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A Supersonic Three-Dimensional Code for Flow Over Blunt Bodies - Program Documentation and Test Cases

D. S. Chaussee and O. J. McMillan

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A Supersonic Three-Dimensional Code
for Flow Over Blunt Bodies -
Program Documentation and Test Cases

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Prepared for
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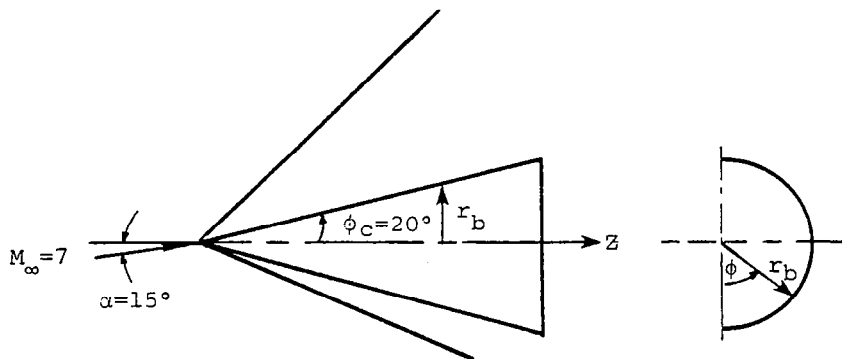
1. INTRODUCTION

In this report we present various test cases to exemplify the use of the three-dimensional code employed to calculate supersonic flow over blunt bodies.

Problem formulation, mathematical framework and the overall program logic are presented in a separate report (ref. 1). In section 2 of this report we present the input data and answer listings for the first test case which is for a 20° half-angle cone at 15° angle of attack and a free-stream Mach number of 7. Section 3 of this report involves the test case for a cone-ogive-cylinder at 10° angle of attack and a free-stream Mach number of 2.86. A complete listing of the code is given in the appendix.

2. FIRST TEST CASE: CONE

The first test case is for a 20° half-angle cone at 15° angle of attack and a free-stream Mach number of 7 as shown below.



The input data cards required are listed below. Further information about the parameters specified on these cards is provided in reference 1. Following this list is the input data set used for the first test case.

Card No.	Format	Variables
1	8I5	NSEG: Number of segment points. KIND: Flag for kind of segment. 0 = sphere or circular ogive 1 = circular cone 2 = circular cone with flat cut
2	8F10.6	ZSEG: Z - station initiating segment.
3	8F10.6	RSEG: r - coord. initiating segment.
4	8F10.6	DSEG: Distance from centerline to flat chord, initiating segment.
5	8F10.6	ASEG: ϕ_{seg} - Angle between straight down and DSEG initiating segment.
5a	3F10.6	ZC: Z at center of longitudinal arc. RC: r at center of longitudinal arc. RADIUS: Radius of longitudinal arc.

(Cards 6-11 are read in SUB.INPUT)

6	3E15.6, 5X,I5	XMACH: Mach number ALPHA: Angle of attack (degrees) GAMMA: Ratio of specific heats NREAL: 0 for perfect gas, -1 for real gas (pointed cone starting solutions are generated internally for perfect gas option only).
7	3F10.5	PHIFD: Meridional angle about which points are clustered. RK: Meridional clustering parameter (0 for no clustering). RJ: Radial clustering parameter (0 for no clustering).

Card No.	Format	Variables
8	5I5	<p>NIT: No. of points between body and shock (max = 20)</p> <p>NIPHI: No. of intervals in meridional direction (max = 36)</p> <p>NITER: No. of integration steps desired (when ZEND is specified set NITER to 99999)</p> <p>ICONST(49): Stepsize is computed every ICONST(49) iterations (5 is nominal)</p> <p>NCONE: { 1 for pointed cone solutions, 2 for all other geometries</p>
9	3F10.5	<p>CONST(9): Courant No. (usually 0.9)</p> <p>CONST(4): Radial dissipation constant</p> <p>CONST(5): Meridional dissipation constant</p>
10	5I5	<p>DISK 1: 1 reads solution from tape, 2 writes solution on tape, 3 does nothing (logical unit 12)</p> <p>DISK 2: 1 reads solution from tape, 2 writes solution on tape, 3 does nothing (logical unit 11)</p> <p>TAPE 1: 1 does nothing, 2 stores body shape and writes data on tape each Z station, 3 writes data only (logical unit 9)</p> <p>TAPE 2: 1 does nothing, 2 reads starting solution from punched cards, 3 stores solution on punched cards when exiting (logical unit 7). If TAPE2 = 1 and DISK 1 and DISK 2 = 2 or 3, a pointed cone solution will be generated for the perfect gas case only</p> <p>NTDSOS: 0</p>
11	2F10.5 3I5	<p>ZBS: increment in z for printing shock and body variables (ZBS > ZEND if not desired)</p> <p>ZFLD: increment in z for printing field variables (ZFLD > ZEND if not desired)</p>

} print
based on
z station

Card No.	Format	Variables
		ITPRTB: No. of iterations for printing shock and body variables (ITPRTB > NITER if not desired) ITPRTF: No. of iterations for printing field variables (ITPRTF > NITER if not desired) NCASE: If > 0, new case follows

print based on number of iterations

(The following card contains values used in force and moment calculations or in shifting the origin of the pointed-cone starting solution.)

12	5F10.5 I5	DIAM: Length used in calculating reference area; usually maximum diameter ALENGT: Reference length used in calculating moments ZREF: Moment reference center ZCG: Center of gravity location for static margin calculation ZSHIFT: The value of Z which corresponds to the starting cone origin; if no shift set = 0 IFANDM: { 0, force and moment calculation 1, no force and moment calculation
----	--------------	---

(If starting solution is to be read from punched cards (TAPE 2 = 2), the following three cards are read in main program. If solution is read from magnetic storage device, these are not required.)

12a	5E15.6	XMACH, ALPHA, GAMMA, RK, PHIFD: (Defined above)
12b	5E15.6	RJ: (Defined above)
12c	3I5, 4E15.6	NIT, NIPHI, NREAL: (Defined above)
		PLINF: free stream pressure, RLINF: free stream density, VLINF: free stream velocity, GASCON: gas constant (1716.0 for air)

real gas option only (dimensional)

Card No.	Format	Variables
----------	--------	-----------

[If NREAL = -1, gas tables are placed here and will be read in SUB.RGAS(523 cards for equilibrium air)]

(If TAPE 2 = 2 punch card starting solution is placed here. The first card is the Z station of the starting plane and is followed by flow variables at each node.)

(The following card(s) is used to change the program control variables at preselected longitudinal (Z) stations and is read in Program MAIN. At least one card is required if no modifications are asked for. In this case ZALTER should then be > ZEND)

13	F10.5,I2, I3,F10.5, I2,I3	ZALTER: Z station where altering occurs NITA: New NIT NIPHEA: New NIPHI RJA: New RJ RKA: New RK PHFDA: New PHFD STP: { 0, stepsize determined automatically >0, value of desired constant stepsize DISS1: New CONST(4) DISS2: New CONST(5) NSWCH1: { 0, new MacCormack 1, old MacCormack NSWCH5: { 0, no entropy relaxation 1, entropy relaxation
----	---------------------------------	--

(The following card is used to initialize the force and moment calculations, and is read in SUB.COMPUT. This card is needed only if IFANDM = 0. *If NCONE = 2 and IFANDM = 0 this card is read before the first card 13, otherwise it is read after all card 13's.)

14	6F12.8	FTX: } initial plane forces in the z, r, FTY: } ϕ direction FTZ: } RMTX: } initial plane moments in the z, r, RMTY: } ϕ direction RMTZ: }
----	--------	--

A complete output for this test case is now presented. In the following, the velocities are made dimensionless with respect to the maximum adiabatic velocity, $V_m = \sqrt{2\gamma/\gamma-1 \cdot p_{t\infty}/\rho_{t\infty}}$ and the pressure and density for the complete flow field printout are normalized with respect to the free stream stagnation conditions. Polar coordinates (z, r, ϕ) are used with the corresponding velocity components (u, v, w) . The circumferential index is k , the radial index is j ($j = 3$ indicates the body surface). The output consists of the following sections:

1. Printout of the input quantities
2. Printout of the free-stream velocity field and the computational mesh. TAU is the radial computational variable, XI is the normalized physical radial variable running from 0 on the body to 1 at the shock. $TXI = \frac{\partial(TAU)}{\partial(XI)}$, $TXIT = \frac{\partial(TXI)}{\partial(TAU)}$. ETA is the computational circumferential variable, DTIL = $\frac{\partial(ETA)}{\partial(PHI)}$, DTILE = $\frac{\partial(DTIL)}{\partial(ETA)}$.
3. Intermediate printout of shock and body variables controlled by card 11.
4. Printout of the flow field at the final z station.
5. Line-printer plot of the normalized density field at the final z station.
6. Printout of the shock and body variables at the final z station.
7. The solution reset to the initial z plane using the conical property of the converged flow field. Sections 4-6 are repeated at z-initial.
8. Printout of the force and moment calculations.

MACH = 7.000000
 ALPHA = 15.000000
 GAMMA = 1.400
 SIGMA = 20.00
 Z-INITIAL = 1.00
 Z-FINAL = 10000.00
 PHI-ZERO = 90.00

NIT = 20
 NIPHZ = 18
 METHOD ORDER = 2
 NITER = 1500
 NPRINT = 0
 IPRINT = 1
 NCONV = 1
 NWRPRT = 0
 NREAL = 0

DZ/DY = 0.000 INITIALLY
 DELTA-X = 0.000
 DELTA-Y = 0.000

DISK1 = 3
 DISK2 = 3
 TAPE1 = 1
 TAPE2 = 1

PERCENT OF MAX. STEP SIZE = .90
 METHOD = 2
 BND. COND. = 1
 BETA = 0.000
 OMEGA = 0.000

PINF = .241555E-03 RHOIN = .260860E-02 GINF = .952579E+00
 GASCON = 1.7160E+03

K	PHI	UINF	VINF	WINF
3	0.000000	.920121	-.246546	0.000000
4	10.000000	.920121	-.242800	.042812
5	20.000000	.920121	-.231677	.094324
6	30.000000	.920121	-.213515	.123273
7	40.000000	.920121	-.188665	.159477
8	50.000000	.920121	-.158477	.188865
9	60.000000	.920121	-.123273	.213515
10	70.000000	.920121	-.084324	.231677
11	80.000000	.920121	-.042812	.242800
12	90.000000	.920121	-.000000	.246546
13	100.000000	.920121	.042812	.242800
14	110.000000	.920121	.084324	.231677
15	120.000000	.920121	.123273	.213515
16	130.000000	.920121	.159477	.188865
17	140.000000	.920121	.188665	.158477
18	150.000000	.920121	.213515	.123273
19	160.000000	.920121	.231677	.094324
20	170.000000	.920121	.242800	.042812
21	180.000000	.920121	.246546	.000000

RADIAL MESH DESCRIPTION

J= 3	TAU= 0.	XI = 0.	TXI =	.1000E+01	TXIY = 0.
J= 4	TAU= .4762E-01	XI = .4762E-01	TXI =	.1000E+01	TXIY = 0.
J= 5	TAU= .9524E-01	XI = .9524E-01	TXI =	.1000E+01	TXIY = 0.
J= 6	TAU= .1429E+00	XI = .1429E+00	TXI =	.1000E+01	TXIY = 0.
J= 7	TAU= .1905E+00	XI = .1905E+00	TXI =	.1000E+01	TXIY = 0.
J= 8	TAU= .2381E+00	XI = .2381E+00	TXI =	.1000E+01	TXIY = 0.
J= 9	TAU= .2857E+00	XI = .2857E+00	TXI =	.1000E+01	TXIY = 0.
J=10	TAU= .3333E+00	XI = .3333E+00	TXI =	.1000E+01	TXIY = 0.
J=11	TAU= .3810E+00	XI = .3810E+00	TXI =	.1000E+01	TXIY = 0.
J=12	TAU= .4286E+00	XI = .4286E+00	TXI =	.1000E+01	TXIY = 0.
J=13	TAU= .4762E+00	XI = .4762E+00	TXI =	.1000E+01	TXIY = 0.
J=14	TAU= .5238E+00	XI = .5238E+00	TXI =	.1000E+01	TXIY = 0.
J=15	TAU= .5714E+00	XI = .5714E+00	TXI =	.1000E+01	TXIY = 0.
J=16	TAU= .6190E+00	XI = .6190E+00	TXI =	.1000E+01	TXIY = 0.
J=17	TAU= .6667E+00	XI = .6667E+00	TXI =	.1000E+01	TXIY = 0.
J=18	TAU= .7143E+00	XI = .7143E+00	TXI =	.1000E+01	TXIY = 0.
J=19	TAU= .7619E+00	XI = .7619E+00	TXI =	.1000E+01	TXIY = 0.
J=20	TAU= .8095E+00	XI = .8095E+00	TXI =	.1000E+01	TXIY = 0.
J=21	TAU= .8571E+00	XI = .8571E+00	TXI =	.1000E+01	TXIY = 0.
J=22	TAU= .9048E+00	XI = .9048E+00	TXI =	.1000E+01	TXIY = 0.
J=23	TAU= .9524E+00	XI = .9524E+00	TXI =	.1000E+01	TXIY = 0.
J=24	TAU= .1000E+01	XI = .1000E+01	TXI =	.1000E+01	TXIY = 0.

150.0 18.9419 .3640 0.0000 25.9026 .4971 .5014
 160.0 18.9419 .3640 0.0000 25.6940 .4979 -.6586
 170.0 18.9419 .3640 0.0000 25.6727 .4946 -1.0678
 180.0 18.9419 .3640 0.0000 25.5213 .4916 0.0000

SURFACE FLOW VARIABLES AT Z = 797.994173
 X/L = .079799 DZDT= 91.327916 ITER= 1256

PHI	RB	CP	P/PINF	R/RINF	M-Z	M-R	M-PHI	A	COMP	H/HT	TEMP	(S-S.INF)/CV
0.0	290.4461	.6709	2.4012E+01	5.0298E+00	2.3607	.8592	0.0000	2.9733E-01	1.0000	.44204	.00	9.1703E-01
10.0	290.4461	.6616	2.3694E+01	4.9821E+00	2.3675	.8617	.0841	2.9677E-01	1.0000	.44036	.00	9.1703E-01
20.0	290.4461	.6546	2.2767E+01	4.8421E+00	2.3677	.8691	.1679	2.9508E-01	1.0000	.43536	.00	9.1703E-01
30.0	290.4461	.5919	2.1303E+01	4.6175E+00	2.4218	.8815	.2506	2.9229E-01	1.0000	.42717	.00	9.1703E-01
40.0	290.4461	.5368	1.9413E+01	4.3211E+00	2.4701	.8990	.3317	2.8844E-01	1.0000	.41598	.00	9.1703E-01
50.0	290.4461	.4733	1.7233E+01	3.9607E+00	2.5332	.9220	.4106	2.8357E-01	1.0000	.40207	.00	9.1703E-01
60.0	290.4461	.4056	1.4913E+01	3.5793E+00	2.6116	.9505	.4862	2.7777E-01	1.0000	.38579	.00	9.1703E-01
70.0	290.4461	.3379	1.2590E+01	3.1714E+00	2.7059	.9849	.5580	2.7113E-01	1.0000	.36757	.00	9.1703E-01
80.0	290.4461	.2736	1.0336E+01	2.7642E+00	2.8163	1.0250	.6241	2.6375E-01	1.0000	.34791	.00	9.1703E-01
90.0	290.4461	.2155	8.3504E+00	2.3734E+00	2.9429	1.0711	.6835	2.5586E-01	1.0000	.32733	.00	9.1703E-01
100.0	290.4461	.1649	6.6576E+00	2.0119E+00	3.0853	1.1230	.7339	2.4755E-01	1.0000	.30639	.00	9.1703E-01
110.0	290.4461	.1232	5.2252E+00	1.6923E+00	3.2409	1.1796	.7704	2.3813E-01	1.0000	.28590	.00	9.1703E-01
120.0	290.4461	.0899	4.0845E+00	1.4193E+00	3.4065	1.2399	.7887	2.3086E-01	1.0000	.26648	.00	9.1703E-01
130.0	290.4461	.0648	3.2210E+00	1.1978E+00	3.5747	1.3011	.7807	2.2316E-01	1.0000	.24899	.00	9.1703E-01
140.0	290.4461	.0471	2.6166E+00	1.0328E+00	3.7322	1.3594	.7310	2.1663E-01	1.0000	.23464	.00	9.1703E-01
150.0	290.4461	.0367	2.2581E+00	9.2970E-01	3.8571	1.4039	.6141	2.1212E-01	1.0000	.22497	.00	9.1703E-01
160.0	290.4461	.0321	2.0595E+00	8.6270E-01	3.9332	1.4316	.4149	2.0935E-01	1.0000	.22035	.00	9.1703E-01
170.0	290.4461	.0309	2.0592E+00	8.7016E-01	3.9628	1.4423	.1664	2.0934E-01	1.0000	.21912	.00	9.1703E-01
180.0	290.4461	.0307	2.0544E+00	8.6870E-01	3.9684	1.4444	0.0000	2.0927E-01	1.0000	.21897	.00	9.1703E-01

MACH = 7.000000
 ALPHA = 15.000000
 GAMMA = 1.400
 SIGMA = 20.00

 Z-INITIAL = 797.99
 Z-FINAL = 10000.00
 PHI-ZERO = 90.00

NIT = 20
 NIPHI = 18
 METHOD ORDER = 2
 NIETA = 1500
 NPRINT = 0
 IPRINT = 1
 NCONV = 1
 NJRPT = 0
 NREAL = 0

DZ/DY = 91.328 INITIALLY
 DELTA-X = 0.000
 DELTA-Y = 0.000

DISK1 = 3
 DISK2 = 3
 TAPE1 = 1
 TAPE2 = 1

PERCENT OF MAX. STEP SIZE = .90
 METHOD = 2
 BND. COND. = 1
 BETA-0.000
 OMEGA = 0.000

PINF =	.241555E-03	RHOIN =	.260880E-02	GINF =	.952579E+00
GASCON =	1.7160E+03				

K = 3	PHI = 0.000000	UINF =	.920121	VINF =	-.246546	WINF =	0.000000
K = 4	PHI = 10.000000	UINF =	.920121	VINF =	-.242800	WINF =	.042812
K = 5	PHI = 20.000000	UINF =	.920121	VINF =	-.231677	WINF =	.084324
K = 6	PHI = 30.000000	UINF =	.920121	VINF =	-.213515	WINF =	.123273
K = 7	PHI = 40.000000	UINF =	.920121	VINF =	-.188865	WINF =	.158477
K = 8	PHI = 50.000000	UINF =	.920121	VINF =	-.158477	WINF =	.188865
K = 9	PHI = 60.000000	UINF =	.920121	VINF =	-.123273	WINF =	.213515
K = 10	PHI = 70.000000	UINF =	.920121	VINF =	-.084324	WINF =	.242800
K = 11	PHI = 80.000000	UINF =	.920121	VINF =	-.042812	WINF =	.260880
K = 12	PHI = 90.000000	UINF =	.920121	VINF =	-.000000	WINF =	.276546
K = 13	PHI = 100.000000	UINF =	.920121	VINF =	.042812	WINF =	.290000
K = 14	PHI = 110.000000	UINF =	.920121	VINF =	.084324	WINF =	.301677
K = 15	PHI = 120.000000	UINF =	.920121	VINF =	.123273	WINF =	.311515
K = 16	PHI = 130.000000	UINF =	.920121	VINF =	.158477	WINF =	.320000
K = 17	PHI = 140.000000	UINF =	.920121	VINF =	.188865	WINF =	.327373
K = 18	PHI = 150.000000	UINF =	.920121	VINF =	.213515	WINF =	.334324
K = 19	PHI = 160.000000	UINF =	.920121	VINF =	.231677	WINF =	.340812
K = 20	PHI = 170.000000	UINF =	.920121	VINF =	.242800	WINF =	.346000
K = 21	PHI = 180.000000	UINF =	.920121	VINF =	.246546	WINF =	.350000

RADIAL MESH DESCRIPTION

J= 3	TAU= 0.	XI = 0.	TXI =	.1000E+01	TXIT = 0.
J= 4	TAU= .4762E-01	XI = .4762E-01	TXI =	.1000E+01	TXIT = 0.
J= 5	TAU= .9524E-01	XI = .9524E-01	TXI =	.1000E+01	TXIT = 0.
J= 6	TAU= .1429E+00	XI = .1429E+00	TXI =	.1000E+01	TXIT = 0.
J= 7	TAU= .1905E+00	XI = .1905E+00	TXI =	.1000E+01	TXIT = 0.
J= 8	TAU= .2381E+00	XI = .2381E+00	TXI =	.1000E+01	TXIT = 0.
J= 9	TAU= .2857E+00	XI = .2857E+00	TXI =	.1000E+01	TXIT = 0.
J=10	TAU= .3333E+00	XI = .3333E+00	TXI =	.1000E+01	TXIT = 0.
J=11	TAU= .3810E+00	XI = .3810E+00	TXI =	.1000E+01	TXIT = 0.
J=12	TAU= .4286E+00	XI = .4286E+00	TXI =	.1000E+01	TXIT = 0.
J=13	TAU= .4762E+00	XI = .4762E+00	TXI =	.1000E+01	TXIT = 0.
J=14	TAU= .5238E+00	XI = .5238E+00	TXI =	.1000E+01	TXIT = 0.
J=15	TAU= .5714E+00	XI = .5714E+00	TXI =	.1000E+01	TXIT = 0.
J=16	TAU= .6190E+00	XI = .6190E+00	TXI =	.1000E+01	TXIT = 0.
J=17	TAU= .6667E+00	XI = .6667E+00	TXI =	.1000E+01	TXIT = 0.
J=18	TAU= .7143E+00	XI = .7143E+00	TXI =	.1000E+01	TXIT = 0.
J=19	TAU= .7619E+00	XI = .7619E+00	TXI =	.1000E+01	TXIT = 0.
J=20	TAU= .8095E+00	XI = .8095E+00	TXI =	.1000E+01	TXIT = 0.
J=21	TAU= .8571E+00	XI = .8571E+00	TXI =	.1000E+01	TXIT = 0.
J=22	TAU= .9048E+00	XI = .9048E+00	TXI =	.1000E+01	TXIT = 0.
J=23	TAU= .9524E+00	XI = .9524E+00	TXI =	.1000E+01	TXIT = 0.
J=24	TAU= .1000E+01	XI = .1000E+01	TXI =	.1000E+01	TXIT = 0.

