

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#### TABLE I

SUMMARY OF RESULTS

Quantity	Comp.	۰Exp.	Comp.	Exp.	Comp.	Exp.
Equivalent mass of block, gm	102.2	102.2	102.2	102.2	153	153
Initial impact velocity, cm/sec	30	33	50	47	30	30
Peak acceleration, g	· 1.76	1.52	2.84	2.28	1.24	1.12
Peak pressure, kN/m <sup>2</sup>	2.9	6.3	4.7	9.2	3.0	6.5
Maximum penetration, cm	27.11	23.07	28.16	24.46		
Time at maximum penetration, sec	.395	.390	.375	. 373		# <b>-</b>



Figure 1. Soil constitutive relationship.



Figure 2. Position for different types of cells.



Figure 3. Linear scheme for estimating  $F_{xe}^{n+1}$ .



Figure 4. Areas used in shifting of pressure field for a positive  $\Delta X_{w}$  and  $\Delta Y_{w}$ .



Figure 5. Accuracy of vertical force on rigid block.

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Figure 6. Experimental apparatus used to measure displacement, acceleration, and pressure.



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Figure 8. Comparison of computational and experimental time histories of rigid block impacting on still water.



Figure 8. Continued.

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(c)  $v_0 = 30$  cm/sec, mass of block = 153 gm

Figure 8. Concluded.



## **Computational** Parameters

$\Delta x = \Delta y = .9524  \mathrm{cm}.$	Initial fluid depth = 24 cells (23 cm)
No. of cells = $62 \times 62$	Width of fluid (half field) = 60cells (57cm)
<sup>v</sup> o = 50 cm/sec.	Size of half block = 4 x 34 cells (3.8 x 32.4 cm)
Mass = 102.2gm.	Fluid kinematic viscosity = .01cm <sup>2</sup> /sec.

Figure 9. Fluid dynamics evolution for typical computational study.



Figure 10. Computed excess hydrostatic pressure at center of base of rigid block at time t = .003 seconds after impact. Mass = 102.2 gm

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Figure 11. Time history of forces on rigid block of various contact length.



Figure 12. Effect of contact length on displacements.



Figure 13. Effect of initial horizontal block velocity on forces.