MERIDIANAL MESH DESCRIPTION

K=	ETA	ETA	PHI	DTIL	DTIL	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV
K= 2	ETA= -.1745E+00	PHI= -.1745E+00	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K= 3	ETA= 0.	PHI= 0.	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K= 4	ETA= .1745E+00	PHI= .1745E+00	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K= 5	ETA= .3491E+00	PHI= .3491E+00	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K= 6	ETA= .5236E+00	PHI= .5236E+00	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K= 7	ETA= .6981E+00	PHI= .6981E+00	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K= 8	ETA= .8727E+00	PHI= .8727E+00	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K= 9	ETA= 1.047E+01	PHI= 1.047E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=10	ETA= 1.222E+01	PHI= 1.222E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=11	ETA= 1.396E+01	PHI= 1.396E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=12	ETA= 1.571E+01	PHI= 1.571E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=13	ETA= 1.745E+01	PHI= 1.745E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=14	ETA= 1.920E+01	PHI= 1.920E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=15	ETA= 2.094E+01	PHI= 2.094E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=16	ETA= 2.268E+01	PHI= 2.268E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=17	ETA= 2.443E+01	PHI= 2.443E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=18	ETA= 2.618E+01	PHI= 2.618E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=19	ETA= 2.793E+01	PHI= 2.793E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=20	ETA= 2.967E+01	PHI= 2.967E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=21	ETA= 3.142E+01	PHI= 3.142E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	
K=22	ETA= 3.316E+01	PHI= 3.316E+01	DTIL= .1000E+01	DTIL= .1000E+01	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV	

X/L = .079799 SURFACE FLOW VARIABLES AT Z = 797.994173
 DZDT = 91.020467 ITER = 1256

PHI	RB	CP	P/PINF	R/RINF	M-Z	M-R	M-PHI	A	COMP	H/AT	TEMP	(S-S.INF)/CV
0.0	290.4461	.6709	2.4012E+01	5.0299E+00	2.3607	.8592	0.0000	2.9133E-01	1.0000	.44204	.00	9.1703E-01
10.0	290.4461	.6616	2.3694E+01	4.9821E+00	2.3675	.8617	.0841	2.9677E-01	1.0000	.44036	.00	9.1703E-01
20.0	290.4461	.6346	2.2767E+01	4.8421E+00	2.3677	.8691	.1679	2.9503E-01	1.0000	.43536	.00	9.1703E-01
30.0	290.4461	.5919	2.1303E+01	4.6175E+00	2.4218	.8815	.2506	2.9229E-01	1.0000	.42717	.00	9.1703E-01
40.0	290.4461	.5368	1.9413E+01	4.3211E+00	2.4701	.8990	.3317	2.8804E-01	1.0000	.41598	.00	9.1703E-01
50.0	290.4461	.4733	1.7233E+01	3.9687E+00	2.5332	.9220	.4106	2.8357E-01	1.0000	.40207	.00	9.1703E-01
60.0	290.4461	.4058	1.4913E+01	3.5795E+00	2.6126	.9503	.4862	2.7717E-01	1.0000	.38579	.00	9.1703E-01
70.0	290.4461	.3379	1.2590E+01	3.1714E+00	2.7059	.9849	.5580	2.7113E-01	1.0000	.36757	.00	9.1703E-01
80.0	290.4461	.2736	1.0305E+01	2.7642E+00	2.8163	1.0250	.6315	2.6566E-01	1.0000	.34791	.00	9.1703E-01
90.0	290.4461	.2158	8.3204E+00	2.3734E+00	2.9429	1.0711	.7039	2.6155E-01	1.0000	.32639	.00	9.1703E-01
100.0	290.4461	.1649	6.6576E+00	2.0119E+00	3.0853	1.1206	.7704	2.5813E-01	1.0000	.30390	.00	9.1703E-01
110.0	290.4461	.1232	5.2252E+00	1.6922E+00	3.2409	1.1796	.8287	2.5586E-01	1.0000	.28590	.00	9.1703E-01
120.0	290.4461	.0899	4.0946E+00	1.4195E+00	3.4065	1.2399	.8787	2.5366E-01	1.0000	.26848	.00	9.1703E-01
130.0	290.4461	.0648	3.2210E+00	1.1976E+00	3.5747	1.3011	.9170	2.5151E-01	1.0000	.24999	.00	9.1703E-01
140.0	290.4461	.0471	2.6166E+00	1.0326E+00	3.7322	1.3584	.9510	2.4943E-01	1.0000	.23464	.00	9.1703E-01
150.0	290.4461	.0367	2.2581E+00	9.2840E-01	3.8571	1.4039	.9741	2.4743E-01	1.0000	.22497	.00	9.1703E-01
160.0	290.4461	.0321	2.0999E+00	8.6240E-01	3.9332	1.4316	.9884	2.4553E-01	1.0000	.22035	.00	9.1703E-01
170.0	290.4461	.0309	2.0592E+00	8.7016E-01	3.9626	1.4423	.9944	2.4384E-01	1.0000	.21912	.00	9.1703E-01
180.0	290.4461	.0307	2.0544E+00	8.6870E-01	3.9694	1.4444	0.0000	2.4227E-01	1.0000	.21897	.00	9.1703E-01

K= 3 PHI = 0.0 Z = *****

J	R	P	RHO	U	V	W	(S-S.INF)/CV	A	T	H/AT
31092.26296076	5.8003E-03	1.3121E-02	.70192139	.25547849	0.00000000	0.00000000	.91703047	.29733386	0.0000	.4420
41103.12979391	5.79983E-03	1.31194E-02	.70319446	.25202113	0.00000000	0.00000000	.91702521	.29732235	.0476	.4420
51113.95662706	5.79570E-03	1.31144E-02	.70444865	.24857450	0.00000000	0.00000000	.91702521	.29729939	.0952	.4419
61124.86346021	5.79067E-03	1.31062E-02	.70574906	.24513914	0.00000000	0.00000000	.91702521	.29726253	.1429	.4418
71135.73029336	5.78359E-03	1.30948E-02	.70703527	.24172402	0.00000000	0.00000000	.91702521	.29721057	.1905	.4417
81146.50712651	5.77455E-03	1.30803E-02	.70832715	.23832627	0.00000000	0.00000000	.91702521	.29714415	.2381	.4415
91157.46333983	5.76358E-03	1.30624E-02	.70962511	.23494511	0.00000000	0.00000000	.91702521	.29706329	.2857	.4412
101168.33079280	5.75066E-03	1.30415E-02	.71092973	.23157854	0.00000000	0.00000000	.91702521	.29696811	.3333	.4410
111179.19732595	5.73583E-03	1.30175E-02	.71224169	.22822460	0.00000000	0.00000000	.91702521	.29685825	.3810	.4408
121190.06445910	5.71911E-03	1.29904E-02	.71356174	.22489107	0.00000000	0.00000000	.91702521	.29673495	.4286	.4403
131200.93129225	5.70052E-03	1.29502E-02	.71489078	.22154555	0.00000000	0.00000000	.91702521	.29659695	.4762	.4398
141211.79812540	5.68005E-03	1.29269E-02	.71623270	.21821518	0.00000000	0.00000000	.91702521	.29644457	.5238	.4394
151222.66493655	5.65770E-03	1.28990E-02	.71757978	.21488820	0.00000000	0.00000000	.91702521	.29627768	.5714	.4389
161233.53179170	5.63549E-03	1.28511E-02	.71894191	.21156086	0.00000000	0.00000000	.91702521	.29609611	.6190	.4384

171244 .39862485 5.60736E-03 1.28065E-02 72031743 .20823047 0.00000000 .91702521 .29509960 .4370
 181255 .26545800 5.57935E-03 1.27128E-02 72170767 .20489398 0.00000000 .91702521 .29546049 .4372
 191266 .13229115 5.54937E-03 1.27138E-02 72311413 .20154763 0.00000000 .91702521 .29546049 .4365
 201277 .99124300 5.51745E-03 1.26615E-02 72453829 1.9818826 0.00000000 .91702521 .29521710 .4359
 211287 .86595745 5.48350E-03 1.26058E-02 72598251 1.9848110 0.00000000 .91702521 .29495696 .4350
 221298 .73279660 5.44758E-03 1.25468E-02 72744657 1.9141471 0.00000000 .91702521 .29466013 .4342
 231309 .59362375 5.40989E-03 1.24857E-02 72894039 1.8759432 0.00000000 .91702521 .29438336 .4333
 241320 .46645690 5.36965E-03 1.24183E-02 73044069 1.8454e58 0.00000000 .91702521 .29407422 1.0000 .4324

K = 4 PHI = 10.0 Z = *****

31092.26596076 5.72347E-03 1.29974E-02 70258673 .25572066 .02496519 .91703047 .29676778 0.0000 .4404
 41103.16693592 5.72251E-03 1.29924E-02 70375068 .25224761 .02561434 .91739748 .29679961 .0476 .4405
 51114.07091109 5.71994E-03 1.29886E-02 70518404 .24888630 .02670375 .91633028 .29666749 .0952 .4401
 61125.97488624 5.71555E-03 1.29970E-02 70654250 .24550954 .02833921 .91564938 .29656659 .1429 .4398
 71135.67886140 5.70919E-03 1.29912E-02 70789169 .24219938 .02981151 .91511687 .29644593 .1905 .4394
 81146.72828357 5.70090E-03 1.29829E-02 70923264 .23880222 .03153339 .91463821 .29634702 .2381 .4391
 91157.66681173 5.69075E-03 1.29704E-02 71058359 .23547051 .03317033 .91419783 .29622484 .2857 .4387
 101168.59078669 5.67869E-03 1.29545E-02 71189672 .23215212 .03481793 .91379746 .29609269 .3333 .4384
 111179.49476205 5.66473E-03 1.29354E-02 71321204 .22884611 .03646447 .91342087 .29594950 .3810 .4379
 121190.39873721 5.64906E-03 1.29130E-02 71454568 .22553024 .03821574 .91306744 .29579462 .4286 .4375
 131201.30271238 5.63150E-03 1.28874E-02 71589125 .22226754 .04008196 .91273056 .29562752 .4762 .4370
 141212.20668754 5.61212E-03 1.28585E-02 71725150 .21903053 .04206382 .91240912 .29544000 .5238 .4364
 151223.11062710 5.59092E-03 1.28267E-02 71861823 .21579158 .04426944 .91210001 .29525560 .5714 .4359
 161234.01463766 5.56766E-03 1.27917E-02 71999407 .21242324 .04663369 .91180219 .29508005 .6190 .4353
 171244.01861302 5.54297E-03 1.27534E-02 72135056 .20914232 .04916647 .91151540 .29490391 .6667 .4346
 181255.62258119 5.51621E-03 1.27119E-02 72274922 .20584533 .05189859 .91123469 .29472781 .7143 .4339
 191266.72656335 5.48753E-03 1.26672E-02 72415169 .20256041 .05483109 .91096300 .29455028 .7619 .4332
 201277.63053351 5.45703E-03 1.26212E-02 72556549 .19932621 .05793476 .91069895 .29438082 .8095 .4324
 211288.53451367 5.42450E-03 1.25747E-02 72700516 .19622821 .06121393 .91044132 .29422092 .8571 .4316
 221299.43944883 5.38959E-03 1.25280E-02 72846001 .19318330 .06464663 .91018979 .29406139 .9048 .4308
 231310.34246399 5.35359E-03 1.24813E-02 72993696 .18923314 .06823359 .90994433 .29390439 .9524 .4298
 241321.24643916 5.31469E-03 1.24392E-02 73143730 .18581369 .07190744 .90970316 .29375445 1.0000 .4289

K = 5 PHI = 20.0 Z = *****

31092.26596076 5.49950E-03 1.26320E-02 70457174 .25644314 .01953493 .91703047 .29508029 0.0000 .4354
 41103.27663310 5.50014E-03 1.26726E-02 70655773 .25333584 .02077114 .91266038 .29462499 .0476 .4340
 51114.29430261 5.49919E-03 1.26597E-02 70824600 .25014794 .02296784 .90249728 .29428310 .0952 .4330
 61125.30978003 5.49663E-03 1.27133E-02 70972094 .24690206 .02568199 .90150584 .29405627 .1429 .4323
 71135.32365045 5.47285E-03 1.27222E-02 71136628 .24366842 .02837399 .90574711 .29383919 .1905 .4317
 81146.34132268 5.46133E-03 1.27222E-02 71284732 .24044055 .02970763 .90424159 .29363348 .2381 .4311
 91157.35699330 5.44735E-03 1.27254E-02 71432034 .23723198 .03140964 .90284919 .29342752 .2857 .4305
 101168.37266772 5.46873E-03 1.27212E-02 71582346 .23403748 .03309253 .90151137 .29322047 .3333 .4299
 111180.38340151 5.45747E-03 1.27134E-02 71734440 .23083053 .03493992 .90036318 .29300769 .3810 .4293
 121191.40401257 5.44452E-03 1.27032E-02 71886933 .22767824 .03691685 .89922153 .29278989 .4286 .4286
 131202.41988500 5.42935E-03 1.26878E-02 71929858 .22451290 .03904234 .89812782 .29256208 .4762 .4280
 141213.43553742 5.41359E-03 1.26700E-02 72002928 .22136102 .04131622 .89707849 .29232681 .5238 .4276
 151224.45102954 5.39559E-03 1.26491E-02 72093394 .21821022 .04367633 .89602610 .29208205 .5714 .4266
 161235.46670227 5.37591E-03 1.26250E-02 72190131 .21506851 .04613740 .89500306 .29182729 .6190 .4258
 171246.48237469 5.35453E-03 1.25977E-02 72293354 .21191928 .04870383 .89412907 .29156182 .6667 .4250
 181257.49804712 5.33142E-03 1.25571E-02 72403700 .20877003 .0514929 .89330321 .29128511 .7143 .4242
 191268.51371694 5.30645E-03 1.25134E-02 72519489 .20561478 .0544498 .89259362 .29099652 .7619 .4234
 201279.52939496 5.27994E-03 1.24663E-02 72641803 .20244493 .05752539 .89194073 .29069542 .8095 .4225
 211290.54506439 5.25151E-03 1.24159E-02 72770991 .19927220 .06071029 .89140539 .29038278 .8571 .4216
 221301.56073681 5.22114E-03 1.23620E-02 72907338 .19607138 .06406903 .89089003 .29005278 .9048 .4207
 231312.57640223 5.18906E-03 1.23048E-02 73050411 .19293545 .06754183 .89045565 .28971112 .9524 .4197
 241323.59308166 5.15432E-03 1.22312E-02 73204031 .18980342 .07190744 .89003187 .28934872 1.0000 .4186

K = 6 PHI = 30.0 Z = *****

J R P RHO U V W M (\$-SINF)/CV A T H/MT
 J R P RHO U V W M (\$-SINF)/CV A T H/MT

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
31092	26296076	5.14578E-03	1.20462E-02	70787184	25764428	07325329	91703047	29229124	0.0000	4212
41103	69588896	5.12193E-02	1.21395E-02	71122024	25514499	07494908	90491325	29101527	0.0476	4234
51115	167421717	5.15039E-03	1.22188E-02	71330006	25223378	07789299	89800991	29030493	0.0952	4215
61127	87984537	5.12250E-03	1.22550E-02	71424971	24919824	08041573	89385008	28952086	0.1429	4203
71139	80547357	5.14625E-03	1.22855E-02	71651588	24616977	08288722	89017263	28922890	0.1905	4201
81151	29110178	5.14647E-03	1.23085E-02	71794704	24311694	08516994	88700697	28917924	0.2381	4181
91159	46672998	5.14217E-03	1.23270E-02	71941588	24012767	08735357	88407255	28884188	0.2857	4161
101170	70235818	5.13640E-03	1.23405E-02	72080163	23712122	08946764	88137358	28851732	0.3333	4142
111181	90798639	5.12917E-03	1.23510E-02	72216170	23414262	09151361	87881781	28819610	0.3810	4153
121193	11364159	5.12049E-03	1.23574E-02	72349780	23117164	09356467	87639911	28787757	0.4286	4144
131204	31942800	5.11035E-03	1.23604E-02	72481771	22821283	09544799	87407944	28755779	0.4762	4134
141215	52401100	5.09377E-03	1.23600E-02	72613369	22526692	09734909	87185128	28723592	0.5238	4125
151226	73049920	5.06875E-03	1.23554E-02	72746207	22232916	09921237	86969848	28690998	0.5714	4116
161237	93612741	5.07132E-03	1.23496E-02	72876937	21939804	10104144	86780939	28659716	0.6190	4106
171249	14175561	5.05255E-03	1.23397E-02	72999397	21647102	10251926	86557735	28624226	0.6667	4097
181260	34736391	5.03771E-03	1.23256E-02	73127673	21364932	10469432	86359165	28592849	0.7143	4087
191271	53701202	5.01877E-03	1.23104E-02	73255834	21061853	10635070	86166505	28559699	0.7619	4077
201282	73684022	4.99825E-03	1.22905E-02	73384588	20763653	10808629	85977422	28518687	0.8095	4067
211293	98426843	4.97605E-03	1.22683E-02	73513665	20474748	10978243	85782171	28481771	0.8571	4056
221305	18489663	4.95219E-03	1.22420E-02	73643665	20179230	11143510	85610540	28443739	0.9048	4045
231316	37552483	4.92699E-03	1.22131E-02	73773792	19883409	11308576	85432081	28404907	0.9524	4034
241327	58115504	4.89806E-03	1.21794E-02	73907957	19591589	11472006	85257119	28363950	1.0000	4023

K = 7 PHI = 40.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
31092	26296076	4.68926E-03	1.12729E-02	71247322	25931904	09556793	91703047	28437351	0.0000	4160
41103	73971941	4.69521E-03	1.14768E-02	71762483	25763301	09764794	89318335	28401324	0.0476	4091
51115	21647807	4.69976E-03	1.15701E-02	7200421	25502249	10121788	89209387	28369527	0.0952	4060
61127	85325373	4.70339E-03	1.16417E-02	72376336	25349519	10441183	87495157	28425741	0.1429	4040
71139	16999538	4.70578E-03	1.16947E-02	72732197	24959598	10746167	86662594	28353656	0.1905	4022
81151	64675404	4.70769E-03	1.17484E-02	72955678	24603578	11024540	86318443	28309629	0.2381	4007
91161	12351270	4.70703E-03	1.17855E-02	73240910	24309110	11297300	86144285	28253735	0.2857	3993
101174	60232135	4.70520E-03	1.18239E-02	73531948	24135459	11561091	85307650	28211022	0.3333	3879
111184	77703001	4.70361E-03	1.18589E-02	73828473	23864470	11811962	84911904	28164881	0.3810	3866
121195	35378867	4.70018E-03	1.18819E-02	74102412	23594703	12066239	84498887	28120317	0.4286	3854
131207	80304732	4.69555E-03	1.19134E-02	74323204	23326661	12305653	84090972	28076350	0.4762	3841
141218	50730595	4.68979E-03	1.19355E-02	74538645	23106019	12547933	83717021	28033157	0.5238	3829
151229	98408464	4.68285E-03	1.19547E-02	74742697	22949472	12781558	83471775	27990301	0.5714	3917
161241	46088329	4.67475E-03	1.19701E-02	74965089	22830937	13016994	82940193	27947664	0.6190	3905
171252	37598195	4.66584E-03	1.19923E-02	75185646	226797954	13236579	82602519	27905053	0.6667	3893
181264	44134083	4.65497E-03	1.19923E-02	75394649	22005631	13456631	82303908	27862360	0.7143	3882
191275	89109225	4.64325E-03	1.19923E-02	75592999	21743179	13677598	81973319	27818460	0.7619	3870
201287	38785792	4.63024E-03	1.20023E-02	74080421	21482000	13891119	81650116	27776235	0.8095	3858
211298	84461657	4.61600E-03	1.20037E-02	74197194	21232073	14105953	81333592	27732647	0.8571	3845
221310	32133523	4.60029E-03	1.20009E-02	74314177	20957411	14316156	81023373	27688401	0.9048	3833
231321	76612389	4.58358E-03	1.19980E-02	74429924	20895497	14523675	80718718	27644971	0.9524	3821
241333	27489254	4.56408E-03	1.19850E-02	74549456	20472719	14729114	80419983	27597668	1.0000	3808

K = 8 PHI = 50.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
31092	26296076	4.16286E-03	1.03537E-02	71894342	26144562	11642966	91703047	28357285	0.0000	4021
41104	09912909	4.17188E-03	1.06555E-02	72558262	26074174	11841567	87890580	27962381	0.0476	3915
51115	93529742	4.17961E-03	1.08003E-02	72879187	25866231	12232549	86192546	27820593	0.0952	3870
61127	7146575	4.16679E-03	1.06934E-02	73056606	25627434	12594139	85097363	27718783	0.1429	3842
71139	60762408	4.19311E-03	1.08655E-02	73288921	25388373	12934189	84133544	27629486	0.1905	3817
81151	44380241	4.18058E-03	1.10811E-02	73516303	25144198	13295929	83303825	27552867	0.2381	3796
91161	27997074	4.20523E-03	1.11306E-02	73616304	24902320	13572320	82537804	27481928	0.2857	3776
101175	11615905	4.20703E-03	1.11935E-02	73762597	24662596	13875386	81833786	27416458	0.3333	3758
111186	52230741	4.21001E-03	1.12525E-02	73921329	24424502	14165646	81165820	27351940	0.3810	3741
121198	78847574	4.21216E-03	1.13076E-02	74042941	24188154	14456690	80540602	27294376	0.4286	3725
131210	62464407	4.21386E-03	1.13589E-02	74159174	23954375	14737145	79939344	27237553	0.4762	3709
141222	46081240	4.21398E-03	1.14087E-02	74280645	23722393	15011844	79362933	27182000	0.5238	3694
151234	29698073	4.21365E-03	1.14515E-02	74397733	23492343	15281265	78806544	27127735	0.5714	3680

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
161257	13314506	4. 21240E-03	1. 14933E-02	74511370	23264052	15545941	78268447	27074576	6190	3665
171257	86931719	4. 21045E-03	1. 15323E-02	74621936	23037360	15606236	77745985	27022520	6667	3651
181269	60548572	4. 20756E-03	1. 13686E-02	74729790	22812094	16062486	77237914	26970601	7143	3637
191281	64165406	4. 20579E-03	1. 16021E-02	74835395	22587818	16311496	76742327	26919464	7619	3623
201293	47742239	4. 19906E-03	1. 16330E-02	74939864	22364574	16564009	76259523	26868676	8095	3610
211305	113959072	4. 19348E-03	1. 16618E-02	75045033	22142083	16809725	75785304	26818202	8571	3596
221317	150159025	4. 18668E-03	1. 16863E-02	75151367	21919160	17052434	75322043	26767666	9048	3583
231328	88032730	4. 17941E-03	1. 17098E-02	75239658	21698340	17292100	74867694	26711632	9524	3569
241340	82249571	4. 16969E-03	1. 17276E-02	75340677	21472024	17529297	74422418	26666302	1.0000	3555

K-9 PHI = 60.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
31092	26296076	3. 60231E-03	9. 33745E-03	72543162	26403582	13600581	91703047	27773381	0.0000	3858
41104	55024065	3. 61397E-03	9. 73517E-03	72642731	26442731	13676531	86143039	27243900	0476	3711
51116	85752054	3. 62474E-03	9. 92771E-03	73857062	26297912	14071643	83741424	27022622	0952	3651
61129	12480043	3. 63524E-03	1. 00501E-02	74335841	26089954	14485943	82204397	26885799	1429	3614
71143	14208032	3. 64529E-03	1. 01760E-02	74530528	25809444	14817081	80842009	26766359	1905	3582
81153	69926022	3. 65470E-03	1. 03795E-02	74572452	25850537	15166380	79684324	26665233	2381	3555
91165	86644011	3. 66336E-03	1. 03772E-02	74692291	25481944	15502771	78611134	26572542	2857	3530
101178	27392000	3. 67218E-03	1. 04671E-02	74846174	25279377	15829794	77627434	26488097	3333	3508
111190	56119929	3. 68015E-03	1. 05575E-02	74997513	25090303	16347763	76700280	26408734	3810	3487
121202	84647970	3. 68765E-03	1. 06351E-02	75116808	24882773	16458337	75826496	26334111	4286	3467
131215	13575967	3. 69467E-03	1. 07132E-02	75232567	24687978	16761946	74992214	26262890	4762	3449
141227	42303957	3. 70121E-03	1. 07801E-02	75353194	24495669	17052501	74194305	26194778	5238	3431
151239	71031946	3. 70725E-03	1. 08601E-02	75461944	24305897	17351396	73425960	26129093	5714	3414
161251	99753935	3. 71225E-03	1. 09295E-02	75565333	24115503	17639195	72684592	26063581	6190	3397
171264	28487924	3. 71789E-03	1. 09954E-02	75664065	23933397	17920228	71966447	26003875	6667	3381
181276	57215913	3. 72434E-03	1. 10509E-02	75753595	23750342	18197881	71269522	25943761	7143	3365
191288	85943902	3. 72647E-03	1. 11232E-02	75849351	23569276	18471418	70591521	25885023	7619	3350
201301	44671082	3. 72929E-03	1. 11833E-02	75936845	23389760	18741141	69230955	25832444	8095	3335
211313	43392801	3. 73279E-03	1. 12442E-02	76021094	23212103	19007428	68286254	25776979	8571	3321
221325	72127870	3. 73508E-03	1. 12968E-02	76103276	23034798	19269786	68656419	25715198	9048	3306
231338	00853859	3. 73707E-03	1. 13509E-02	76181745	22860473	19529442	68040104	25660637	9524	3292
241350	39583846	3. 73733E-03	1. 14004E-02	76261167	22682435	19786026	67437027	25605682	1.0000	3278

K-10 PHI = 70.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
31092	26296076	3. 04114E-03	8. 27365E-03	73565014	26702681	15127516	91703047	27113464	0.0000	3676
41105	10274873	3. 05492E-03	8. 76161E-03	74563875	26858700	15235607	84132510	26407253	0476	3487
51117	94253669	3. 06815E-03	8. 99197E-03	75021874	26761345	15602948	80931112	26123158	0952	3412
61130	78232466	3. 08133E-03	9. 15362E-03	75340571	26410171	15983884	78865048	25947016	1429	3366
71143	62211263	3. 09438E-03	9. 30108E-03	75530644	26484394	16346218	77050046	25794883	1905	3327
81156	46190060	3. 10715E-03	9. 43235E-03	75733003	26292620	17041401	75500879	25667693	2381	3294
91169	30168856	3. 11977E-03	9. 55631E-03	75907835	26131774	17044568	74077708	25552353	2857	3265
101182	44147653	3. 13220E-03	9. 67274E-03	76060779	25971511	17379997	72780219	25448671	3333	3238
111194	94126450	3. 14446E-03	9. 78455E-03	76199935	25813803	17706488	71561727	25353509	3810	3214
121207	82103247	3. 15655E-03	9. 89134E-03	7635876	25650507	18026033	70418737	252532073	4286	3191
131220	66034044	3. 16743E-03	9. 99503E-03	76494778	2550273	18338459	69331214	25178507	4762	3170
141233	50062840	3. 18025E-03	1. 00795E-02	76548288	25356989	18644763	68295362	25098926	5238	3150
151246	34041637	3. 19187E-03	1. 01953E-02	76647018	25210833	18945133	67301278	25023911	5714	3131
161259	18020434	3. 20333E-03	1. 02715E-02	76739558	25067676	19240174	66346643	24950435	6190	3113
171272	01999231	3. 21466E-03	1. 03455E-02	76823028	24927515	19535108	65423067	24860890	6667	3095
181284	85979028	3. 22681E-03	1. 04779E-02	76903353	24790160	19815946	64530858	24814005	7143	3079
191297	69936824	3. 23958E-03	1. 05688E-02	77047340	24623431	20096113	63665743	24749490	7619	3063
201310	33935618	3. 24759E-03	1. 06574E-02	77172480	24452931	20372719	62825705	24687081	8095	3047
211323	37914418	3. 24627E-03	1. 07450E-02	77271455	24239597	20645361	62006545	24626682	8571	3032
221336	21893215	3. 24680E-03	1. 08303E-02	77374155	24026024	20914287	61242802	24567875	9048	3018
231349	05872011	3. 24789E-03	1. 09156E-02	77471244	24141465	21179696	60436789	24510988	9524	3004
241361	89808088	3. 24805E-03	1. 09975E-02	77286934	24015927	21441681	59679618	24454936	1.0000	2990

K-11 PHI = 80.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
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J	R	P	RHO	U	V	W	M	(S-SINF)/CV	A	T	H/T
31092	26296076	2.50579E-03	7.21112E-03	74288164	27036688	16465480	91703047	26378260	0.0000	3479	
41105	75441797	2.52398E-03	7.71044E-03	75726194	27315199	14472546	91703047	25487441	0.0476	3248	
51119	24587518	2.53875E-03	8.03922E-03	76266505	27282169	16741116	7670851	25131471	0.952	3158	
61132	73732329	2.55375E-03	8.28585E-03	76578113	27180558	17131784	75000601	24913899	1.429	3104	
71146	22678960	2.56268E-03	8.40087E-03	76836608	27070421	17478550	72686785	24729854	1.905	3058	
81159	12034681	2.58391E-03	8.55266E-03	77042411	26952344	17824219	70726647	24577776	2.381	3020	
91173	21170403	2.59919E-03	8.70177E-03	77221354	26834522	18159541	68936617	24441649	2.857	2987	
101186	70316123	2.61449E-03	8.84031E-03	77375078	26717050	18488722	67312033	24320624	3.333	2957	
111200	19461844	2.62935E-03	8.97427E-03	77511164	26602309	18809255	65793650	24209396	3.810	2930	
121213	68607565	2.64539E-03	9.10379E-03	77632170	26494928	19121213	64375408	24107317	4.286	2906	
131227	177529007	2.66103E-03	9.23034E-03	77740436	26381799	19428860	63016195	24021201	4.762	2883	
141240	64893007	2.67678E-03	9.35912E-03	77837244	26276198	19737353	61751316	23923233	5.238	2862	
151254	16044728	2.69263E-03	9.47584E-03	77924518	26175550	20024611	60339479	23839568	5.714	2842	
161267	65180449	2.70879E-03	9.59570E-03	78022935	26071963	20313246	59313918	23760699	6.190	2823	
171281	14535617	2.72493E-03	9.71402E-03	781073594	25984090	20595373	58235601	23685989	6.667	2805	
181294	34818191	2.74129E-03	9.83114E-03	78137054	25893785	20874437	57175234	23615125	7.143	2788	
191308	12627612	2.75781E-03	9.94711E-03	78193906	25807043	21147619	56134458	23547719	7.619	2772	
201321	61773333	2.77448E-03	1.00621E-02	78244917	25723516	21416227	55128716	23483500	8.095	2757	
211335	10919054	2.79134E-03	1.01765E-02	78290206	25643577	21686468	54155107	23424224	8.571	2743	
221348	60664774	2.80831E-03	1.02895E-02	78330470	25564663	21946566	53211594	23363568	9.048	2729	
231362	09210495	2.82548E-03	1.04021E-02	78365726	25492363	2193639	52256165	2330762	9.524	2716	
241375	58356216	2.84272E-03	1.05140E-02	78396799	25422175	22449116	51407088	23254002	1.0000	2701	

K-12 PHI = 90.0 Z = *****

J	R	P	RHO	U	V	W	M	(S-SINF)/CV	A	T	H/T
31092	26296076	2.02675E-03	6.19174E-03	75297969	27406220	37487440	91703047	25586342	0.0000	3273	
41106	51218838	2.04223E-03	6.80613E-03	76974315	27804850	17357108	79219157	24497249	0.476	3001	
51120	76141601	2.05780E-03	7.12020E-03	77582340	27632440	17573921	74021673	24072090	0.952	2898	
61135	01604363	2.07356E-03	7.31016E-03	77920532	27777419	17892321	70744215	23615777	1.429	2837	
71149	25987126	2.08978E-03	7.50122E-03	78186274	27712251	18201862	67906919	23604747	1.905	2786	
81163	50939988	2.10612E-03	7.67331E-03	78410885	27637814	18525350	65506598	23429317	2.381	2745	
91177	00755414	2.12277E-03	7.83052E-03	78595167	27563349	18935912	63322877	23273461	2.857	2708	
101192	20678174	2.13969E-03	7.99455E-03	78749654	27489032	19142689	61349769	23136266	3.333	2676	
111206	55678176	2.15694E-03	8.14662E-03	78937650	2741529	19444447	59514710	23011508	3.810	2648	
121220	50502939	2.17451E-03	8.29431E-03	78993360	27348872	19734502	57810818	22898427	4.286	2622	
131234	08323701	2.19274E-03	8.43924E-03	79100299	27284045	20020421	56206585	22789425	4.762	2598	
141249	40444644	2.21072E-03	8.59166E-03	79187811	27223009	20300371	54695628	22698568	5.238	2576	
151263	25369228	2.22840E-03	8.72217E-03	79263473	27166208	20573866	53261900	22609794	5.714	2556	
161277	50291289	2.24645E-03	8.86113E-03	79323769	27113445	20943664	51900007	22527461	6.190	2537	
171291	75314751	2.26790E-03	8.99876E-03	79384671	27064911	21103654	50501784	22450861	6.667	2520	
181306	00137514	2.28795E-03	9.13562E-03	79431875	27030367	21316024	49362279	22379853	7.143	2504	
191320	23630276	2.30805E-03	9.27107E-03	79471182	26979924	21611565	48175741	22313048	7.619	2489	
201334	45983039	2.32877E-03	9.40716E-03	79503200	26943394	21837876	47036293	22250978	8.095	2478	
211348	74905801	2.34995E-03	9.54234E-03	79529130	26910908	22097349	45945981	22193020	8.571	2463	
221362	99828564	2.37154E-03	9.67723E-03	79547458	26882196	22336215	44895702	22138848	9.048	2451	
231377	24751327	2.39363E-03	9.81213E-03	79560512	26857331	22566863	43884561	22088272	9.524	2439	
241391	49674089	2.41611E-03	9.94687E-03	79568298	26836608	22796884	42910052	22040947	1.0000	2429	

K-13 PHI = 100.0 Z = *****

J	R	P	RHO	U	V	W	M	(S-SINF)/CV	A	T	H/T
31092	26296076	1.60821E-03	5.24877E-03	76375443	27798388	18167908	91703047	24754670	0.0000	3064	
41107	35553856	1.63232E-03	5.89445E-03	78264227	28311000	17670983	76390365	23468387	0.476	2794	
51122	44811636	1.63863E-03	6.21076E-03	78944506	28399184	17968727	70016743	22971183	0.952	2838	
61137	54064916	1.65419E-03	6.43527E-03	79316159	28359372	18227738	65990359	22673613	1.429	2871	
71152	63327196	1.67023E-03	6.64210E-03	79614506	28373350	18494454	62528417	22426153	1.905	2815	
81167	72584977	1.68654E-03	6.82970E-03	79841391	28341180	18766342	59626295	22325905	2.381	2470	
91182	81842757	1.70351E-03	7.00532E-03	80031227	28307079	19039220	57015667	22050942	2.857	2431	
101197	91100637	1.72078E-03	7.17591E-03	80165636	28271854	19312267	54886120	21899782	3.333	2398	
111213	00358317	1.73853E-03	7.34024E-03	80316239	28232623	19578622	52946134	21764923	3.810	2369	
121228	09616097	1.75679E-03	7.49924E-03	80424443	28200765	19849511	50584879	21645224	4.286	2343	
131243	18873878	1.77549E-03	7.65535E-03	80515599	28180531	20095338	48760898	21537286	4.762	2319	
141258	28131658	1.79474E-03	7.80860E-03	80590783	28157157	20344208	47064559	21440312	5.238	2298	

J	R	P	RHO	U	V	W	M (\$-SINF)/CV	A	T	M/HT
151273	37389438	1.81453E-03	7.95994E-03	.80652821	.28138116	.20586161	.45473909	.21352184	.5714	.2280
161288	46647218	1.83490E-03	8.10969E-03	.80702809	.28123695	.20821763	.43980818	.21272522	.6190	.2263
171303	55904998	1.85587E-03	8.25854E-03	.80741868	.28144220	.21050728	.42570672	.21200940	.6667	.2247
181318	65162778	1.87743E-03	8.44666E-03	.80771403	.28173480	.21273480	.41237380	.21134180	.7143	.2233
191333	74420659	1.89928E-03	8.55445E-03	.80819220	.28110116	.21490071	.39972210	.21074243	.7619	.2221
201348	83876339	1.92243E-03	8.70218E-03	.808604915	.28155544	.21700796	.38770258	.21019790	.8095	.2209
211363	92936119	1.94509E-03	8.84890E-03	.80910186	.28123973	.21905882	.37625548	.20870340	.8571	.2199
221379	02193899	1.97002E-03	8.99802E-03	.808088334	.28141336	.22105442	.36534098	.20923561	.9048	.2189
231394	11451799	1.99479E-03	9.14856E-03	.808000511	.28161380	.22300045	.35491366	.20885029	.9524	.2181
241409	20709459	2.02033E-03	9.29599E-03	.808186631	.281866240	.22489267	.34494439	.20848646	1.0000	.2173

K-14 PHI =110.0 Z = *****

J	R	P	RHO	U	V	W	M (\$-SINF)/CV	A	T	M/HT
31092	26296076	1.26213E-03	4.41455E-03	.77498133	.28207014	.18422596	.91703047	.23912389	0.0000	.2859
41108	26687619	1.27575E-03	5.00108E-03	.79602455	.28830076	.17930296	.73090094	.22406839	.0476	.2511
51124	27079104	1.29041E-03	5.41311E-03	.80356442	.28973430	.17529594	.65347836	.21032594	.0952	.2383
61140	27470104	1.30460E-03	5.64776E-03	.80756694	.29008033	.18080813	.60522746	.21493841	.1429	.2310
71156	2786247	1.3191E-03	5.86312E-03	.81070189	.29034183	.18285371	.56435973	.21217293	.1905	.2251
81172	28235790	1.33516E-03	6.03570E-03	.813300947	.29074374	.18519626	.53072487	.20990332	.2381	.2205
91188	28645333	1.35121E-03	6.23995E-03	.81636604	.29120769	.18751631	.50075859	.20812280	.2857	.2166
101204	29036815	1.35735E-03	6.41195E-03	.81757833	.29011736	.18967288	.47482503	.20654754	.3333	.2133
111220	29428418	1.36481E-03	6.57931E-03	.81854597	.29010207	.19453793	.42978320	.20517307	.3810	.2105
121236	29819981	1.40294E-03	6.74126E-03	.81854597	.29010207	.19453793	.42978320	.20386084	.4286	.2080
131252	30211504	1.42070E-03	6.8985E-03	.81832806	.29014931	.19881326	.41015008	.20292982	.4762	.2059
141268	30603046	1.43952E-03	7.05843E-03	.81994022	.29021946	.19836701	.39211376	.20200388	.5238	.2040
151284	30994559	1.45805E-03	7.20911E-03	.82041326	.29033110	.20057732	.37535073	.20118999	.5714	.2024
161300	31386132	1.47971E-03	7.36124E-03	.82053842	.29053842	.20249137	.35986394	.20046968	.6190	.2009
171316	31777615	1.49597E-03	7.51244E-03	.82093279	.29078245	.20433710	.34535465	.20013268	.6667	.1997
181332	32169218	1.52149E-03	7.66312E-03	.82112647	.29103874	.20602433	.33180531	.19933253	.7143	.1985
191348	32560760	1.54337E-03	7.81347E-03	.82117065	.29114744	.20737882	.31907562	.19937284	.7619	.1976
201364	32952303	1.56687E-03	7.96428E-03	.82112876	.29187413	.20939770	.30710728	.19834968	.8095	.1967
211380	33343846	1.59052E-03	8.11484E-03	.82113033	.29237426	.21095947	.29582266	.19797397	.8571	.1960
221396	33735359	1.61485E-03	8.26793E-03	.82051553	.29290041	.21244332	.28517010	.19765575	.9048	.1953
231412	34126932	1.63981E-03	8.41843E-03	.82057203	.29347455	.21383382	.27508894	.19733677	.9524	.1948
241428	34518474	1.66635E-03	8.57379E-03	.82023183	.29416540	.21524991	.26554402	.19715676	1.0000	.1944

K-15 PHI =120.0 Z = *****

J	R	P	RHO	U	V	W	M (\$-SINF)/CV	A	T	M/HT
31092	26296076	9.86712E-04	3.70272E-03	.78644166	.28223044	.18205979	.91703047	.23096060	0.0000	.2665
41109	27417219	9.8655E-04	4.30297E-03	.80554362	.29348072	.17509901	.69293872	.21347077	.0476	.2278
51126	16538363	1.01135E-03	4.72442E-03	.81772102	.29532809	.17329600	.60534245	.20891447	.0952	.2141
61143	11659508	1.02399E-03	4.96340E-03	.82195199	.29601298	.17453495	.54386422	.20312990	.1429	.2063
71160	08786650	1.03735E-03	5.17903E-03	.82515944	.29639370	.17606028	.49707783	.19781328	.1905	.2003
81177	01901794	1.05105E-03	5.37106E-03	.82744496	.29599700	.17759174	.45945619	.19763203	.2381	.1957
91193	97022937	1.06535E-03	5.55130E-03	.82926267	.29674705	.17987165	.42675530	.19591310	.2857	.1919
101210	92144001	1.06015E-03	5.72002E-03	.82664861	.29647650	.18182039	.39633401	.19433167	.3333	.1888
111227	87252824	1.02584E-03	5.60237E-03	.83175595	.29702633	.18361085	.37357540	.19293590	.3810	.1862
121244	82356368	1.11131E-03	6.05875E-03	.83380593	.29720746	.18539886	.35123371	.19166518	.4286	.1841
131261	77507511	1.12009E-03	6.19135E-03	.83326512	.29744248	.18705873	.33132159	.19089503	.4762	.1822
141278	72628655	1.14531E-03	6.34053E-03	.83353073	.29732424	.18863051	.31303285	.19007034	.5238	.1806
151295	67749798	1.16317E-03	6.48755E-03	.83409525	.29808424	.19009955	.29441487	.18936371	.5714	.1793
161313	62870942	1.18173E-03	6.63294E-03	.83432826	.29850483	.19147698	.28121587	.18876500	.6190	.1782
171330	57952036	1.20033E-03	6.77717E-03	.83481315	.29895248	.19276227	.26721703	.18823658	.6667	.1772
181346	53113229	1.22025E-03	6.92111E-03	.83441115	.29935164	.19395996	.25343843	.18823658	.7143	.1764
191363	48234373	1.24152E-03	7.05943E-03	.83432560	.29970624	.19509836	.24334103	.18793311	.7619	.1757
201380	43355516	1.26307E-03	7.20874E-03	.83414412	.30018023	.19618136	.23127485	.18719718	.8095	.1752
211397	38476660	1.28504E-03	7.35821E-03	.83397404	.30162639	.19706650	.22069089	.18636677	.8571	.1748
221414	33597803	1.30334E-03	7.49867E-03	.83355641	.30248927	.19791660	.21124569	.18580269	.9048	.1745
231431	28718947	1.33160E-03	7.64279E-03	.83320047	.30334452	.19862141	.20221280	.18537036	.9524	.1742
241448	23840090	1.35694E-03	7.79327E-03	.83271084	.30431340	.19935239	.19376651	.18660994	1.0000	.1741

K-16 PHI =130.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/M/T
31092	26296076	7.78018E-04	3.12468E-03	.79771585	.29037483	.17423638	.91703047	.22315510	0.0000	.2490
41110	11805106	7.87680E-04	3.81172E-03	.82291010	.29852495	.16532698	.64910638	.20314968	.0476	.2063
51129	97474137	7.98115E-04	4.16613E-03	.83171044	.30071844	.16228242	.53919037	.19569906	.0952	.1935
61145	83063169	8.08452E-04	4.40635E-03	.83507052	.30152408	.16305566	.47420378	.1955910	.1429	.1815
71163	68682198	8.19498E-04	4.61693E-03	.83925974	.30195427	.16422042	.42201595	.18841357	.1905	.1775
81181	54241289	8.30802E-04	4.79950E-03	.84177863	.30219789	.16579559	.38182094	.18668335	.2381	.1731
91199	35830260	8.42703E-04	4.95377E-03	.84319800	.30231081	.16710994	.34751949	.18417371	.2857	.1696
101217	25419290	8.55044E-04	5.12498E-03	.84474719	.30237128	.16832182	.31817088	.18268816	.3333	.1668
111235	11066321	8.67947E-04	5.27304E-03	.84546620	.30240175	.16947915	.29346735	.18142078	.3810	.1646
121252	95597352	8.81363E-04	5.41526E-03	.84625679	.30239261	.17019215	.27192669	.18042117	.4286	.1628
131270	8216832	8.95332E-04	5.55243E-03	.84715628	.30227187	.17126125	.25267289	.17958859	.4762	.1613
141288	6777543	9.09935E-04	5.68575E-03	.84811582	.30205384	.17264035	.23362462	.17891159	.5238	.1600
151306	53354444	9.25176E-04	5.81659E-03	.84913767	.30182404	.17435942	.22013051	.17835811	.5714	.1591
161324	38953474	9.41048E-04	5.94571E-03	.85026958	.30159419	.17632798	.20660019	.17791758	.6190	.1583
171342	24542505	9.57471E-04	6.07350E-03	.85146143	.30136434	.17846143	.19416143	.17756718	.6667	.1577
181360	10131536	9.74710E-04	6.20165E-03	.85274286	.30113449	.18079243	.18287873	.17730450	.7143	.1572
191377	95720366	9.92419E-04	6.32773E-03	.85412431	.30090464	.18332803	.17257418	.17710816	.7619	.1568
201395	81304937	1.01116E-03	6.45015E-03	.85560576	.30067479	.18592718	.16315374	.17698955	.8095	.1566
211413	66892528	1.03031E-03	6.58313E-03	.85718721	.30044494	.18862631	.15448705	.17650318	.8571	.1563
221431	52487658	1.05056E-03	6.71419E-03	.85886866	.30021509	.19142466	.14615840	.17600078	.9048	.1565
231449	38076689	1.07075E-03	6.84207E-03	.86065011	.30000432	.19432410	.13913334	.17691511	.9524	.1565
241467	23665720	1.093310E-03	6.97766E-03	.86253156	.30000000	.19841824	.13232031	.17700682	1.0000	.1567

K-17 PHI =140.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/M/T
31092	26296076	6.32089E-04	2.69389E-03	.80650817	.29427291	.15834642	.91703047	.21663045	0.0000	.2346
41110	87711105	6.39165E-04	3.41997E-03	.82602843	.30347387	.14821347	.59402728	.19333521	.0476	.1889
51129	49128133	6.47077E-04	3.78097E-03	.84381481	.30581481	.14441138	.465294042	.18500845	.0952	.1711
61148	10541105	6.54641E-04	4.01254E-03	.86257284	.30856191	.14529248	.359424344	.18063760	.1429	.1631
71166	11956195	6.62950E-04	4.21213E-03	.88258897	.30888194	.14632236	.33889209	.17742088	.1905	.1574
81185	3371224	6.71363E-04	4.37730E-03	.89472820	.30966875	.14778664	.29765009	.17314203	.2381	.1534
91203	94766264	6.80897E-04	4.52643E-03	.90891019	.30897072	.14907080	.26396861	.17337490	.2857	.1503
101222	56201284	6.85337E-04	4.65931E-03	.86744435	.30651948	.15023197	.23619229	.17203154	.3333	.1480
111241	17616313	6.99234E-04	4.78424E-04	.85832871	.30702671	.15127603	.21304530	.17058919	.3810	.1462
121259	75031313	7.09342E-04	4.90079E-03	.87655976	.30794698	.15212666	.19455537	.17043300	.4286	.1447
131278	40446373	7.15910E-04	5.01203E-03	.89428857	.30724630	.15278790	.17768421	.16949115	.4762	.1436
141297	01861402	7.20981E-04	5.11827E-03	.85773804	.30750213	.15310213	.16351654	.16659109	.5238	.1428
151315	63216432	7.24251E-04	5.22375E-03	.85922839	.30784447	.15366175	.15084942	.16860121	.5714	.1421
161334	24691462	7.24658E-04	5.32698E-03	.85997068	.30823641	.15389566	.13978684	.16839972	.6190	.1417
171352	86106491	7.27425E-04	5.42017E-03	.85997753	.30883024	.15400650	.12990508	.16813360	.6667	.1413
181371	47521521	7.28503E-04	5.50202E-03	.85905233	.30948941	.15400677	.12109602	.16801916	.7143	.1412
191390	05936551	7.94317E-04	5.63125E-03	.85966415	.31021438	.15391328	.11316634	.16796148	.7619	.1411
201408	70351691	8.09036E-04	5.73477E-03	.85937086	.31108610	.15372594	.10602228	.16797348	.8095	.1411
211427	31766610	8.23918E-04	5.83594E-03	.85904277	.31194830	.15346811	.09957469	.16802109	.8571	.1412
221445	93191640	8.40176E-04	5.94359E-03	.85859530	.31301525	.15313086	.09302847	.16813022	.9048	.1413
231464	54958670	8.56202E-04	6.04812E-03	.85815138	.31413450	.15274448	.08820542	.16828458	.9524	.1416
241483	16011699	8.74206E-04	6.16040E-03	.85755568	.31543561	.15228719	.08326364	.16846794	1.0000	.1419

K-18 PHI =150.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/M/T
31092	26296076	5.45450E-04	2.42459E-03	.81816095	.29778623	.13026966	.91703047	.21211593	0.0000	.2250
41111	32440315	5.49652E-04	3.22205E-03	.84847056	.30528455	.12045743	.52625930	.18468804	.0476	.1705
51130	36584533	5.54851E-04	3.60873E-03	.87072452	.31072432	.11726179	.37732231	.17535657	.0952	.1537
61149	44723072	5.59547E-04	3.83754E-03	.86204123	.31133580	.11835607	.29910301	.17076770	.1429	.1458
71168	50813031	5.64914E-04	4.01558E-03	.86478599	.31133930	.12055896	.24574654	.16737304	.1905	.1407
81187	57017020	5.70170E-04	4.15191E-03	.86635703	.31132299	.12224823	.20832001	.16779011	.2381	.1373
91206	63161509	5.75910E-04	4.26334E-03	.86788356	.31052126	.12354956	.17941681	.16425620	.2857	.1349
101225	65305747	5.81557E-04	4.36717E-03	.86883600	.31082287	.12463495	.15725510	.16318662	.3333	.1332
111244	75449985	5.87580E-04	4.45649E-03	.86457874	.31025503	.12540448	.13925540	.16238741	.3810	.1318
121263	81594225	5.93817E-04	4.53723E-03	.87012529	.31008137	.12596525	.12467487	.16178786	.4286	.1309
131282	87739444	6.00320E-04	4.61303E-03	.86705494	.30994241	.12626153	.11237260	.16132891	.4762	.1301

J	R	P	RHO	U	V	W	(S-SINP)/CV	A	T	H/HT
141301	93882702	6.07145E-04	4.69480E-03	.87083896	.30922255	.126444620	.10206138	.16099620	.5238	.1296
151321	00026941	6.14250E-04	4.75408E-03	.87104403	.30995921	.12642677	.09314436	.16075153	.5714	.1292
161340	06171180	6.21601E-04	4.82202E-03	.87114429	.31017140	.12626975	.08547829	.16059180	.6190	.1289
171359	12315419	6.29641E-04	4.88896E-03	.87118816	.31043775	.12598152	.07872425	.16049189	.6667	.1287
181378	18453658	6.38093E-04	4.95671E-03	.87113497	.31083170	.12558281	.07291942	.16045755	.7143	.1285
191397	24603626	6.46604E-04	5.02345E-03	.87103254	.31130722	.12520377	.06748756	.16046444	.7619	.1283
201416	30748135	6.55359E-04	5.08904E-03	.87083239	.31194466	.12484367	.06275636	.16042946	.8095	.1280
211436	36892374	6.66031E-04	5.16353E-03	.87062939	.31258754	.12450315	.05846949	.16038057	.8531	.1278
221454	43036613	6.76954E-04	5.23911E-03	.87043719	.31347159	.12416949	.05460368	.16037075	.9048	.1276
231473	49180852	6.87766E-04	5.31118E-03	.86990956	.31443353	.12385644	.05105533	.16039102	.9524	.1274
241492	55325090	7.00216E-04	5.39206E-03	.86941613	.31544650	.12344397	.04783593	.16115859	1.0000	.1272

K-19 PHI -160.0 Z = *****

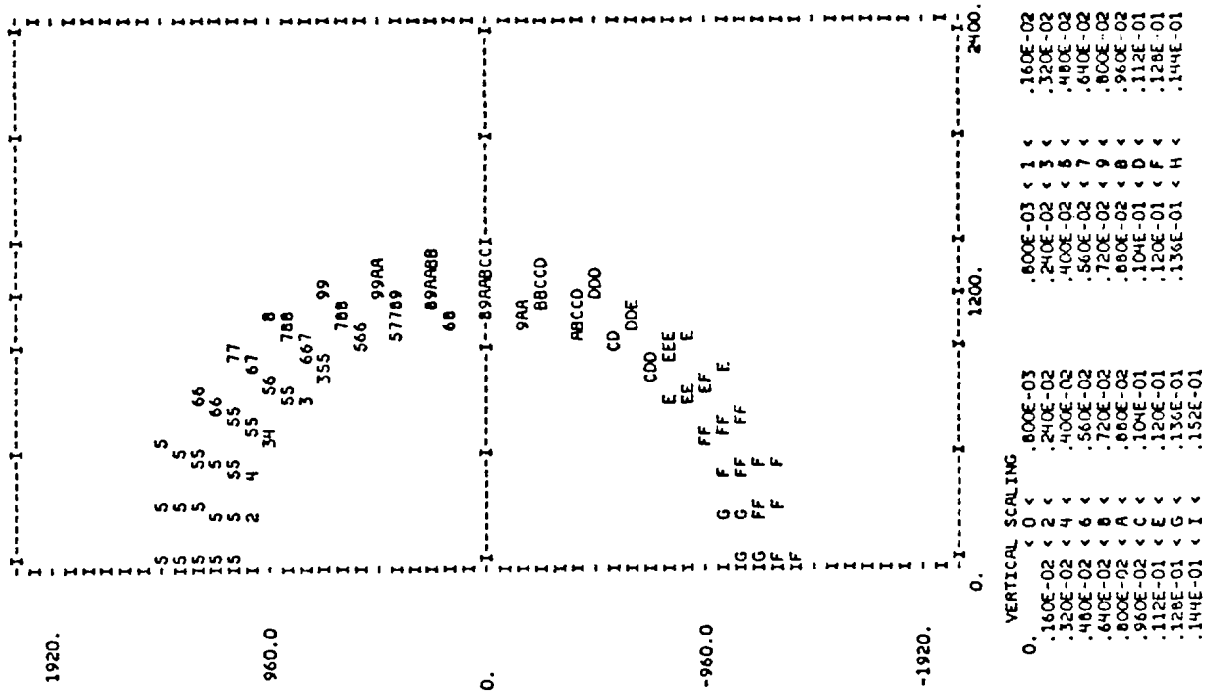
J	R	P	RHO	U	V	W	(S-SINP)/CV	A	T	H/HT
31092	26296076	5.07233E-04	2.30200E-03	.82564990	.30032472	.08708835	.91703047	.20992616	0.0000	.2203
41111	32325659	5.04547E-04	3.28648E-03	.86070674	.31291828	.08050071	42315995	.17593734	.0476	.1548
51130	38153082	5.11273E-04	3.71879E-03	.86289062	.31518349	.08043005	25342321	.16581731	.0952	.1375
61149	44033355	5.13551E-04	3.92535E-03	.87252523	.31524232	.08401972	18574701	.18218353	.1429	.1315
71168	50010048	5.15222E-04	4.03208E-03	.87490556	.31484853	.08633705	14932535	.15997275	.1905	.1280
81187	55935841	5.16282E-04	4.12007E-03	.87438859	.31434889	.08827413	12365711	.15766289	.2381	.1258
91206	61667035	5.20376E-04	4.19038E-03	.87765788	.31376114	.08957086	10478316	.15766289	.2857	.1243
101225	67795520	5.23382E-04	4.24724E-03	.87774493	.31326904	.09051504	.09088779	.15699028	.3333	.1232
111244	73724021	5.26011E-04	4.28606E-03	.87830339	.31278057	.09113567	.07988194	.15648611	.3810	.1224
121263	79652514	5.28554E-04	4.33647E-03	.87874413	.31238173	.09150762	.07115159	.15611068	.4288	.1219
131282	85581007	5.31372E-04	4.37697E-03	.87912124	.31202561	.09185217	.06390911	.15582153	.4762	.1214
141301	91509500	5.34356E-04	4.41424E-03	.87940635	.31174347	.09216677	.05788310	.15550408	.5238	.1211
151320	97437893	5.37021E-04	4.44591E-03	.87965242	.31145551	.09246396	.05271666	.15543703	.5714	.1209
161339	03364987	5.40183E-04	4.47633E-03	.87984056	.31116246	.09271919	.04825923	.15531722	.6190	.1206
171359	09294980	5.43323E-04	4.50866E-03	.87999417	.31086703	.09293669	.04335880	.15522375	.6667	.1203
181378	15223473	5.46473E-04	4.54133E-03	.88009178	.31057610	.09307618	.04090506	.15517955	.7143	.1204
191397	21151966	5.50344E-04	4.57250E-03	.88016395	.31028150	.09312001	.03780578	.15515124	.7619	.1204
201416	27030459	5.54395E-04	4.60551E-03	.88023629	.31001369	.09317435	.03501435	.15515851	.8095	.1204
211436	33008952	5.58473E-04	4.63830E-03	.88031137	.30971120	.09321003	.03246622	.15518033	.8571	.1204
221454	38937445	5.62504E-04	4.67468E-03	.88037230	.30941509	.09324944	.03013823	.15524229	.9048	.1205
231473	44865939	5.66430E-04	4.71051E-03	.88042611	.30912050	.09328927	.02798183	.15531191	.9524	.1206
241492	50794432	5.70636E-04	4.75234E-03	.88048688	.30882688	.09332910	.02599473	.15543224	1.0000	.1208

K-20 PHI -170.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINP)/CV	A	T	H/HT
31092	26296076	4.97409E-04	2.27006E-03	.82953736	.30194016	.03901894	.91703047	.20934041	0.0000	.2191
41110	32325659	4.97189E-04	3.69297E-03	.87376434	.31701593	.03703787	.23330506	.16409145	.0476	.1346
51129	38153082	4.97894E-04	4.00737E-03	.87937067	.31755223	.04026871	12334541	.15763541	.0952	.1242
61148	44033357	4.98469E-04	4.07236E-03	.88026810	.31688118	.04370072	.09997469	.15638440	.1429	.1233
71166	50010048	4.98413E-04	4.13870E-03	.88174126	.31629560	.04541452	.07824088	.15519494	.1905	.1204
81185	55935841	4.98672E-04	4.17027E-03	.88235257	.31570175	.04830319	.06512276	.15464662	.2361	.1196
91203	61667035	4.99021E-04	4.20179E-03	.88286477	.31516819	.04760445	.05627890	.15411931	.2857	.1188
101222	67795520	4.99303E-04	4.22177E-03	.88330199	.31471323	.04819837	.05230485	.15379776	.3333	.1183
111241	73724021	4.99588E-04	4.24114E-03	.88376288	.31426168	.04851749	.04635121	.15348908	.3810	.1178
121259	79652514	4.99844E-04	4.25547E-03	.88410042	.31390147	.04871582	.04215467	.15327041	.4286	.1178
131278	85581007	5.00066E-04	4.26501E-03	.88440636	.31354264	.04876291	.03815188	.15306115	.4762	.1171
141296	91509500	5.00274E-04	4.27569E-03	.88466850	.31320533	.04873109	.03500352	.15289823	.5238	.1169
151315	97437893	5.00423E-04	4.28994E-03	.88494427	.31286232	.04860673	.03202397	.15274222	.5714	.1167
161334	10364643	5.00577E-04	4.29851E-03	.88515410	.31252547	.04842619	.02933550	.15261300	.6190	.1165
171352	10364643	5.00644E-04	4.30414E-03	.88536309	.31218913	.04818219	.02716536	.15244320	.6667	.1163
181371	10364643	5.00742E-04	4.31301E-03	.88559404	.31191707	.04789456	.02513945	.15230025	.7143	.1161
191389	90923005	5.00732E-04	4.31605E-03	.88581019	.31167356	.04759471	.02321101	.15222513	.7619	.1159
201408	51211125	5.00732E-04	4.32444E-03	.88601018	.31143744	.04717777	.02147954	.15218204	.8095	.1158
211427	11500246	5.00648E-04	4.32660E-03	.88622238	.31107724	.04675138	.01984332	.15208889	.8571	.1157
221445	17189266	5.00661E-04	4.33352E-03	.88641523	.31079471	.04626954	.01634143	.15200788	.9048	.1155
231464	23078487	5.00645E-04	4.33667E-03	.88662076	.31047359	.04577440	.01619132	.15192123	.9524	.1154
241482	292367607	5.00485E-04	4.34100E-03	.88681379	.31019947	.04532186	.01557197	.15185031	1.0000	.1153

K-21 PHI -180.0 Z = *****

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	N/AT
31092.26296076	4.96248E-04	2.26627E-03	.83046139	.30226323	0.00000000	.91703047	.20927056	0.0000	.2190	
41110.44098547	4.95876E-04	3.96812E-03	.87956883	.31850305	0.00000000	.13165770	.15905977	.0476	.1249	
51128.61900618	4.95831E-04	4.13408E-03	.88259927	.31793240	0.00000000	.07461170	.15487899	.0952	.1199	
61146.79702890	4.95502E-04	4.14608E-03	.88318207	.3170745	0.00000000	.08328435	.15455655	.1429	.1194	
71164.97505161	4.94914E-04	4.18288E-03	.88404281	.31557139	0.00000000	.05612998	.15391494	.1903	.1183	
81183.15307432	4.94304E-04	4.19191E-03	.88445002	.31595850	0.00000000	.05207673	.15356978	.2391	.1179	
91201.33109704	4.93802E-04	4.20396E-03	.88493941	.31552479	0.00000000	.04378162	.15318092	.2857	.1173	
101219.50911975	4.93285E-04	4.21568E-03	.88525447	.31513785	0.00000000	.04210463	.15297887	.3333	.1170	
111237.68714246	4.92728E-04	4.22538E-03	.88560163	.31479863	0.00000000	.03775129	.15271645	.3810	.1166	
121255.86516518	4.92160E-04	4.23014E-03	.88586950	.31446647	0.00000000	.03502186	.15254249	.4286	.1163	
131274.04318789	4.91523E-04	4.23584E-03	.88615299	.31415573	0.00000000	.03184093	.15234110	.4762	.1160	
141292.22121060	4.90908E-04	4.24074E-03	.88639815	.31384018	0.00000000	.02922777	.15218585	.5238	.1158	
151310.39923332	4.90309E-04	4.24415E-03	.88665533	.31352224	0.00000000	.02704285	.15201719	.5714	.1155	
161328.57725603	4.89728E-04	4.24725E-03	.88689528	.31319149	0.00000000	.02505719	.15187353	.6190	.1153	
171346.75527074	4.89143E-04	4.24987E-03	.88714930	.31284986	0.00000000	.02302737	.15172168	.6667	.1151	
181364.93320146	4.88573E-04	4.25178E-03	.88739830	.31249914	0.00000000	.02100507	.15158317	.7143	.1149	
191383.11132417	4.88011E-04	4.25290E-03	.88766763	.31215914	0.00000000	.01999650	.15143675	.7619	.1147	
201401.28934688	4.874607E-04	4.25358E-03	.88793964	.31182441	0.00000000	.01880895	.15129665	.8098	.1145	
211419.467356960	4.869201E-04	4.25382E-03	.88821432	.31149253	0.00000000	.01660278	.15114514	.8571	.1142	
221437.64539231	4.863942E-04	4.25361E-03	.88849339	.31099854	0.00000000	.01525083	.15099527	.9048	.1140	
231455.82341502	4.8591931	4.25374E-03	.88879131	.30996647	0.00000000	.01393956	.15082574	.9524	.1137	
241474.00143374	4.854946E-04	4.25278E-03	.88929594	.30930387	0.00000000	.01270887	.15065447	1.0000	.1135	



X/L = SURFACE FLOW VARIABLES AT Z = *****
 .300097 DZDT=343.454220 ITER= 1500

PHI	RB	CP	P/PINF	R/RINF	M-Z	M-R	M-PHI	A	COMP	H/HT	TEMP	(S-S.INF)/CV
0.0	1092.2630	.6709	2.4012E+01	5.0298E+00	2.3607	.8592	0.0000	2.9733E-01	1.0000	.44204	.00	9.1703E-01
10.0	1092.2630	.6616	2.3694E+01	4.9821E+00	2.3675	.8617	.0841	2.9677E-01	1.0000	.44036	.00	9.1703E-01
20.0	1092.2630	.6346	2.2767E+01	4.8421E+00	2.3677	.8691	.1679	2.9508E-01	1.0000	.43536	.00	9.1703E-01
30.0	1092.2630	.5919	2.1303E+01	4.6175E+00	2.4218	.8815	.2504	2.9298E-01	1.0000	.42717	.00	9.1703E-01
40.0	1092.2630	.5368	1.9413E+01	4.3117E+00	2.4701	.8980	.3317	2.8844E-01	1.0000	.41598	.00	9.1703E-01
50.0	1092.2630	.4733	1.7234E+01	3.9698E+00	2.5332	.9220	.4106	2.8357E-01	1.0000	.40207	.00	9.1703E-01
60.0	1092.2630	.4056	1.4913E+01	3.5792E+00	2.6116	.9503	.4862	2.7777E-01	1.0000	.38579	.00	9.1703E-01
70.0	1092.2630	.3379	1.2592E+01	3.1714E+00	2.7059	.9848	.5679	2.7113E-01	1.0000	.36757	.00	9.1703E-01
80.0	1092.2630	.2736	1.0366E+01	2.7642E+00	2.8163	1.0250	.6242	2.6378E-01	1.0000	.34791	.00	9.1703E-01
90.0	1092.2630	.2155	8.3904E+00	2.3734E+00	2.9429	1.0711	.6835	2.5584E-01	1.0000	.32733	.00	9.1703E-01
100.0	1092.2630	.1649	6.6577E+00	2.0119E+00	3.0853	1.1230	.7339	2.4755E-01	1.0000	.30640	.00	9.1703E-01
110.0	1092.2630	.1232	5.2250E+00	1.6922E+00	3.2409	1.1796	.7704	2.3912E-01	1.0000	.28590	.00	9.1703E-01
120.0	1092.2630	.0899	4.0843E+00	1.4193E+00	3.4064	1.2358	.7886	2.3086E-01	1.0000	.26648	.00	9.1703E-01
130.0	1092.2630	.0647	3.2205E+00	1.1977E+00	3.5747	1.3011	.7808	2.2316E-01	1.0000	.24899	.00	9.1703E-01
140.0	1092.2630	.0471	2.6167E+00	1.0324E+00	3.7322	1.3584	.7310	2.1663E-01	1.0000	.23464	.00	9.1703E-01
150.0	1092.2630	.0367	2.2088E+00	9.2933E-01	3.8511	1.4039	.6441	2.1212E-01	1.0000	.22497	.00	9.1703E-01
160.0	1092.2630	.0321	2.0955E+00	8.6240E-01	3.9332	1.4316	.4949	2.0993E-01	1.0000	.22034	.00	9.1703E-01
170.0	1092.2630	.0309	2.0592E+00	8.7015E-01	3.9628	1.4423	.3864	2.0934E-01	1.0000	.21912	.00	9.1703E-01
180.0	1092.2630	.0307	2.0544E+00	8.6870E-01	3.9684	1.4444	.0000	2.0927E-01	1.0000	.21897	.00	9.1703E-01

BODY AND SHOCK GEOMETRY AT Z = *****

PHI	RB	DRB/DZ	DRB/DPHI	RS	DRS/DZ	DRS/DPHI
0.0	1092.2630	.3640	0.0000	1320.4665	.4400	0.0000
10.0	1092.2630	.3640	0.0000	1321.2464	.4402	8.9543
20.0	1092.2630	.3640	0.0000	1323.5921	.4410	18.1476
30.0	1092.2630	.3640	0.0000	1327.5812	.4423	27.7392
40.0	1092.2630	.3640	0.0000	1333.2749	.4442	37.9337
50.0	1092.2630	.3640	0.0000	1340.8225	.4467	48.7614
60.0	1092.2630	.3640	0.0000	1350.2938	.4499	60.3783
70.0	1092.2630	.3640	0.0000	1361.6903	.4536	72.3440
80.0	1092.2630	.3640	0.0000	1375.5836	.4584	84.7927
90.0	1092.2630	.3640	0.0000	1391.4967	.4637	96.3243
100.0	1092.2630	.3640	0.0000	1409.2011	.4696	105.6630
110.0	1092.2630	.3640	0.0000	1428.3452	.4760	111.8165
120.0	1092.2630	.3640	0.0000	1448.2384	.4827	114.4159
130.0	1092.2630	.3640	0.0000	1467.2367	.4890	100.0433
140.0	1092.2630	.3640	0.0000	1483.1601	.4943	72.5267
150.0	1092.2630	.3640	0.0000	1492.5533	.4974	26.7796
160.0	1092.2630	.3640	0.0000	1492.5070	.4974	-27.5867
170.0	1092.2630	.3640	0.0000	1482.9237	.4942	-53.0172
180.0	1092.2630	.3640	0.0000	1474.0014	.4912	0.0000

CONE SOLUTION RESET TO Z=INITIAL= 1.00000

K=3 PHI = 0.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.36397023	5.60033E-03	1.31218E-02	.70192138	.25547849	0.00000000	.91703047	.29733366	0.0000	.4420
4	.36759134	5.79823E-03	1.31194E-02	.70319446	.25202113	0.00000000	.91702521	.29732235	.0476	.4420
5	.37121245	5.79570E-03	1.31144E-02	.70445865	.24857450	0.00000000	.91702521	.29729939	.0952	.4419
6	.37483356	5.79057E-03	1.31062E-02	.70574906	.24513914	0.00000000	.91702521	.29726653	.1429	.4418
7	.37845467	5.78359E-03	1.30948E-02	.70703357	.24172402	0.00000000	.91702521	.29721057	.1905	.4417
8	.38207578	5.77455E-03	1.30802E-02	.70832715	.23832627	0.00000000	.91702521	.29714415	.2381	.4415
9	.38569689	5.76356E-03	1.30624E-02	.70962511	.23494451	0.00000000	.91702521	.29706329	.2857	.4412
10	.38931800	5.75044E-03	1.30415E-02	.71092973	.23157854	0.00000000	.91702521	.29696811	.3333	.4410
11	.39293911	5.73582E-03	1.30175E-02	.71224169	.22823460	0.00000000	.91702521	.29685865	.3810	.4406
12	.39656022	5.71911E-03	1.29906E-02	.71356174	.22490107	0.00000000	.91702521	.29673495	.4286	.4403
13	.40018133	5.70032E-03	1.29602E-02	.71489078	.22154355	0.00000000	.91702521	.29659695	.4762	.4398
14	.40380244	5.68005E-03	1.29269E-02	.71622978	.21821548	0.00000000	.91702521	.29644457	.5238	.4394
15	.40742355	5.65770E-03	1.28906E-02	.71757978	.21486820	0.00000000	.91702521	.29627768	.5714	.4389
16	.41104466	5.63348E-03	1.28511E-02	.71894191	.21156086	0.00000000	.91702521	.29609611	.6190	.4384

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
17	.41466577	5.60736E-03	1.26065E-02	.72031743	.20823047	0.00000000	.91702521	.29589960	.6667	.4378
18	.41826688	5.57935E-03	1.27626E-02	.72170767	.20489368	0.00000000	.91702521	.29589786	.7143	.4372
19	.42190759	5.54917E-03	1.27138E-02	.72311413	.201541763	0.00000000	.91702521	.29546049	.7619	.4358
20	.42552910	5.51745E-03	1.26615E-02	.72453629	.19810926	0.00000000	.91702521	.29521710	.8095	.4350
21	.42915021	5.48350E-03	1.26058E-02	.72588251	.19481110	0.00000000	.91702521	.29495696	.8571	.4350
22	.43277131	5.44738E-03	1.25468E-02	.72744657	.19141471	0.00000000	.91702521	.29468013	.9048	.4342
23	.43639242	5.40929E-03	1.24837E-02	.72919432	.18799432	0.00000000	.91702521	.29438336	.9524	.4333
24	.44001353	5.36965E-03	1.24183E-02	.73044069	.184594858	0.00000000	.91702521	.294107422	1.0000	.4324

K - 4 PHI = 10.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.36397023	5.72347E-03	1.29974E-02	.70258673	.25572064	.02496519	.91703047	.29676778	0.0000	.4404
4	.36760372	5.72231E-03	1.29924E-02	.70375068	.25247461	.02351434	.91703047	.29679961	.0476	.4405
5	.37123721	5.71994E-03	1.29822E-02	.70510404	.24888620	.02167073	.91703047	.29666749	.0752	.4401
6	.37487069	5.71552E-03	1.29704E-02	.70654258	.24530954	.02043721	.91584998	.29636859	.1429	.4398
7	.37850418	5.70921E-03	1.29579E-02	.70789169	.24174938	.01891151	.91511487	.29645915	.1905	.4394
8	.38213766	5.70023E-03	1.29324E-02	.70922504	.23820222	.01729339	.91463821	.29634702	.2361	.4391
9	.38577115	5.69073E-03	1.29074E-02	.71056359	.23464051	.01561203	.91419783	.29622484	.2857	.4387
10	.38940464	5.67665E-03	1.28834E-02	.71189672	.23107822	.01393793	.91379746	.29609289	.3333	.4384
11	.39303812	5.66470E-03	1.28594E-02	.71323180	.22751611	.01221204	.91342087	.29594950	.3810	.4379
12	.39667161	5.64925E-03	1.28354E-02	.71456698	.22395402	.01048574	.91308744	.29579462	.4286	.4375
13	.40030510	5.63105E-03	1.28114E-02	.71591252	.22039193	.00876196	.91273056	.29562752	.4762	.4370
14	.40393858	5.61121E-03	1.27874E-02	.71726150	.21682984	.00703628	.91240912	.29544800	.5238	.4364
15	.40757207	5.59090E-03	1.27634E-02	.71861823	.21326775	.00531060	.91210501	.29525350	.5714	.4359
16	.41120555	5.56745E-03	1.27394E-02	.71998907	.20970566	.00358492	.91180219	.29505005	.6190	.4353
17	.41483904	5.54190E-03	1.27154E-02	.72135054	.20614357	.00185924	.91151403	.29484091	.6667	.4346
18	.41847253	5.51621E-03	1.26914E-02	.72271202	.20258148	.00013353	.91123469	.29463028	.7143	.4339
19	.42210601	5.49159E-03	1.26674E-02	.72407349	.20001939	.00000000	.91096120	.29442028	.7619	.4332
20	.42573950	5.46702E-03	1.26434E-02	.72543496	.19745730	.00000000	.9106885	.29421028	.8095	.4324
21	.42937299	5.44245E-03	1.26194E-02	.72679643	.19489521	.00000000	.9104132	.29400028	.8571	.4316
22	.43300647	5.41788E-03	1.25954E-02	.72815790	.19233312	.00000000	.9101380	.29379028	.9048	.4308
23	.43663996	5.39331E-03	1.25714E-02	.72951937	.18977103	.00000000	.90986283	.29358028	.9524	.4298
24	.44027344	5.36874E-03	1.25474E-02	.73088084	.18720894	.00000000	.90958758	.29337028	1.0000	.4289

K - 5 PHI = 20.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.36397023	5.49950E-03	1.26320E-02	.70457174	.25844314	.04953493	.91703047	.29580829	0.0000	.4354
4	.36764094	5.50014E-03	1.26226E-02	.70655773	.25533364	.05077114	.91266038	.29462499	.0476	.4340
5	.37131165	5.49919E-03	1.26097E-02	.70854600	.25014794	.05236784	.90949728	.29428510	.0952	.4330
6	.37490235	5.49663E-03	1.26135E-02	.70972094	.24692206	.05481959	.90750584	.29405627	.1429	.4323
7	.37865306	5.49222E-03	1.26232E-02	.71115628	.24364242	.05637599	.90574711	.29382819	.1905	.4317
8	.38232377	5.48517E-03	1.26329E-02	.71259152	.24044255	.05797063	.90424139	.29360048	.2381	.4311
9	.38599447	5.47812E-03	1.26426E-02	.71402676	.23724268	.05949284	.90284919	.2933728	.2857	.4305
10	.38966518	5.46871E-03	1.26523E-02	.71546200	.23404281	.06101253	.90151117	.29314517	.3333	.4299
11	.39333589	5.45745E-03	1.26620E-02	.71689724	.23084294	.06252992	.90026318	.2929175	.3810	.4293
12	.39700659	5.44452E-03	1.26717E-02	.71833248	.22764307	.06404730	.89901503	.2926900	.4286	.4286
13	.40067730	5.42989E-03	1.26814E-02	.71976772	.22444320	.06556468	.89776782	.2924625	.4762	.4280
14	.40434801	5.41355E-03	1.26911E-02	.72062298	.22124333	.06708206	.89652015	.2922350	.5238	.4273
15	.40801871	5.39558E-03	1.26991E-02	.72147824	.21804346	.06860944	.89527248	.2920075	.5714	.4266
16	.41168942	5.37591E-03	1.26950E-02	.72233349	.21484359	.07013682	.89402481	.2917800	.6190	.4258
17	.41536013	5.35445E-03	1.26909E-02	.72318874	.21164372	.07166420	.89277714	.2915525	.6667	.4250
18	.41903083	5.33142E-03	1.26868E-02	.72404399	.20844385	.07319158	.89152947	.2913250	.7143	.4242
19	.42270154	5.30839E-03	1.26827E-02	.72489924	.20524398	.07471896	.89028180	.2910975	.7619	.4234
20	.42637225	5.28436E-03	1.26786E-02	.72575449	.20204411	.07624634	.88903413	.2908700	.8095	.4225
21	.43004295	5.25833E-03	1.26745E-02	.72660974	.19884424	.07777372	.88778646	.2906425	.8571	.4216
22	.43371366	5.23130E-03	1.26704E-02	.72746499	.19564437	.07930110	.88653879	.2904150	.9048	.4207
23	.43738437	5.20327E-03	1.26663E-02	.72832024	.19244450	.08082848	.88529112	.2901875	.9524	.4197
24	.44105507	5.17524E-03	1.26622E-02	.72917549	.18924463	.08235586	.88404345	.2899600	1.0000	.4186

K - 6 PHI = 30.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.36397023	5.15432E-03	1.23128E-02	.73434031	.18660342	.07854746	.88003787	.28934812	1.0000	.4186

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	36397023	5.14579E-03	1.20462E-02	70787184	25764428	07323329	91703047	29229124	0.0000	41272
4	36770424	5.14685E-03	1.21593E-02	71122024	25514459	07494908	90454325	29101527	0.0476	41234
5	37143824	5.15036E-03	1.22188E-02	71330004	25523378	07769299	89800991	29074939	0.0952	41215
6	37517225	5.15060E-03	1.22554E-02	71494971	24919824	08047573	89385808	28992096	0.1429	41201
7	37890625	5.14928E-03	1.22855E-02	71651588	24619377	08288722	89011263	28952858	0.1905	41191
8	38264026	5.14647E-03	1.23085E-02	71798704	43114694	08518994	88700697	28917924	0.2381	41181
9	38637426	5.14217E-03	1.23270E-02	71941588	24012767	08736757	88407255	28890488	0.2857	41171
10	39010827	5.13640E-03	1.23409E-02	72080163	23717272	08946764	88137358	288651732	0.3333	41162
11	39384227	5.12917E-03	1.23510E-02	72216170	23411764	09151361	87881781	288419610	0.3810	41154
12	39757628	5.12049E-03	1.23574E-02	72349780	23117164	09350467	87659911	28817757	0.4286	41144
13	40131028	5.11036E-03	1.23624E-02	72481771	22821383	09544799	87407944	28795579	0.4762	41134
14	40504429	5.09877E-03	1.23600E-02	72612309	22526892	09734909	87165128	287733592	0.5238	41125
15	40877829	5.08573E-03	1.23564E-02	72742007	22232916	09921237	86969648	28750998	0.5714	41116
16	41251230	5.07123E-03	1.23508E-02	72870917	21939604	10104144	86760939	28728716	0.6190	41106
17	41624630	5.05535E-03	1.23497E-02	72999337	21647112	10285926	86557735	287064226	0.6667	41097
18	41998031	5.03777E-03	1.23326E-02	73127613	21349780	10463832	86359016	28684949	0.7143	41087
19	42371431	5.01817E-03	1.23104E-02	73255984	21061863	10645070	86166505	28663469	0.7619	41077
20	42744832	4.99800E-03	1.22809E-02	73384358	20762853	10826829	85977422	28642887	0.8095	41067
21	43118232	4.97608E-03	1.22683E-02	73512730	20474748	10975253	85782171	28622300	0.8571	41056
22	43491632	4.95219E-03	1.22420E-02	73641663	20179230	11143510	85610540	28601739	0.9048	41045
23	43865033	4.92699E-03	1.22131E-02	73770792	19884909	11308576	85432081	28581197	0.9524	41034
24	44238433	4.89886E-03	1.21784E-02	73907957	19581589	11472006	85257119	28560690	1.0000	41023

K = 7 PHI = 40.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	36397023	4.68926E-03	1.12728E-02	71247332	25761904	09567936	91703047	28843751	0.0000	4100
4	36770424	4.69521E-03	1.14764E-02	71762483	25516351	09744794	89318135	28640324	0.0476	4101
5	37143824	4.69978E-03	1.15761E-02	72020421	25502249	10121768	88209387	28495527	0.0952	4080
6	37517225	4.70339E-03	1.16417E-02	72208338	25234319	10441163	87495157	28425741	0.1429	4040
7	37890625	4.70578E-03	1.16987E-02	72320197	24959558	10740167	86842594	28363656	0.1905	4022
8	38264026	4.70699E-03	1.17404E-02	72459578	24683378	11024540	86318443	28309629	0.2381	4007
9	38637426	4.70703E-03	1.17839E-02	72589643	24402110	11297380	85814285	28258735	0.2857	3993
10	39010827	4.70550E-03	1.18255E-02	72721944	24133589	11581021	85550750	28211022	0.3333	3979
11	39384227	4.70361E-03	1.18682E-02	72869473	23864470	11861962	84911904	28164681	0.3810	3966
12	39757628	4.70012E-03	1.18078E-02	73102412	23594705	12036239	84526887	28120217	0.4286	3954
13	40131028	4.69555E-03	1.19135E-02	73322043	23230653	12305653	84057021	28076350	0.4762	3941
14	40504429	4.68978E-03	1.19355E-02	73532645	22960119	12574793	83571702	28033157	0.5238	3929
15	40877829	4.68296E-03	1.19543E-02	73742897	22704972	12841558	83134775	27990301	0.5714	3917
16	41251230	4.67476E-03	1.19701E-02	73953059	22532987	13102994	82900193	27947664	0.6190	3905
17	41624630	4.6647E-03	1.19828E-02	74125848	22287984	13236579	82682519	27905053	0.6667	3893
18	42008031	4.65497E-03	1.19923E-02	74304819	22006338	13456651	82303908	27862360	0.7143	3882
19	42381431	4.64325E-03	1.19993E-02	74489899	21743779	13677398	81973319	27819460	0.7619	3870
20	42754832	4.63024E-03	1.20023E-02	74680421	21455000	13893119	81650116	27776235	0.8095	3858
21	43128232	4.61600E-03	1.20037E-02	74877194	21222075	14105953	81333592	27732647	0.8571	3845
22	43501632	4.60024E-03	1.20006E-02	75079411	20959411	14318156	81023373	27688401	0.9048	3833
23	44045033	4.58359E-03	1.19960E-02	75292924	20695497	14523675	80718718	27643971	0.9524	3821
24	44238433	4.56406E-03	1.19850E-02	75549456	20427319	14720006	80419983	27597668	1.0000	3809

K = 6 PHI = 50.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	36397023	4.16288E-03	1.03537E-02	71834342	26145562	11642966	91703047	28357285	0.0000	4021
4	36770424	4.17184E-03	1.06559E-02	72259262	2607174	11814567	89800991	27982381	0.0476	3915
5	37143824	4.17961E-03	1.08003E-02	72879187	25866231	12242549	86192546	27620593	0.0952	3870
6	37517225	4.18675E-03	1.09234E-02	73509560	25627434	12524139	85097363	27178783	0.1429	3842
7	37890625	4.19311E-03	1.09855E-02	74136892	25300973	12944189	84133594	27262948	0.1905	3817
8	38264026	4.19858E-03	1.10511E-02	74764850	25144198	13250529	83303825	27352867	0.2381	3796
9	38637426	4.20322E-03	1.11308E-02	75392810	24902810	13572320	82537802	27481928	0.2857	3776
10	39010827	4.20703E-03	1.11939E-02	76021730	24662596	13875331	81833786	27416458	0.3333	3758
11	39384227	4.21001E-03	1.12529E-02	76650650	24424502	14169646	81167826	27354190	0.3810	3741
12	39757628	4.21216E-03	1.13076E-02	77279570	24183354	14456690	80540602	27294876	0.4286	3725
13	40131028	4.21348E-03	1.13599E-02	77908490	23943375	14737145	79919344	27235533	0.4762	3709
14	40504429	4.21398E-03	1.14067E-02	78537415	23722384	15011844	79362933	27182000	0.5238	3694
15	41238433	4.21365E-03	1.14518E-02	79166343	23492243	15281265	78806844	27127735	0.5714	3680

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
16	41524376	4.21248E-03	1.14931E-02	746311370	23264052	155415941	78268447	27074576	6190	3665
17	41918787	4.21048E-03	1.1532E-02	74621936	23031360	15606326	71745985	27022250	6467	3651
18	42311199	4.20758E-03	1.15866E-02	74729790	22812054	16062466	71237814	26970601	7143	3637
19	42707611	4.20379E-03	1.1603E-02	74835395	226287878	16314986	76742327	26919464	7819	3623
20	43102022	4.19908E-03	1.16330E-02	74938654	22464514	16554009	76258523	26968676	8095	3610
21	43494434	4.19443E-03	1.16612E-02	75040533	22312663	16809125	75785304	26816202	8571	3596
22	43890846	4.18664E-03	1.16863E-02	75141367	21919160	17052434	75322043	26767666	9048	3583
23	44288257	4.17941E-03	1.17098E-02	75239358	21698340	17292100	74867694	26711632	9524	3569
24	44679669	4.16969E-03	1.17276E-02	75340617	21472024	17522024	74422418	26666302	1.0000	3555

K=9 PHI = 60.0 Z = 1.000000

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
3	36397023	3.60231E-03	9.33745E-03	72543162	26403552	13506581	91703047	27777381	0.0000	3858
4	36808467	3.61397E-03	9.73815E-03	73502273	26442731	13676531	86143239	27243900	0.0476	3711
5	37215911	3.62474E-03	9.92777E-03	74287910	26287910	14071643	80714424	27022622	0.0952	3651
6	37625355	3.63524E-03	1.00581E-02	74135441	26092954	14455463	82304387	26855799	0.1429	3614
7	38031759	3.64575E-03	1.01749E-02	74346528	25898444	14817081	80348009	26760359	0.1903	3582
8	38442423	3.65617E-03	1.02799E-02	74532452	25688037	15168180	78694824	26685233	0.2381	3555
9	38853887	3.66658E-03	1.03772E-02	74698292	25481944	15522771	76811134	26571542	0.2857	3530
10	39263131	3.67216E-03	1.04677E-02	74848174	25278877	15829794	76274354	26480977	0.3333	3508
11	39672575	3.68015E-03	1.05534E-02	74987513	25083003	16147763	76700280	26400734	0.3810	3487
12	40081462	3.69467E-03	1.06351E-02	75116668	24842273	16458837	76264966	26334111	0.4286	3469
13	40491462	3.69467E-03	1.07135E-02	75238567	246437975	16761246	74992214	26252298	0.4762	3449
14	40902206	3.70321E-03	1.07851E-02	75353194	24449569	17059501	74194305	26184778	0.5238	3431
15	41310350	3.70726E-03	1.08301E-02	75461444	24250397	17351398	73425980	26128293	0.5714	3414
16	41719194	3.71283E-03	1.08653E-02	75565333	24051850	17639195	72684592	26085501	0.6190	3397
17	42129230	3.71787E-03	1.08934E-02	75666926	23853187	17920228	71968447	2603378	0.6667	3381
18	42533632	3.72345E-03	1.09160E-02	75765498	23654974	18197681	71269522	25943761	0.7143	3368
19	42948126	3.72847E-03	1.12324E-02	75864931	23456276	18471418	70591521	25868023	0.7619	3355
20	43356570	3.72929E-03	1.1163E-02	75964645	23257960	18744141	69930955	25827444	0.8095	3335
21	43767014	3.73269E-03	1.12412E-02	76021094	23121203	19007228	69286259	25770979	0.8571	3321
22	44178458	3.73503E-03	1.12812E-02	76083276	23034798	19269986	68658479	25715190	0.9048	3308
23	44585902	3.73707E-03	1.13508E-02	76181745	22860474	19524922	68040104	25660637	0.9524	3292
24	44995345	3.73733E-03	1.14004E-02	76261167	22682455	19766026	67437027	25605682	1.0000	3278

K=10 PHI = 70.0 Z = 1.000000

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
3	36397023	3.04114E-03	6.27365E-03	73365014	26702681	15127516	91703047	27113464	0.0000	3676
4	36824878	3.05492E-03	6.76161E-03	74563875	26556700	15335607	84132510	26407253	0.0476	3487
5	37252733	3.06815E-03	6.99191E-03	75031874	26476124	15662848	8093112	26123158	0.0952	3412
6	37680683	3.08135E-03	7.18355E-03	75360571	26410171	15985884	78865048	259747016	0.1429	3368
7	38102443	3.09455E-03	7.35013E-03	75526844	26294304	16346218	77050046	25879883	0.1903	3329
8	38526598	3.10775E-03	7.43535E-03	75693035	26131774	16701401	75500479	25667693	0.2381	3294
9	38951353	3.11977E-03	7.50970E-03	75860779	25911151	17044568	74077007	25552353	0.2857	3265
10	39376004	3.13202E-03	7.57974E-03	76028033	25681303	17379977	72780219	25448671	0.3333	3238
11	39801663	3.14446E-03	7.64645E-03	76199935	25461303	17706888	71561127	25325309	0.3810	3214
12	40247718	3.15694E-03	7.71281E-03	76375876	25248307	18046033	70418173	25212873	0.4286	3191
13	40703572	3.16848E-03	7.78039E-03	76541778	25042273	18388359	69251214	25118507	0.4762	3170
14	41170427	3.18035E-03	7.84963E-02	76708288	24843909	18744763	68295362	25038826	0.5238	3150
15	41649120	3.19187E-03	7.92195E-02	76876710	24653933	19145133	67301278	25022911	0.5714	3131
16	42138592	3.20314E-03	8.00715E-02	77048328	24473515	19541074	66345663	24950435	0.6190	3113
17	42638692	3.21464E-03	8.09458E-02	77223828	24302767	19941546	65425067	24880890	0.6667	3095
18	43149447	3.22501E-03	8.18479E-02	77401860	24141596	20342608	64530858	24814005	0.7143	3079
19	43672702	3.23681E-03	8.27835E-02	77583767	24000113	20745743	63665743	24749490	0.7619	3063
20	44209812	3.24955E-03	8.37574E-02	77769747	23878331	21150219	62825705	24687081	0.8095	3047
21	44760412	3.25827E-03	8.47805E-02	77971240	23783997	21564531	62022945	24626682	0.8571	3032
22	45326267	3.26853E-03	8.5853E-02	78194355	23712450	21991428	61212802	24567875	0.9048	3018
23	45914121	3.27897E-03	8.69856E-02	78431244	23661465	22431969	60436789	24510998	0.9524	3004
24	45361976	3.28850E-03	8.81797E-02	78686934	236201592	22882455	59679618	24454936	1.0000	2990

K=11 PHI = 80.0 Z = 1.000000

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
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J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/RT
3	36397023	2.50879E-03	7.21112E-03	742880185	27038688	16465480	91703047	26378260	0.0000	3479
4	36846394	2.52388E-03	7.77044E-03	75226394	27313199	16412546	81844036	28487441	0.0476	3248
5	37286114	2.53875E-03	8.03922E-03	76265051	27282169	16774116	77670851	25131471	0.952	3104
6	3745734	2.55375E-03	8.22858E-03	76578113	27180558	171131784	75003601	24913899	1429	3108
7	38195304	2.56904E-03	8.40087E-03	76836608	27070421	174782550	72668765	24279854	1905	3058
8	38644878	2.58397E-03	8.55235E-03	77042411	26853244	17424319	70786647	24577776	2381	3020
9	39084448	2.59919E-03	8.70177E-03	77221554	26634522	18139541	68936617	24441649	2857	2987
10	39544015	2.61443E-03	8.87437E-03	77375078	26717050	18488872	67112033	24320824	3333	2957
11	39993585	2.62985E-03	8.94072E-03	77511643	26602003	18839255	65793650	24293996	3810	2930
12	40443155	2.64535E-03	9.10379E-03	77632132	26490283	19123213	64375408	24107317	4266	2906
13	40892725	2.66102E-03	9.26304E-03	77740436	26381799	19423300	63031695	24012101	4762	2883
14	41342256	2.67678E-03	9.35915E-03	77837244	26274798	19730388	61757316	23832323	5274	2862
15	41791826	2.69268E-03	9.47594E-03	77924318	26178530	20024241	60539479	23699586	5714	2842
16	42241436	2.70872E-03	9.59579E-03	78002335	26077963	20315246	59373938	23570399	6190	2823
17	42691006	2.72493E-03	9.71405E-03	78079354	25970090	20546373	582353601	23459599	6667	2805
18	43140576	2.74129E-03	9.83114E-03	78137054	25823785	20874437	57152324	23364525	7143	2788
19	43590147	2.75781E-03	9.94711E-03	78193366	256807043	21147619	56124458	232847719	7619	2772
20	44039717	2.77448E-03	1.00621E-02	78244917	25532316	21416227	55123716	232083500	8095	2757
21	44489287	2.79134E-03	1.01782E-02	78290206	25384377	21680908	54159107	23132252	8571	2743
22	44938857	2.80831E-03	1.02895E-02	78330470	25236463	21940566	53211594	23063668	9048	2729
23	45388428	2.82548E-03	1.04021E-02	78366726	25089463	22196839	52296161	23007692	9524	2716
24	45837998	2.84272E-03	1.05140E-02	78399679	24942175	22449116	51407088	229254002	1.0000	2704

K-12 PHI = 90.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/RT
3	36397023	2.02675E-03	6.19174E-03	75297369	27408220	17487440	91703047	25586342	0.0000	3273
4	36846394	2.04223E-03	6.80615E-03	76274315	27604850	17371108	79219157	24497249	0.0476	3001
5	37286114	2.05764E-03	7.10209E-03	77362750	27774240	17571342	74027675	24012890	0.952	2898
6	3745734	2.07365E-03	7.31016E-03	77920352	2777419	17892321	70744215	23818777	1429	2837
7	38195304	2.08978E-03	7.50125E-03	78196274	27712251	18205862	67908919	23604747	1305	2786
8	38644878	2.10512E-03	7.67351E-03	78411085	27637814	18545350	65502598	23494317	1805	2745
9	39084448	2.12077E-03	7.83603E-03	78595167	27566349	18835912	63323877	23275461	2857	2708
10	39544015	2.13582E-03	7.98458E-03	78749164	27488032	19142689	61349769	23136268	3333	2676
11	40039717	2.15024E-03	8.14662E-03	78893350	27417529	19441449	59547170	23011508	3810	2648
12	40539287	2.16491E-03	8.29131E-03	78959560	27348972	19734502	57810318	22892427	4266	2622
13	41038857	2.17944E-03	8.43924E-03	79020249	27284045	200220421	56208595	22784335	4762	2598
14	41538428	2.19372E-03	8.58152E-03	79187611	27222009	20300373	54695628	22698568	5238	2576
15	42037998	2.20840E-03	8.72212E-03	79353473	27166204	20571894	53061900	22609794	5714	2556
16	42537568	2.22345E-03	8.86113E-03	79528769	27113445	20841666	51900007	22527461	6190	2537
17	43037138	2.23848E-03	8.99887E-03	797034671	27064611	21103354	50601784	22450861	6667	2520
18	43536708	2.25348E-03	9.13562E-03	798781875	27020267	21360254	49362279	22375553	7143	2504
19	44036278	2.26845E-03	9.27167E-03	799471182	26977924	21611565	48175741	22312018	7619	2489
20	44535848	2.28338E-03	9.40716E-03	799503300	26943354	21867876	47038295	22250978	8095	2476
21	45035418	2.29828E-03	9.54235E-03	799526130	26910906	22089349	45845941	22193020	8571	2463
22	45534988	2.31315E-03	9.67723E-03	799547458	26882196	22336215	44685702	22138048	9048	2451
23	46034558	2.32798E-03	9.81215E-03	799568632	26857431	22586663	43684561	22088272	9524	2439
24	46534128	2.34277E-03	9.94687E-03	799589896	26833608	22796884	42910052	22040947	1.0000	2429

K-13 PHI = 100.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/RT
3	36397023	1.60821E-03	5.24877E-03	76375443	27798389	18167908	91703047	24754670	0.0000	3064
4	36846394	1.62323E-03	5.69445E-03	78264227	28311000	17870983	76390365	23468367	0.0476	2754
5	37286114	1.63825E-03	6.21076E-03	78944506	28392184	17968127	7016743	22971183	0.952	2638
6	3745734	1.65327E-03	6.43521E-03	79316159	2839442	18227358	65990329	22673813	1429	2571
7	38195304	1.66829E-03	6.64216E-03	79614506	28393350	18488454	62584417	22426153	1905	2515
8	38644878	1.68331E-03	6.82106E-03	79941391	28391180	18766242	59628295	22225905	2381	2470
9	39084448	1.69833E-03	7.00032E-03	80031227	28307079	19039220	57015667	22050942	2857	2431
10	39544015	1.71335E-03	7.17591E-03	80186636	282071854	19312267	54686120	21899762	3333	2398
11	40039717	1.72837E-03	7.34004E-03	80342319	28107623	19576822	52461134	21764923	3810	2369
12	40539287	1.74339E-03	7.49924E-03	80498063	2802765	19840511	50588879	21645224	4266	2343
13	41038857	1.75841E-03	7.65853E-03	80653809	28018053	20093338	48760898	21537286	4762	2319
14	41538428	1.77343E-03	7.80860E-03	80809578	28015167	20344208	47064559	21440212	5238	2298

J	R	P	RHO	U	Y	M	(S-SINF)/CV	A	T	M/RT
15	424332108	1.81453E-03	7.95994E-03	80652821	28139116	20586161	45473902	21352184	5714	2200
16	429336031	1.83490E-03	8.10969E-03	80702608	28125368	20821763	43980818	21272522	6160	2263
17	43437955	1.85587E-03	8.25854E-03	80741868	28114220	21050725	42570672	21200040	6667	2247
18	43940879	1.87741E-03	8.40664E-03	80771403	28109639	21273460	41237356	21139180	7143	2233
19	44443802	1.89962E-03	8.55443E-03	80792200	28110116	21460071	3972210	21074243	7619	2221
20	44946726	1.92243E-03	8.70210E-03	80804915	28115544	21690766	38770258	21019750	8095	2209
21	45449650	1.94539E-03	8.84992E-03	80810188	28125973	21905882	37625548	20970240	8571	2199
22	45952573	1.97002E-03	8.99802E-03	80808534	28111336	22105442	36534062	20923561	9048	2189
23	46455497	1.99479E-03	9.14656E-03	80800511	28113360	22300045	35491366	20885029	9524	2181
24	46958421	2.02033E-03	9.29599E-03	80786240	28185631	22489267	34494439	20848646	1.0000	2173
K-14 PHI =110.0 Z = 1.000000										
3	36397023	1.26213E-03	4.41455E-03	77498133	28207014	18122596	91703047	23912369	0.0000	2859
4	36930315	1.27575E-03	5.08106E-03	79602455	28670076	17930294	73093084	22408839	0476	2813
5	37463607	1.29011E-03	5.41311E-03	80366442	28930510	17657450	65347436	21832594	0952	2363
6	37998699	1.30436E-03	5.64776E-03	80736694	29033833	18656813	60322746	21493941	1429	2310
7	38530191	1.31971E-03	5.86318E-03	81070189	29242163	18285371	56435973	21217293	1905	2251
8	39063482	1.33515E-03	6.05590E-03	81300947	29034374	18519658	53072487	20993882	2381	2205
9	39595774	1.35121E-03	6.23535E-03	81488749	29050769	18751631	50095859	20812280	2857	2166
10	40130666	1.36733E-03	6.41194E-03	81636504	29013565	18966268	47482503	20654754	3333	2133
11	40663358	1.38461E-03	6.57931E-03	81757833	29011736	19213910	45116491	20517307	3810	2105
12	41188650	1.40243E-03	6.74125E-03	81854597	29010307	19436793	42978320	20350684	4286	2080
13	41725541	1.42070E-03	6.89985E-03	81932306	29014031	19651326	41015008	20202962	4762	2059
14	42263233	1.43952E-03	7.05543E-03	82014022	29021946	19858701	39211376	20030368	5238	2040
15	42801326	1.45903E-03	7.20911E-03	82041326	29037732	20057732	37539073	20119939	5714	2024
16	43329817	1.47917E-03	7.36124E-03	82075831	29053242	20249137	35966394	20045688	6190	2009
17	43863109	1.49997E-03	7.51844E-03	82099379	29076245	20432710	34538485	19983353	6667	1997
18	44393400	1.52149E-03	7.66312E-03	82126947	29098724	20608033	33180943	19827424	7143	1985
19	44922692	1.54367E-03	7.81347E-03	82117065	29144744	20771862	31807562	19677687	7619	1976
20	45453984	1.56678E-03	7.96425E-03	82112676	29197413	20939770	30170726	19034866	8095	1967
21	45984276	1.59025E-03	8.11406E-03	82101303	29224726	21095547	29582266	19797397	8571	1960
22	46529568	1.61488E-03	8.26708E-03	82081553	29290241	21244351	28517010	19765575	9048	1953
23	47082859	1.63981E-03	8.41843E-03	82051203	29347455	21388382	27808896	19737677	9524	1948
24	47596151	1.66635E-03	8.57379E-03	82023183	29416540	21524991	26594402	19715876	1.0000	1944
K-15 PHI =120.0 Z = 1.000000										
3	36397023	9.86712E-04	3.70272E-03	78491166	28623044	18205979	91703047	23080606	0.0000	2665
4	36961382	9.98655E-04	4.38297E-03	80954342	29348072	17509901	69291872	21347077	0476	2278
5	37525740	1.01135E-03	4.72442E-03	82935299	29545299	17352600	66654245	20591447	0952	2141
6	38091598	1.03359E-03	4.96340E-03	82195199	29601298	17463495	64388422	20312990	1429	2063
7	38658456	1.05735E-03	5.17928E-03	82515944	29639700	17606028	61907078	20013268	1905	2003
8	39221314	1.08105E-03	5.37103E-03	82744496	29693700	17768174	60455619	19783203	2381	1919
9	39787172	1.06335E-03	5.51308E-03	82928267	29674705	17987465	42675930	19591310	2857	1919
10	40351030	1.03015E-03	5.72003E-03	83034861	29687658	18160079	39863401	19433767	3333	1888
11	40915889	1.09552E-03	5.88452E-03	83172595	29702633	18365985	37357540	19299580	3810	1862
12	41480747	1.11151E-03	6.03879E-03	83260593	29720946	18549406	35113371	19166518	4286	1841
13	42045505	1.12596E-03	6.19335E-03	83336612	29744248	18705873	33121579	18669503	4762	1822
14	42610463	1.14531E-03	6.35023E-03	83409373	29773242	18863051	31303205	19007034	5238	1806
15	43175321	1.16317E-03	6.48755E-03	83469525	29803942	19009955	29641457	18935371	5714	1793
16	43740179	1.18173E-03	6.63524E-03	83430826	29839488	19147698	28121587	18076500	6190	1792
17	44305037	1.20093E-03	6.77717E-03	83441315	29869348	19276227	26721703	18825658	6667	1772
18	44869896	1.22033E-03	6.92111E-03	83441115	29905164	19395996	25430643	18783311	7143	1764
19	45434754	1.24152E-03	7.06439E-03	83432560	30017084	19507836	24234103	18474944	7619	1757
20	45999612	1.26307E-03	7.20874E-03	83414412	30028023	19611415	23123895	18719718	8095	1752
21	46564470	1.28504E-03	7.35221E-03	83390404	30162639	19700555	22089089	18696677	8571	1748
22	47129328	1.30832E-03	7.49667E-03	83356421	30248927	19797660	21124509	18620269	9048	1745
23	47694106	1.33160E-03	7.64279E-03	83320071	30334452	19842141	20221280	18667036	9524	1742
24	48259045	1.35694E-03	7.79327E-03	83271084	30417340	19958239	19378651	18660994	1.0000	1741

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	36397023	7.78018E-04	3.12468E-03	.79771585	.29034483	.17423638	.91703047	.22315510	0.0000	.2490
4	36992028	7.87680E-04	3.81172E-03	.82291010	.29852493	.16538598	.84910638	.20314968	.0476	.2063
5	37587032	7.98158E-04	4.16813E-03	.83171042	.30071844	.16328242	.81919837	.19569906	.0952	.1915
6	38182037	8.08482E-04	4.40635E-03	.83607514	.30152408	.16305566	.81742037	.19155910	.1429	.1835
7	38777041	8.19491E-04	4.61693E-03	.83925974	.30195927	.16282242	.82241595	.18841357	.1905	.1775
8	39372045	8.30906E-04	4.79956E-03	.84147663	.30231965	.16259359	.83172094	.18606535	.2361	.1731
9	39967050	8.42702E-04	4.96077E-03	.84319460	.30259778	.16236094	.84173771	.18417371	.2857	.1696
10	40562054	8.55044E-04	5.12490E-03	.84474718	.30282978	.16212818	.85182088	.18266816	.3333	.1668
11	41157059	8.67897E-04	5.27364E-03	.84546820	.30301123	.16189515	.86236673	.18142878	.3810	.1646
12	41752063	8.81303E-04	5.41823E-03	.84626820	.30315361	.16166212	.87292369	.18042117	.4286	.1628
13	42347067	8.95233E-04	5.56543E-03	.84714529	.30327267	.16142909	.88348859	.17958859	.4762	.1610
14	42942072	9.09693E-04	5.72739E-03	.84813332	.30338943	.16119606	.89406342	.17891159	.5238	.1600
15	43537076	9.25176E-04	5.90459E-03	.84924761	.30350514	.16096303	.90463826	.17835811	.5714	.1591
16	44132080	9.41445E-04	6.09571E-03	.85048958	.30362085	.16073000	.91521310	.17791738	.6190	.1583
17	44727085	9.57471E-04	6.29932E-03	.85175013	.30373656	.16049697	.92578793	.17755818	.6667	.1577
18	45322089	9.74130E-04	6.51603E-03	.85303068	.30385227	.16026394	.93636276	.17720905	.7143	.1572
19	45917094	9.92419E-04	6.74573E-03	.85433123	.30396798	.16003091	.94693760	.17686972	.7619	.1568
20	46512098	1.01116E-03	6.98841E-03	.85565178	.30408369	.15979788	.95751244	.17653039	.8095	.1566
21	47107102	1.03014E-03	7.24409E-03	.85700233	.30420940	.15956485	.96808728	.17619106	.8571	.1565
22	47702107	1.05056E-03	7.51277E-03	.85838288	.30433511	.15933182	.97866212	.17585173	.9048	.1565
23	48297111	1.07293E-03	7.79445E-03	.85979343	.30446082	.15909879	.98923696	.17551240	.9524	.1565
24	48892116	1.09730E-03	8.09014E-03	.86123398	.30458653	.15886576	.10000000	.17517307	1.0000	.1567

K=17 PHI=140.0 Z=1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	36397023	6.32089E-04	2.69392E-03	.80850917	.29427291	.16834842	.91703047	.21663045	0.0000	.2346
4	37017295	6.39168E-04	3.41937E-03	.83049843	.30417367	.14821347	.84902728	.19333521	.0476	.1869
5	37637568	6.47077E-04	3.78097E-03	.84527039	.30501481	.14441138	.84584076	.18500245	.0952	.1711
6	38257838	6.54940E-04	4.01254E-03	.84957284	.30585599	.14022848	.83942444	.18053760	.1429	.1631
7	38873110	6.62900E-04	4.21213E-03	.85385597	.30671194	.13632236	.83292204	.17742088	.1905	.1574
8	39488381	6.71352E-04	4.37750E-03	.85813912	.30757809	.13242624	.82640951	.17442503	.2381	.1534
9	40103653	6.80370E-04	4.52743E-03	.86242227	.30845424	.12853012	.82000701	.17157490	.2857	.1503
10	40718924	6.89937E-04	4.65149E-03	.86670542	.30934040	.12463400	.81360450	.16882923	.3333	.1462
11	41334195	6.99231E-04	4.74339E-03	.87098857	.31023655	.12073788	.80720200	.16618350	.3810	.1431
12	41949466	7.09246E-04	4.90073E-03	.87527172	.31114270	.11684176	.80080050	.16353780	.4286	.1400
13	42564737	7.19910E-04	5.01203E-03	.87955487	.31204885	.11294564	.79439900	.16089210	.4762	.1369
14	43180008	7.30993E-04	5.11827E-03	.88383802	.31295500	.10904952	.78800750	.15824640	.5238	.1338
15	43795279	7.42511E-04	5.22373E-03	.88812117	.31386115	.10515340	.78161600	.15560070	.5714	.1307
16	44410550	7.54655E-04	5.35253E-03	.89240432	.31476730	.10125728	.77522450	.15295500	.6190	.1276
17	45025821	7.67400E-04	5.49216E-03	.89668747	.31567345	.97571116	.76883300	.15030930	.6667	.1245
18	45641092	7.80744E-04	5.64280E-03	.90097062	.31657960	.93620000	.76244150	.14766360	.7143	.1214
19	46256363	7.94698E-04	5.80454E-03	.90525377	.31748575	.89668850	.75605000	.14491790	.7619	.1183
20	46871634	8.09036E-04	5.97747E-03	.90953692	.31839190	.85717700	.74965850	.14217230	.8095	.1152
21	47486905	8.23910E-04	6.16180E-03	.91382007	.31929805	.81766550	.74326700	.13942670	.8571	.1121
22	48102176	8.40176E-04	6.36698E-03	.91810822	.32020420	.77815400	.73687550	.13668110	.9048	.1090
23	48717447	8.56902E-04	6.59012E-03	.92239637	.32111035	.73864250	.73048400	.13393550	.9524	.1059
24	49332718	8.74206E-04	6.83040E-03	.92668452	.32201650	.70000000	.72409250	.13118990	1.0000	.1028

K=18 PHI=150.0 Z=1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	36397023	5.45450E-04	2.42459E-03	.81816095	.29778623	.17026964	.91703047	.21211593	0.0000	.2250
4	37032200	5.49852E-04	3.22285E-03	.84847056	.30828455	.12045743	.82825930	.18468804	.0476	.1705
5	37647105	5.54851E-04	3.60379E-03	.86787946	.31074452	.11728179	.83732891	.17536557	.0952	.1537
6	38262010	5.59547E-04	3.83756E-03	.88204126	.31319800	.11409007	.84640000	.17076770	.1429	.1458
7	38876915	5.64914E-04	4.03644E-03	.89478599	.31565149	.11090832	.85540000	.16773704	.1905	.1407
8	39491820	5.70170E-04	4.15181E-03	.90655705	.31810498	.10772665	.86440000	.16572901	.2381	.1373
9	40106725	5.75818E-04	4.28035E-03	.91832812	.32055847	.10454498	.87340000	.16428020	.2857	.1349
10	40721630	5.81857E-04	4.42401E-03	.93010829	.32301196	.10136332	.88240000	.16283166	.3333	.1322
11	41336535	5.88296E-04	4.57767E-03	.94188846	.32546545	.98255000	.89140000	.16138311	.3810	.1318
12	41951440	5.95135E-04	4.74132E-03	.95366863	.32791894	.94270000	.90040000	.16003462	.4286	.1309
13	42566345	6.02274E-04	4.91507E-03	.96544880	.33037243	.90285000	.90940000	.15878613	.4762	.1301

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
14	43383965	6.07145E-04	4.68480E-03	87083896	30992255	12644620	10204138	16099620	5238	1296
15	44019141	6.14250E-04	4.75406E-03	87104403	30996921	12642677	09314936	16075153	5714	1292
16	44654318	6.21801E-04	4.82202E-03	87114925	31017140	12626975	08547829	16059160	6190	1289
17	45285494	6.30893E-04	4.88966E-03	87116818	31043375	12598152	07872425	16049189	6667	1288
18	45824671	6.38093E-04	4.95671E-03	87115497	31083170	12558151	07279142	16045753	7143	1287
19	46559847	6.46094E-04	5.02395E-03	87103254	31130722	12508377	06748756	16046444	7619	1287
20	47195024	6.56359E-04	5.09404E-03	87083239	31193466	12449567	06275636	16052946	8095	1288
21	47830200	6.66071E-04	5.16355E-03	87060239	31260434	12383015	05846949	16062057	8571	1290
22	48465377	6.76954E-04	5.23811E-03	87025719	31347139	12309323	05460368	16071075	9048	1292
23	49100553	6.87766E-04	5.31116E-03	86990956	31435376	12229244	05105533	16093102	9524	1295
24	49735730	7.00216E-04	5.39206E-03	86941613	31544650	12144397	04783593	16115859	1.0000	1299

K=19 PHI =160.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	36397023	5.07233E-04	2.30200E-03	82564900	30052472	08702235	91703047	20992616	0.0000	2203
4	37031220	5.0847E-04	3.28646E-03	86070874	31293328	08300071	42133595	17593734	0476	1348
5	37687233	5.11275E-04	3.71899E-03	86989052	31518049	08043005	25342221	16501731	0952	1375
6	38302337	5.13361E-04	3.90335E-03	87295235	31624232	08401972	18974701	16218133	1429	1315
7	38937442	5.15923E-04	4.03208E-03	87495566	31464853	08833705	14932535	15991215	1905	1280
8	39572546	5.18522E-04	4.18007E-03	87612900	31433669	08827413	12366711	15861704	2381	1288
9	40207651	5.20376E-04	4.15039E-03	87705788	31378114	08357096	10478316	15784389	2857	1243
10	41477650	5.23395E-04	4.24723E-03	87744933	31324906	08055504	09058779	15595028	3333	1232
11	42112660	5.26011E-04	4.29602E-03	87830339	31272057	09113567	07960194	15648511	3810	1224
12	42748659	5.28454E-04	4.33047E-03	87874415	31258173	09150762	07115159	15611068	4266	1219
13	43383965	5.31372E-04	4.37697E-03	87911214	31202361	09165217	06390911	15522153	4762	1214
14	44018079	5.34390E-04	4.41243E-03	87940835	31174347	09163696	05788310	15580408	5238	1211
15	44653303	5.37081E-04	4.44591E-03	87955242	31151551	09146777	05271666	15543703	5714	1208
16	45285494	5.40163E-04	4.47833E-03	87961064	31133646	09118191	04826923	15531722	6190	1206
17	45824671	5.42833E-04	4.50963E-03	87969941	31126708	09070369	04435080	15522975	6667	1205
18	46363893	5.46394E-04	4.54135E-03	88009178	31125810	09229615	04020506	15517955	7143	1204
19	46855397	5.50344E-04	4.57255E-03	88016359	31129120	09272521	03725578	15515124	7619	1204
20	47195024	5.54300E-04	4.60331E-03	88017195	31143629	09707279	03501435	15513651	8095	1204
21	47830200	5.58473E-04	4.63903E-03	88016337	31161203	08834693	03246622	15516033	8571	1205
22	48465377	5.63304E-04	4.67469E-03	88007230	31193503	08756944	03013823	15524229	9048	1204
23	49099116	5.68130E-04	4.71051E-03	87997611	31220250	08671927	02798183	15531191	9524	1206
24	49735730	5.74063E-04	4.75234E-03	87976720	31260608	08582318	02599473	15543224	1.0000	1208

K=20 PHI =170.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	36397023	4.97409E-04	2.27006E-03	82957376	30190416	03301894	91703047	20934041	0.0000	2191
4	37031220	4.97894E-04	3.69297E-03	87376434	31701533	03303167	23330504	16409145	0476	1346
5	37687233	4.97894E-04	4.00737E-03	87937067	31352283	04028871	12334341	15783541	0952	1242
6	38302337	4.97965E-04	4.17235E-03	88056582	31608118	04370072	09997489	15639440	1429	1223
7	38937442	4.98413E-04	4.13076E-03	88174126	31629056	04541452	07824088	15519494	1905	1204
8	39496505	4.98572E-04	4.17027E-03	88236257	31680619	04680619	06812276	15464622	2381	1196
9	40116402	4.99021E-04	4.20179E-03	88286477	31518319	04680619	05827890	15411931	2857	1188
10	40756298	4.99502E-04	4.22177E-03	88330199	31471323	04819837	05220485	15397776	3333	1183
11	41353195	4.99902E-04	4.24110E-03	88368199	31429188	04855121	04355121	15348908	3810	1178
12	41976091	4.99544E-04	4.25017E-03	88410042	31390147	04811592	04215467	15327041	4266	1175
13	42595937	5.00023E-04	4.25601E-03	88440336	31354266	04762821	03031580	15303115	4762	1171
14	43215126	5.00294E-04	4.27623E-03	88466050	31320533	04813109	03500332	15285823	5238	1169
15	43835780	5.00435E-04	4.23924E-03	88492427	31282255	04860633	03202197	15274222	5714	1167
16	44454598	5.00577E-04	4.29051E-03	88519410	31237347	04842869	02953550	15261300	6190	1165
17	45075573	5.00846E-04	4.30816E-03	88538309	31182193	04818219	02719536	15248820	6667	1163
18	45695469	5.00742E-04	4.31304E-03	88559404	31197707	04785456	02513945	15236855	7143	1161
19	46315366	5.00722E-04	4.31835E-03	88581019	31167336	04755471	02321101	15227513	7619	1159
20	46935252	5.00765E-04	4.32445E-03	88601018	31129744	04711777	02147954	15218204	8095	1158
21	47555158	5.00548E-04	4.32880E-03	88622238	31107724	04675708	01984332	15206809	8571	1157
22	48175055	5.00661E-04	4.33535E-03	88641523	31079471	04628994	01834143	15200788	9048	1155
23	48794951	5.00453E-04	4.33667E-03	88662876	31047359	04577440	01691132	15192123	9524	1154
24	49414848	5.00485E-04	4.34100E-03	88680139	31019947	04522186	01557797	15185031	1.0000	1153

K=21 PHI =180.0 Z = 1.000000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	M/RT
3	.36597023	4.96248E-04	2.26627E-03	.83046139	.30226323	0.00000000	.91703047	.20927056	0.0000	.2190
4	.37002762	4.95676E-04	3.96812E-03	.87956885	.31850305	0.00000000	.13165870	.15805977	.0476	.1249
5	.37608501	4.95831E-04	4.13409E-03	.88259927	.31797240	0.00000000	.07461170	.15487899	.0952	.1199
6	.38214379	4.95202E-04	4.14608E-03	.88318207	.31709745	0.00000000	.04922843	.15455655	.1429	.1194
7	.38819978	4.94814E-04	4.16286E-03	.88404281	.31650139	0.00000000	.05612998	.15381494	.1905	.1183
8	.39425717	4.94304E-04	4.19191E-03	.88445002	.31595850	0.00000000	.05207873	.15336978	.2381	.1179
9	.40031455	4.93602E-04	4.20896E-03	.88493841	.31553479	0.00000000	.04530162	.15318082	.2857	.1173
10	.40637194	4.93203E-04	4.21565E-03	.88524447	.31513785	0.00000000	.04210463	.15297887	.3333	.1170
11	.41242933	4.92725E-04	4.22532E-03	.88560163	.31473363	0.00000000	.03775129	.15271645	.3810	.1164
12	.41848371	4.92160E-04	4.23014E-03	.88588950	.31446847	0.00000000	.03502186	.15254249	.4286	.1163
13	.42454410	4.91623E-04	4.23584E-03	.88616299	.31418573	0.00000000	.03194093	.15234110	.4762	.1160
14	.43060149	4.90932E-04	4.23874E-03	.88532815	.31387018	0.00000000	.02952777	.15218585	.5238	.1158
15	.43665987	4.90092E-04	4.24157E-03	.88466533	.31352224	0.00000000	.02704285	.15201719	.5714	.1155
16	.44271826	4.89206E-04	4.24259E-03	.88408528	.31319149	0.00000000	.02505719	.15187353	.6190	.1153
17	.44877365	4.88343E-04	4.24287E-03	.88349330	.31283996	0.00000000	.02302937	.15172168	.6667	.1151
18	.45483104	4.87327E-04	4.24176E-03	.88290330	.31246914	0.00000000	.02130507	.15158317	.7143	.1149
19	.46088842	4.86113E-04	4.23940E-03	.88230753	.31205914	0.00000000	.01959650	.15143675	.7619	.1147
20	.46694581	4.84807E-04	4.23585E-03	.88170966	.31162441	0.00000000	.01808085	.15129665	.8095	.1145
21	.47300320	4.83201E-04	4.23029E-03	.88124322	.31112653	0.00000000	.01660278	.15114514	.8571	.1142
22	.47906058	4.81482E-04	4.22361E-03	.88085639	.31059824	0.00000000	.01525083	.15099527	.9048	.1140
23	.48511797	4.79279E-04	4.21374E-03	.88049131	.30996847	0.00000000	.01391956	.15082574	.9524	.1137
24	.49117536	4.76948E-04	4.20278E-03	.88029594	.30930387	0.00000000	.01270887	.15065447	1.0000	.1135

X/L = SURFACE FLOW VARIABLES AT Z = 1.000000
 .000100 DZOT=343.454220 ITER= 1500

PHI	RB	CF	P/PINF	R/RINF	H-Z	H-R	M-PHI	A	COMP	H/NT	TEMP	(S-S.INF)/CV
0.0	.3640	.6709	2.4012E+01	5.0298E+00	2.3607	.8592	0.0000	2.9733E-01	1.0000	.44204	.00	9.1703E-01
10.0	.3640	.6616	2.3694E+01	4.9821E+00	2.3675	.8617	.0941	2.9677E-01	1.0000	.44036	.00	9.1703E-01
20.0	.3640	.6346	2.2767E+01	4.8421E+00	2.3877	.8691	.1679	2.9508E-01	1.0000	.43536	.00	9.1703E-01
30.0	.3640	.5919	2.1303E+01	4.6175E+00	2.4218	.8815	.2506	2.9229E-01	1.0000	.42717	.00	9.1703E-01
40.0	.3640	.5368	1.9412E+01	4.3211E+00	2.4701	.8990	.3317	2.8844E-01	1.0000	.41598	.00	9.1703E-01
50.0	.3640	.4733	1.7234E+01	3.9688E+00	2.6332	.9220	.4106	2.8357E-01	1.0000	.40207	.00	9.1703E-01
60.0	.3640	.4056	1.4913E+01	3.5764E+00	2.8116	.9605	.4862	2.7777E-01	1.0000	.38579	.00	9.1703E-01
70.0	.3640	.3379	1.2550E+01	3.1714E+00	2.7059	.9848	.5579	2.7132E-01	1.0000	.36757	.00	9.1703E-01
80.0	.3640	.2736	1.0154E+01	2.7643E+00	2.8163	1.0250	.6242	2.6378E-01	1.0000	.34791	.00	9.1703E-01
90.0	.3640	.2155	8.3902E+00	2.3739E+00	2.9429	1.0711	.6835	2.5561E-01	1.0000	.32733	.00	9.1703E-01
100.0	.3640	.1649	6.6577E+00	2.0119E+00	3.0853	1.1230	.7339	2.4755E-01	1.0000	.30640	.00	9.1703E-01
110.0	.3640	.1232	5.2252E+00	1.6924E+00	3.2409	1.1746	.7704	2.3912E-01	1.0000	.28590	.00	9.1703E-01
120.0	.3640	.0899	4.0840E+00	1.4193E+00	3.4064	1.2398	.7886	2.3086E-01	1.0000	.26648	.00	9.1703E-01
130.0	.3640	.0647	3.2205E+00	1.1977E+00	3.5747	1.3011	.7808	2.2316E-01	1.0000	.24899	.00	9.1703E-01
140.0	.3640	.0471	2.6167E+00	1.0336E+00	3.7322	1.3584	.7310	2.1663E-01	1.0000	.23464	.00	9.1703E-01
150.0	.3640	.0367	2.2581E+00	9.2939E-01	3.8571	1.4039	.6141	2.1212E-01	1.0000	.22497	.00	9.1703E-01
160.0	.3640	.0321	2.0995E+00	8.2540E-01	3.9312	1.4316	.4149	2.0921E-01	1.0000	.22034	.00	9.1703E-01
170.0	.3640	.0309	2.0592E+00	8.7015E-01	3.9628	1.4423	.1864	2.0934E-01	1.0000	.21912	.00	9.1703E-01
180.0	.3640	.0307	2.0544E+00	8.6870E-01	3.9684	1.4444	0.0000	2.0927E-01	1.0000	.21897	.00	9.1703E-01

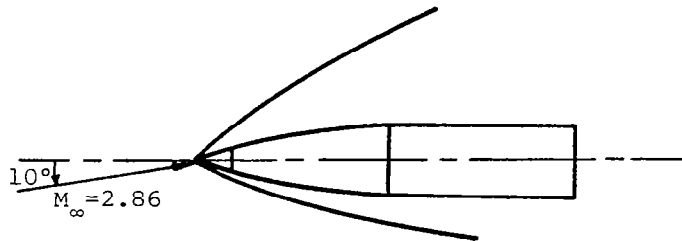
BODY AND SHOCK GEOMETRY AT Z = 1.000

PHI	RB	DMB/DZ	DMB/DPHI	RS	DRS/DZ	DRS/DPHI
0.0	.3640	.3640	0.0000	.4400	.4400	0.0000
10.0	.3640	.3640	0.0000	.4403	.4402	.0030
20.0	.3640	.3640	0.0000	.4411	.4410	.0060
30.0	.3640	.3640	0.0000	.4424	.4423	.0092
40.0	.3640	.3640	0.0000	.4443	.4442	.0126
50.0	.3640	.3640	0.0000	.4468	.4467	.0162
60.0	.3640	.3640	0.0000	.4500	.4499	.0201
70.0	.3640	.3640	0.0000	.4538	.4536	.0241
80.0	.3640	.3640	0.0000	.4584	.4584	.0283
90.0	.3640	.3640	0.0000	.4637	.4637	.0321
100.0	.3640	.3640	0.0000	.4696	.4696	.0352
110.0	.3640	.3640	0.0000	.4760	.4760	.0373
120.0	.3640	.3640	0.0000	.4826	.4826	.0371
130.0	.3640	.3640	0.0000	.4899	.4890	.0333
140.0	.3640	.3640	0.0000	.4942	.4943	.0242
150.0	.3640	.3640	0.0000	.4974	.4974	.0089
160.0	.3640	.3640	0.0000	.4973	.4974	-.0092
170.0	.3640	.3640	0.0000	.4941	.4942	-.0177
180.0	.3640	.3640	0.0000	.4912	.4912	0.0000

REF. AREA # .785398 REF. LENGTH = 1.000000
Z= 1.000000
DCY,DCN,DCA,CY,CN,CA= -.16223337E+06 .1576467E+06 .10116989E+06 .1576467E+06 .10116989E+06
DRX,DHY,DPZ,CRX,CHY,CPZ= -.94998641E+08 -.97763733E+08 0. -.94998641E+08 -.97763733E+08 0.

REF. AREA = .705398 REF. LENGTH = 1.000000
 NORMAL FORCE COEFFICIENT = .157647E+06 LIFT COEFFICIENT = .126090E+06
 SIDE FORCE COEFFICIENT = -.162235E+06 YAW COEFFICIENT = -.162235E+06
 AXIAL FORCE COEFFICIENT = .101170E+06 DRAG COEFFICIENT = .138525E+06
 PITCHING MOMENT COEFFICIENT = -.949986E+08
 SIDE MOMENT COEFFICIENT = .977638E+08
 ROLLING MOMENT COEFFICIENT = 0.
 CENTER OF PRESSURE = .602604E+03 BASED ON REF. LENGTH = .100000E+01 AND MOMENT REF. CENTER = 0.
 STATIC STABILITY MARGIN = .602604E+03 BASED ON REF. LENGTH = .100000E+01 AND C.G. LOCATION = 0.

3. SECOND TEST CASE: CONE-OGIVE-CYLINDER



This problem is run as two stacked cases (NCASE > 0). The first part of the solution is to obtain a pointed-cone starting solution; this solution is then used to start the integration down the ogive-cylinder body. The slopes at the cone-ogive intersection are matched, thus causing a ZSHIFT \neq 0. This is a case which covers most of the options of the code except that force and moment calculations are not made. The input cards used are now listed and follow the formats displayed in section 2.

The output listing for this test case is now displayed. The variable definitions and normalizations described in section 2 are, of course, still applicable. The output consists of the following sections:

1. Printout of the input quantities.
2. Printout of the free-stream velocity field and computational mesh.
3. Intermediate printout of the shock and body variables controlled by card 11.
4. The converged (starting) flow field reset to the initial z plane using the conical property of this converged solution.
5. Line-printer plot of the normalized density field at the initial z plane for the ogive-cylinder solution.
6. Shock and body variables at this initial z plane.
7. Input quantities for the ogive-cylinder case.
8. Printout of the free-stream velocity field and computational mesh for this case.
9. Flow field, line-printer plot of normalized density, and shock and body variables at z-initial (same as items 4, 5, and 6 above).
10. Intermediate printout of the shock and body variables for the ogive-cylinder solution (controlled by card 11).
11. Intermediate printout of the flow field and line-printer plot of the normalized density field controlled by card 11.
12. Flow field, line-printer plot of the normalized density field, and shock and body variables at the final z station of the ogive-cylinder solution.

MSEG, KIND	2	1	1	0	0	0	0	0	0	-I	-I	-I	-I	-I	-I	-I	-I
ZSEG	.10000	100.00000		-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I
ASEG	.03405	34.04047		-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I
DSEG	0.00000	0.00000		-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I
ASEG	0.00000	0.00000		-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I	-I

MACH = 2.860000
 ALPHA = 10.000000
 GAMMA = 1.400
 SIGMA = 18.80
 Z-INITIAL = .10
 Z-FINAL = 100.00
 PHI-ZERO = 90.00

NIT = 20
 N:PHI = 18
 METHOD ORDER = 2
 NITER = 500
 IPRINT = 0
 IPRINT = 1
 NCOMP = 1
 NMPART = 0
 NRECAL = 0

OZ/DT = 0.000 INITIALLY
 DELTA-X = 0.000
 DELTA-Y = 0.000

DISK1 = 2
 DISK2 = 3
 TAPE1 = 1
 TAPE2 = 1

PERCENT OF MAX. STEP SIZE = .90
 METHOD = 2
 BAO. COND. = 1
 BETA = 0.000
 OMEGA = 0.000

PINF = .336308E-01 RHOIN = .886481E-01 QINF = .787198E+00
 GASCON = 1.7160E+03

K	PHI	UINF	VINF	WINF
3	0.000000	.775830	-.136400	0.000000
4	10.000000	.775830	-.134721	.023755
5	20.000000	.775830	-.118450	.040708
6	30.000000	.775830	-.118472	.065400
7	40.000000	.775830	-.104795	.087453
8	50.000000	.775830	-.097753	.104795
9	60.000000	.775830	-.087453	.119472
10	70.000000	.775830	-.074795	.128450
11	80.000000	.775830	-.063755	.134721
12	90.000000	.775830	-.053400	.138450
13	100.000000	.775830	-.043755	.139721
14	110.000000	.775830	-.040708	.128450
15	120.000000	.775830	-.037453	.118472
16	130.000000	.775830	-.034795	.104795
17	140.000000	.775830	-.031753	.087453
18	150.000000	.775830	-.028450	.065400
19	160.000000	.775830	-.024795	.040708
20	170.000000	.775830	-.021721	.023755
21	180.000000	.775830	-.018450	.000000

MERIDIANOL MESH DESCRIPTION

K	ETA	PHI	P/PINE	Q/RINE	M-Z	M-R	M-PHI	A	COMP	H/HT	TEMP	(S-S,INF)/CV
K-2	ETA- -.1745E+00	PHI- -.1745E+00			1.7814	.6064	0.0000	3.4217E-01	1.0000	.58540	.00	6.7798E-02
K-3	ETA- 0.	PHI- 0.			1.7854	.6078	.0550	3.4119E-01	1.0000	.58411	.00	6.7798E-02
K-4	ETA- .1745E+00	PHI- .1745E+00			1.7863	.6118	.1119	3.4074E-01	1.0000	.58050	.00	6.7798E-02
K-5	ETA- .3491E+00	PHI- .3491E+00			1.8148	.6178	.1661	3.3828E-01	1.0000	.57452	.00	6.7798E-02
K-6	ETA- .5236E+00	PHI- .5236E+00			1.8403	.6264	.2170	3.3570E-01	1.0000	.56650	.00	6.7798E-02
K-7	ETA- .6981E+00	PHI- .6981E+00			1.8736	.6374	.2646	3.3314E-01	1.0000	.55655	.00	6.7798E-02
K-8	ETA- .8727E+00	PHI- .8727E+00			1.9112	.6506	.3091	3.3054E-01	1.0000	.54532	.00	6.7798E-02
K-9	ETA- .1047E+01	PHI- .1047E+01			1.9545	.6657	.3581	3.2694E-01	1.0000	.53297	.00	6.7798E-02
K-10	ETA- .1223E+01	PHI- .1223E+01			2.0044	.6823	.4030	3.2254E-01	1.0000	.52003	.00	6.7798E-02
K-11	ETA- .1398E+01	PHI- .1398E+01			2.0566	.7001	.4543	3.1843E-01	1.0000	.50705	.00	6.7798E-02
K-12	ETA- .1571E+01	PHI- .1571E+01			2.1151	.7183	.5056	3.1451E-01	1.0000	.49457	.00	6.7798E-02
K-13	ETA- .1745E+01	PHI- .1745E+01			2.1623	.7261	.5569	3.1044E-01	1.0000	.48222	.00	6.7798E-02
K-14	ETA- .1920E+01	PHI- .1920E+01			2.2102	.7324	.6082	3.0711E-01	1.0000	.47050	.00	6.7798E-02
K-15	ETA- .2094E+01	PHI- .2094E+01			2.2507	.7361	.6595	3.0358E-01	1.0000	.46582	.00	6.7798E-02
K-16	ETA- .2269E+01	PHI- .2269E+01			2.2813	.7376	.7108	3.0045E-01	1.0000	.46041	.00	6.7798E-02
K-17	ETA- .2443E+01	PHI- .2443E+01			2.3010	.7333	.7621	2.9760E-01	1.0000	.45518	.00	6.7798E-02
K-18	ETA- .2618E+01	PHI- .2618E+01			2.3112	.7288	.8134	2.9504E-01	1.0000	.45568	.00	6.7798E-02
K-19	ETA- .2793E+01	PHI- .2793E+01			2.3150	.7280	.8647	2.9277E-01	1.0000	.45525	.00	6.7798E-02
K-20	ETA- .2967E+01	PHI- .2967E+01			2.3160	.7284	.9160	2.9071E-01	1.0000	.45516	.00	6.7798E-02
K-21	ETA- .3142E+01	PHI- .3142E+01										
K-22	ETA- .3316E+01	PHI- .3316E+01										

X/L = .009451 SURFACE FLOW VARIABLES AT Z = .945090
 DZDT = .163562 ITER = 250

BODY AND SHOCK GEOMETRY AT Z = .945

PHI	RB	DRB/COZ	DRB/DPHI	RS	DRS/OZ	DRS/UPHI
0.0	.3217	.3404	0.0000	.4890	.5130	0.0000
10.0	.3217	.3404	0.0000	.4877	.5145	.0076
20.0	.3217	.3404	0.0000	.4917	.5157	.0152
30.0	.3217	.3404	0.0000	.4951	.5193	.0230
40.0	.3217	.3404	0.0000	.4997	.5242	.0307
50.0	.3217	.3404	0.0000	.5058	.5309	.0384
60.0	.3217	.3404	0.0000	.5118	.5391	.0460
70.0	.3217	.3404	0.0000	.5177	.5491	.0531
80.0	.3217	.3404	0.0000	.5236	.5604	.0594
90.0	.3217	.3404	0.0000	.5295	.5717	.0647
100.0	.3217	.3404	0.0000	.5354	.5831	.0699
110.0	.3217	.3404	0.0000	.5413	.5944	.0741
120.0	.3217	.3404	0.0000	.5472	.6058	.0783
130.0	.3217	.3404	0.0000	.5531	.6172	.0825
140.0	.3217	.3404	0.0000	.5590	.6286	.0867
150.0	.3217	.3404	0.0000	.5649	.6400	.0909
160.0	.3217	.3404	0.0000	.5708	.6514	.0951

PHI	RB	CP	P/PINF	R/RINF	H-Z	M-R	H-PHI	A	COMP	H/HT	TEMP	(S-S.INF)/CV
150.0	.3217	.3404	0.0000	.6066	.6520	.6582	.0433					
160.0	.3217	.3404	0.0000	.6132	.6582	.6582	.0310					
170.0	.3217	.3404	0.0000	.6175	.6621	.6621	.0161					
180.0	.3217	.3404	0.0000	.6189	.6633	.6633	0.0000					

X/L = SURFACE FLOW VAR: MILES AT Z = 7.04967
 DZDT = 1.192408 IIER = 500

BODY AND SHOCK GEOMETRY AT Z = 7.047

PHI	RD	DRB/DZ	DRB/DPHI	RS	DRS/DZ	DRS/DPHI
0.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
10.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
20.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
30.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
40.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
50.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
60.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
70.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
80.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
90.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
100.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
110.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
120.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
130.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
140.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
150.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
160.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
170.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000
180.0	2.3988	.3404	0.0000	3.6294	.5130	0.0000

CONE SOLUTION RESET TO Z-INITIAL = .10000

K = 3 PHI = 0.0 Z = .100000

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
3	.03404056	1.29931E-01	2.21729E-01	.60899191	.20728666	0.00000000	.00000000	.00000000	0.0000	.5862
4	.03404212	1.29931E-01	2.21667E-01	.61151000	.20824083	0.00000000	.00000000	.00000000	.0476	.5862
5	.03570268	1.29730E-01	2.21402E-01	.61310000	.19457476	0.00000000	.00000000	.00000000	.0952	.5859
6	.02653535	1.29417E-01	2.21046E-01	.61821000	.18117663	0.00000000	.00000000	.00000000	.1429	.5855
7	.03736681	1.29052E-01	2.20533E-01	.61821000	.18100000	0.00000000	.00000000	.00000000	.1805	.5850
8	.03819837	1.28495E-01	2.20191E-01	.62048509	.17829594	0.00000000	.00000000	.00000000	.2381	.5843
9	.03902994	1.27908E-01	2.21919E-01	.62048509	.16856016	0.00000000	.00000000	.00000000	.2857	.5835
10	.03986150	1.27260E-01	2.21896E-01	.62048509	.16410226	0.00000000	.00000000	.00000000	.3413022	.5827
11	.04069306	1.26516E-01	2.21740E-01	.62048509	.15893209	0.00000000	.00000000	.00000000	.3810	.5817

J	R	P	RHO	U	V	W	H	(S-SINF)/CV	A	T	H/HT
12	.04152463	1.25723E-01	2.16314E-01	.62905276	.15370865	0.00000000	0.00000000	.06845970	.34078321	.4286	.5807
13	.04235617	1.24870E-01	2.13466E-01	.63114451	.14812423	0.00000000	0.00000000	.06845970	.34045197	.4762	.5195
14	.04318176	1.23931E-01	2.11439E-01	.63292618	.14383936	0.00000000	0.00000000	.06845970	.34009677	.5239	.5783
15	.04401932	1.22978E-01	2.11535E-01	.63503279	.13902343	0.00000000	0.00000000	.06845970	.33971811	.5714	.5770
16	.04485088	1.21983E-01	2.11894E-01	.63737860	.13447942	0.00000000	0.00000000	.06845970	.33931615	.6190	.5757
17	.04568245	1.20910E-01	2.12569E-01	.63995265	.12984546	0.00000000	0.00000000	.06845970	.33889066	.6667	.5742
18	.04651401	1.19784E-01	2.01771E-01	.64275019	.12537052	0.00000000	0.00000000	.06845970	.33844139	.7143	.5727
19	.04734557	1.18647E-01	2.01774E-01	.64575019	.12111010	0.00000000	0.00000000	.06845970	.33796672	.7619	.5711
20	.04817714	1.17466E-01	2.00189E-01	.64878613	.11633249	0.00000000	0.00000000	.06845970	.33746352	.8095	.5694
21	.04900870	1.16214E-01	2.00303E-01	.65185328	.11182442	0.00000000	0.00000000	.06845970	.33693619	.8571	.5676
22	.04984026	1.14979E-01	2.00399E-01	.65501366	.10747701	0.00000000	0.00000000	.06845970	.33638317	.9048	.5658
23	.05067183	1.13346E-01	2.01006E-01	.65824193	.10329304	0.00000000	0.00000000	.06845970	.33577517	.9524	.5637
24	.05150339	1.11961E-01	1.99308E-01	.66164275	.099356234	0.00000000	0.00000000	.06845970	.33518591	1.0000	.5617

K- 4 PHI = 10.0 Z = .100000

J	R	P	RHO	U	V	W	H	(S-SINF)/CV	A	T	H/HT
3	.03404056	1.29025E-01	2.20561E-01	.60952474	.20748505	.02108710	.02108710	.06845970	.34204421	0.0000	.5850
4	.03487539	1.28387E-01	2.17249E-01	.61185377	.20547479	.02127411	.02127411	.06845970	.34205567	.0476	.5850
5	.03571022	1.27804E-01	2.15007E-01	.61423797	.19376419	.02127411	.02127411	.06845970	.34196877	.0952	.5847
6	.03654505	1.27307E-01	2.14933E-01	.61659491	.18744174	.02102555	.02102555	.06845970	.34184625	.1429	.5843
7	.03737988	1.26810E-01	2.15477E-01	.61893663	.18131573	.02087282	.02087282	.06845970	.34167820	.1905	.5837
8	.03821471	1.26313E-01	2.16075E-01	.62105355	.17531254	.02071978	.02071978	.06845970	.34148344	.2381	.5831
9	.03904954	1.25816E-01	2.16739E-01	.62319799	.16930854	.02056820	.02056820	.06845970	.34125213	.2857	.5823
10	.03988437	1.25319E-01	2.17411E-01	.62539761	.16448438	.02060117	.02060117	.06845970	.34099804	.3333	.5814
11	.04071920	1.24822E-01	2.18094E-01	.62752972	.15972157	.02052157	.02052157	.06845970	.34071369	.3810	.5804
12	.04155403	1.24325E-01	2.18784E-01	.62963485	.15494145	.02044145	.02044145	.06845970	.34040325	.4286	.5794
13	.04239886	1.23828E-01	2.19484E-01	.63172672	.14914935	.02036175	.02036175	.06845970	.34007341	.4762	.5782
14	.04324369	1.23331E-01	2.20184E-01	.63379562	.14334730	.02028204	.02028204	.06845970	.33972347	.5238	.5770
15	.04408852	1.22834E-01	2.20884E-01	.63584049	.13754529	.02020234	.02020234	.06845970	.33937347	.5714	.5758
16	.04493335	1.22337E-01	2.21584E-01	.63787139	.13174325	.02012264	.02012264	.06845970	.33902347	.6190	.5744
17	.04577818	1.21840E-01	2.02766E-01	.64000230	.12594122	.02004294	.02004294	.06845970	.33867347	.6667	.5730
18	.04662301	1.21343E-01	2.03466E-01	.64213321	.12013919	.02000000	.02000000	.06845970	.33832347	.7143	.5714
19	.04746784	1.20846E-01	2.04166E-01	.64426412	.11433616	.02000000	.02000000	.06845970	.33797347	.7619	.5698
20	.04831267	1.20349E-01	2.04866E-01	.64639503	.10853313	.02000000	.02000000	.06845970	.33762347	.8095	.5682
21	.04915750	1.19852E-01	2.05566E-01	.64852594	.10273010	.02000000	.02000000	.06845970	.33727347	.8571	.5664
22	.04999233	1.19355E-01	2.06266E-01	.65065685	.96529010	.02000000	.02000000	.06845970	.33692347	.9048	.5648
23	.05083716	1.18858E-01	2.06966E-01	.65278776	.92785010	.02000000	.02000000	.06845970	.33657347	.9524	.5632
24	.05168199	1.18361E-01	1.98658E-01	.65491867	.89041010	.02000000	.02000000	.06845970	.33622347	1.0000	.5616

K- 5 PHI = 20.0 Z = .100000

J	R	P	RHO	U	V	W	H	(S-SINF)/CV	A	T	H/HT
3	.03404056	1.26225E-01	2.17131E-01	.61124959	.20807219	.04184351	.04184351	.06845970	.34077772	0.0000	.5813
4	.03488506	1.26234E-01	2.17242E-01	.61375304	.20414519	.04209811	.04209811	.06845970	.34079336	.0476	.5811
5	.03572986	1.26042E-01	2.17144E-01	.61626790	.19834183	.04181759	.04181759	.06845970	.34079321	.0952	.5807
6	.03657466	1.25850E-01	2.16946E-01	.61878276	.19253847	.04153297	.04153297	.06845970	.34066310	.1429	.5803
7	.03741946	1.25658E-01	2.16748E-01	.62129762	.18673511	.04124845	.04124845	.06845970	.34049772	.1905	.5797
8	.03826426	1.25466E-01	2.16550E-01	.62381248	.18093175	.04096393	.04096393	.06845970	.34033234	.2381	.5790
9	.03910906	1.25274E-01	2.16352E-01	.62632734	.17512839	.04067941	.04067941	.06845970	.34016697	.2857	.5782
10	.03995386	1.25082E-01	2.16154E-01	.62884220	.16932503	.04039489	.04039489	.06845970	.34000160	.3333	.5774
11	.04079866	1.24890E-01	2.15956E-01	.63135706	.16352167	.04011037	.04011037	.06845970	.33983623	.3810	.5764
12	.04164346	1.24698E-01	2.15758E-01	.63387192	.15771831	.03982585	.03982585	.06845970	.33967086	.4286	.5754
13	.04248826	1.24506E-01	2.15560E-01	.63638678	.15191495	.03954133	.03954133	.06845970	.33950549	.4762	.5744
14	.04333306	1.24314E-01	2.15362E-01	.63890164	.14611159	.03925681	.03925681	.06845970	.33934012	.5238	.5730
15	.04417786	1.24122E-01	2.15164E-01	.64141650	.14030823	.03897229	.03897229	.06845970	.33917475	.5714	.5714
16	.04502266	1.23930E-01	2.14966E-01	.64393136	.13450487	.03868777	.03868777	.06845970	.33900938	.6190	.5698
17	.04586746	1.23738E-01	2.14768E-01	.64644622	.12870151	.03840325	.03840325	.06845970	.33884401	.6667	.5682
18	.04671226	1.23546E-01	2.14570E-01	.64896108	.12289815	.03811873	.03811873	.06845970	.33867864	.7143	.5664
19	.04755706	1.23354E-01	2.14372E-01	.65147594	.11709479	.03783421	.03783421	.06845970	.33851327	.7619	.5648
20	.04840186	1.23162E-01	2.14174E-01	.65399080	.11129143	.03754969	.03754969	.06845970	.33834790	.8095	.5632
21	.04924666	1.22970E-01	2.13976E-01	.65650566	.10548807	.03726517	.03726517	.06845970	.33818253	.8571	.5616
22	.05009146	1.22778E-01	2.13778E-01	.65902052	.99684613	.03698065	.03698065	.06845970	.33801716	.9048	.5600
23	.05093626	1.22586E-01	2.13580E-01	.66153538	.93828720	.03669613	.03669613	.06845970	.33785179	.9524	.5584
24	.05178106	1.22394E-01	1.98658E-01	.66405024	.87972827	.03641161	.03641161	.06845970	.33768642	1.0000	.5568

K= 6 PHI = 30.0 Z = .100000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.03404056	1.21756E-01	2.11612E-01	.61402883	.20915848	.06184440	.06846347	.33922648	0.0000	.5754
4	.03460133	1.21836E-01	2.12018E-01	.61644137	.21211932	.06194358	.06643570	.33901278	.0476	.5746
5	.03516210	1.21916E-01	2.12424E-01	.61885384	.21508016	.06204276	.06394608	.33880012	.0952	.5742
6	.03572288	1.22000E-01	2.12830E-01	.62126631	.21804100	.06214194	.06095847	.33858746	.1429	.5737
7	.03628365	1.22084E-01	2.13236E-01	.62367878	.22100184	.06224112	.05897086	.33837480	.1905	.5731
8	.03684442	1.22168E-01	2.13642E-01	.62609125	.22396268	.06234030	.05698325	.33816214	.2381	.5724
9	.03740519	1.22252E-01	2.14048E-01	.62850372	.22692352	.06243948	.05499564	.33794948	.2857	.5716
10	.03796596	1.22336E-01	2.14454E-01	.63091619	.22988436	.06253866	.05300803	.33773682	.3333	.5709
11	.03852673	1.22420E-01	2.14860E-01	.63332866	.23284520	.06263784	.05102042	.33752416	.3810	.5699
12	.03908750	1.22504E-01	2.15266E-01	.63574113	.23580604	.06273702	.04903281	.33731150	.4286	.5689
13	.03964827	1.22588E-01	2.15672E-01	.63815360	.23876688	.06283620	.04704520	.33709884	.4762	.5678
14	.04020904	1.22672E-01	2.16078E-01	.64056607	.24172772	.06293538	.04505759	.33688618	.5238	.5666
15	.04076981	1.22756E-01	2.16484E-01	.64297854	.24468856	.06303456	.04307000	.33667352	.5714	.5654
16	.04133058	1.22840E-01	2.16890E-01	.64539101	.24764940	.06313374	.04108241	.33646086	.6190	.5641
17	.04189135	1.22924E-01	2.17296E-01	.64780348	.25061024	.06323292	.03909482	.33624820	.6667	.5627
18	.04245212	1.23008E-01	2.17702E-01	.65021595	.25357108	.06333210	.03710723	.33603554	.7143	.5613
19	.04301289	1.23092E-01	2.18108E-01	.65262842	.25653192	.06343128	.03511964	.33582288	.7619	.5599
20	.04357366	1.23176E-01	2.18514E-01	.65504089	.25949276	.06353046	.03313205	.33561022	.8095	.5589
21	.04413443	1.23260E-01	2.18920E-01	.65745336	.26245360	.06362964	.03114446	.33539756	.8571	.5583
22	.04469520	1.23344E-01	2.19326E-01	.65986583	.26541444	.06372882	.02915687	.33518490	.9048	.5574
23	.04525597	1.23428E-01	2.19732E-01	.66227830	.26837528	.06382800	.02716928	.33497224	.9524	.5568
24	.04581674	1.23512E-01	2.20138E-01	.66469077	.27133612	.06392718	.02518169	.33475958	1.0000	.5559

K= 7 PHI = 40.0 Z = .100000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.03404056	1.15291E-01	2.04283E-01	.61766672	.21015855	.06068848	.06846347	.33684249	0.0000	.5673
4	.03460133	1.16036E-01	2.05078E-01	.62119210	.21311939	.06110234	.06451413	.33643829	.0476	.5660
5	.03516210	1.16881E-01	2.05873E-01	.62471763	.21608023	.06151620	.06056480	.33603409	.0952	.5653
6	.03572288	1.17826E-01	2.06668E-01	.62824316	.21904107	.06193026	.05661612	.33562989	.1429	.5648
7	.03628365	1.18771E-01	2.07463E-01	.63176869	.22200191	.06234432	.05266744	.33522569	.1905	.5642
8	.03684442	1.19716E-01	2.08258E-01	.63529422	.22496275	.06275838	.04871876	.33482149	.2381	.5638
9	.03740519	1.20661E-01	2.09053E-01	.63881975	.22792359	.06317244	.04477020	.33441729	.2857	.5634
10	.03796596	1.21606E-01	2.09848E-01	.64234528	.23088443	.06358650	.04082164	.33401309	.3333	.5630
11	.03852673	1.22551E-01	2.10643E-01	.64587081	.23384527	.06400056	.03687308	.33360889	.3810	.5611
12	.03908750	1.23496E-01	2.11438E-01	.64939634	.23680611	.06441462	.03292452	.33320469	.4286	.5601
13	.03964827	1.24441E-01	2.12233E-01	.65292187	.23976695	.06482868	.02897596	.33279049	.4762	.5591
14	.04020904	1.25386E-01	2.13028E-01	.65644740	.24272779	.06524274	.02502740	.33237629	.5238	.5580
15	.04076981	1.26331E-01	2.13823E-01	.65997293	.24568863	.06565680	.02107884	.33196209	.5714	.5566
16	.04133058	1.27276E-01	2.14618E-01	.66349846	.24864947	.06607086	.01713028	.33154789	.6190	.5554
17	.04189135	1.28221E-01	2.15413E-01	.66702399	.25161031	.06648492	.01318172	.33113369	.6667	.5543
18	.04245212	1.29166E-01	2.16208E-01	.67054952	.25457115	.06689898	.00923316	.33071949	.7143	.5529
19	.04301289	1.30111E-01	2.17003E-01	.67407505	.25753199	.06731304	.00528460	.33030529	.7619	.5515
20	.04357366	1.31056E-01	2.17798E-01	.67760058	.26049283	.06772710	.00133604	.32989109	.8095	.5509
21	.04413443	1.32001E-01	2.18593E-01	.68112611	.26345367	.06814116	.00000000	.32947689	.8571	.5503
22	.04469520	1.32946E-01	2.19388E-01	.68465164	.26641451	.06855522	.00000000	.32906269	.9048	.5498
23	.04525597	1.33891E-01	2.20183E-01	.68817717	.26937535	.06896928	.00000000	.32864849	.9524	.5488
24	.04581674	1.34836E-01	2.20978E-01	.69170270	.27233619	.06938334	.00000000	.32823429	1.0000	.5480

K= 8 PHI = 50.0 Z = .100000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.03404056	1.08973E-01	1.95498E-01	.62750176	.21015855	.05811951	.06846347	.33369369	0.0000	.5574
4	.03460133	1.09718E-01	1.96293E-01	.63102729	.21311939	.05853357	.06451413	.33328949	.0476	.5563
5	.03516210	1.10563E-01	1.97088E-01	.63455282	.21608023	.05894762	.06056480	.33288529	.0952	.5553
6	.03572288	1.11408E-01	1.97883E-01	.63807835	.21904107	.05936168	.05661612	.33248109	.1429	.5548
7	.03628365	1.12253E-01	1.98678E-01	.64160388	.22200191	.05977574	.05266744	.33207689	.1905	.5533
8	.03684442	1.13098E-01	1.99473E-01	.64512941	.22496275	.06018980	.04871876	.33167269	.2381	.5527
9	.03740519	1.13943E-01	2.00268E-01	.64865494	.22792359	.06060386	.04477020	.33126849	.2857	.5520
10	.03796596	1.14788E-01	2.01063E-01	.65218047	.23088443	.06101792	.04082164	.33086429	.3333	.5512

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
11	.04134617	1.08147E-01	1.96504E-01	.64217507	.16807365	.02318579	.05363190	.33176067	.3810	.5504
12	.04235937	1.07688E-01	1.95979E-01	.64913224	.16494324	.02294684	.05363130	.33149847	.4266	.5495
13	.04313258	1.07171E-01	1.95394E-01	.65665058	.16281330	.02272239	.05361556	.33120745	.4762	.5495
14	.04385878	1.06605E-01	1.94782E-01	.66479085	.16069866	.02250149	.05263173	.33089766	.5238	.5475
15	.04459878	1.05979E-01	1.94384E-01	.67352171	.15860359	.02228259	.05158614	.33056854	.5714	.5464
16	.04531218	1.05315E-01	1.93944E-01	.68281499	.15653432	.02206594	.05049655	.33021991	.6190	.5452
17	.04602538	1.04655E-01	1.93476E-01	.69265946	.15448537	.02185161	.04936285	.32985157	.6667	.5440
18	.04673858	1.04017E-01	1.92987E-01	.70305627	.15245125	.02163951	.04819630	.32946303	.7143	.5427
19	.04745179	1.03393E-01	1.92467E-01	.71400113	.15042749	.02142952	.04700895	.32905444	.7619	.5414
20	.04816500	1.02774E-01	1.91914E-01	.72549461	.14840942	.02122163	.04580284	.32862588	.8095	.5402
21	.04887821	1.02160E-01	1.91344E-01	.73753696	.14640016	.02101583	.04459797	.32819732	.8571	.5389
22	.04959142	1.01551E-01	1.90754E-01	.75012921	.14439416	.02081212	.04339432	.32776876	.9048	.5376
23	.05030463	1.00947E-01	1.90144E-01	.76327146	.14239416	.02061041	.04219167	.32734020	.9524	.5363
24	.05101784	1.00348E-01	1.89514E-01	.77696371	.14040374	.02041070	.04100002	.32691164	1.0000	.5350

K-9 PHI = 60.0 Z = .100000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.0404056	1.01388E-01	1.85879E-01	.62821338	.21401987	.11313167	.06846347	.33046993	0.0000	.5461
4	.0411188	1.01019E-01	1.85409E-01	.63794250	.20839773	.11277863	.06720847	.32955264	.0476	.5430
5	.0418320	1.00650E-01	1.84939E-01	.64767162	.20285171	.11242559	.06596192	.32863541	.0952	.5400
6	.0425452	1.00281E-01	1.84469E-01	.65740074	.19730566	.11207255	.06471686	.32771818	.1429	.5370
7	.0432584	1.00012E-01	1.84000E-01	.66712986	.19185954	.11171951	.06347180	.32680093	.1905	.5340
8	.0439716	1.00012E-01	1.83531E-01	.67685898	.18641342	.11136647	.06222674	.32588368	.2381	.5310
9	.0446848	1.00012E-01	1.83062E-01	.68658812	.18096730	.11101343	.06098168	.32496643	.2857	.5280
10	.0453980	1.00012E-01	1.82593E-01	.69631726	.17552118	.11066040	.05973662	.32404918	.3333	.5250
11	.0461112	1.00012E-01	1.82124E-01	.70604640	.17007506	.11030736	.05849156	.32313193	.3809	.5220
12	.0468244	1.00012E-01	1.81655E-01	.71577554	.16462894	.10995432	.05724650	.32221468	.4285	.5190
13	.0475376	1.00012E-01	1.81186E-01	.72550468	.15918282	.10960128	.05600144	.32129743	.4761	.5160
14	.0482508	1.00012E-01	1.80717E-01	.73523382	.15373670	.10924824	.05475638	.32038018	.5237	.5130
15	.0489640	1.00012E-01	1.80248E-01	.74496296	.14829058	.10889520	.05351132	.31946293	.5713	.5100
16	.0496772	1.00012E-01	1.79779E-01	.75469210	.14284446	.10854216	.05226626	.31854568	.6189	.5070
17	.0503904	1.00012E-01	1.79310E-01	.76442124	.13739834	.10818912	.05102120	.31762843	.6665	.5040
18	.0511036	1.00012E-01	1.78841E-01	.77415038	.13195222	.10783608	.04977614	.31671118	.7141	.5010
19	.0518168	1.00012E-01	1.78372E-01	.78387952	.12650610	.10748304	.04853108	.31579393	.7617	.4980
20	.0525300	1.00012E-01	1.77903E-01	.79360866	.12106002	.10713000	.04728602	.31487668	.8093	.4950
21	.0532432	1.00012E-01	1.77434E-01	.80333780	.11561394	.10677696	.04604096	.31395943	.8569	.4920
22	.0539564	1.00012E-01	1.76965E-01	.81306694	.11016786	.10642392	.04479590	.31304218	.9045	.4890
23	.0546696	1.00012E-01	1.76496E-01	.82279608	.10472178	.10607088	.04355084	.31212493	.9521	.4860
24	.0553828	1.00012E-01	1.76027E-01	.83252522	.99776602	.10571784	.04230578	.31120768	1.0000	.4830

K-10 PHI = 70.0 Z = .100000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.03404056	9.35239E-02	1.75270E-01	.63333708	.21624930	.12602415	.06846347	.32664034	0.0000	.5336
4	.0347538	9.32965E-02	1.74801E-01	.64306620	.21070318	.12567112	.06720847	.32572309	.0476	.5286
5	.0354670	9.30691E-02	1.74332E-01	.65279532	.20515706	.12531808	.06596192	.32480584	.0952	.5246
6	.0361802	9.28417E-02	1.73863E-01	.66252444	.20001094	.12496504	.06471686	.32388829	.1429	.5216
7	.0368934	9.26143E-02	1.73394E-01	.67225356	.19486482	.12461200	.06347180	.32297074	.1905	.5186
8	.0376066	9.23869E-02	1.72925E-01	.68198268	.18971870	.12425896	.06222674	.32205319	.2381	.5156
9	.0383198	9.21595E-02	1.72456E-01	.69171180	.18457258	.12390592	.06098168	.32113564	.2857	.5126
10	.0390330	9.19321E-02	1.71987E-01	.70144092	.17942646	.12355288	.05973662	.32021809	.3333	.5096
11	.0397462	9.17047E-02	1.71518E-01	.71117004	.17428034	.12320000	.05849156	.31930054	.3809	.5066
12	.0404594	9.14773E-02	1.71049E-01	.72090016	.16913422	.12284706	.05724650	.31838300	.4285	.5036
13	.0411726	9.12499E-02	1.70580E-01	.73063028	.16398810	.12249402	.05600144	.31746545	.4761	.5006
14	.0418858	9.10225E-02	1.70111E-01	.74036040	.15884198	.12214108	.05475638	.31654790	.5237	.4976
15	.0425990	9.07951E-02	1.69642E-01	.75009052	.15369586	.12178804	.05351132	.31563035	.5713	.4946
16	.0433122	9.05677E-02	1.69173E-01	.75982064	.14854974	.12143500	.05226626	.31471280	.6189	.4916
17	.0440254	9.03403E-02	1.68704E-01	.76955076	.14340362	.12108196	.05102120	.31379525	.6665	.4886
18	.0447386	9.01129E-02	1.68235E-01	.77928088	.13825750	.12072892	.04977614	.31287770	.7141	.4856
19	.0454518	8.98855E-02	1.67766E-01	.78901100	.13311138	.12037588	.04853108	.31196015	.7617	.4826
20	.0461650	8.96581E-02	1.67297E-01	.79874112	.12796526	.12002284	.04728602	.31104260	.8093	.4796
21	.0468782	8.94307E-02	1.66828E-01	.80847124	.12281914	.11966980	.04604096	.31012505	.8569	.4766
22	.0475914	8.92033E-02	1.66359E-01	.81820136	.11767302	.11931676	.04479590	.30920750	.9045	.4736
23	.0483046	8.89759E-02	1.65890E-01	.82793148	.11252690	.11896372	.04355084	.30829005	.9521	.4706
24	.0490178	8.87485E-02	1.65421E-01	.83766160	.10738078	.11861068	.04230578	.30737250	1.0000	.4676

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
24	.05488320	8.73546E-02	1.71005E-01	.67798230	.13132504	.11049782	.03470967	.31963460	1.0000	.5108
K-11 PHI = 80.0 Z = .10000										
3	.03404056	8.57628E-02	1.64752E-01	.64360326	.21874513	.13459183	.06846347	.32266214	0.0000	.5206
4	.03582333	8.63142E-02	1.67447E-01	.64836649	.21800273	.13082636	.05216612	.32108387	.0476	.5155
5	.03612405	8.67335E-02	1.68735E-01	.65104683	.20500039	.13376712	.04628744	.32663213	.0952	.5140
6	.03716886	8.70424E-02	1.69582E-01	.65376695	.20405190	.13354284	.04344422	.32028841	.1429	.5129
7	.03823273	8.72544E-02	1.70112E-01	.65646598	.19940449	.13340931	.04089164	.32028856	.1905	.5125
8	.03928490	8.73775E-02	1.70447E-01	.65764114	.19450563	.13340363	.03913181	.32011550	.2281	.5125
9	.04025117	8.74007E-02	1.70755E-01	.65855770	.19061229	.13340351	.03733209	.31999151	.2657	.5120
10	.04123471	8.73974E-02	1.70948E-01	.66136603	.18656116	.13340351	.03526574	.31983214	.3333	.5115
11	.04237471	8.72941E-02	1.70536E-01	.66333696	.18163798	.13340351	.03314001	.31965482	.3810	.5109
12	.04341648	8.71961E-02	1.70174E-01	.66449404	.17680125	.13340351	.03147885	.31948376	.4266	.5103
13	.04445825	8.70971E-02	1.70005E-01	.66484104	.17240462	.13340351	.03031894	.31925742	.4762	.5096
14	.04550001	8.69974E-02	1.70312E-01	.66315319	.16800273	.13340351	.02949746	.31897549	.5238	.5089
15	.04654178	8.68977E-02	1.69937E-01	.66146534	.16360085	.13340351	.02882845	.31872949	.5714	.5081
16	.04758355	8.67980E-02	1.69562E-01	.66007756	.16090565	.13340351	.02828245	.31851535	.6190	.5073
17	.04862532	8.66983E-02	1.69187E-01	.65889171	.15940976	.13340351	.02784947	.31832568	.6667	.5064
18	.04966709	8.65986E-02	1.68812E-01	.65790587	.15840976	.13340351	.02742649	.31815455	.7143	.5055
19	.05070886	8.64989E-02	1.68437E-01	.65712229	.15840976	.13340351	.02701351	.31799915	.7619	.5045
20	.05175063	8.63992E-02	1.68062E-01	.65653870	.15840976	.13340351	.02661053	.31785067	.8095	.5035
21	.05279240	8.62995E-02	1.67687E-01	.65615511	.14930010	.13340351	.02621755	.31771186	.8571	.5025
22	.05383417	8.61998E-02	1.67312E-01	.65597152	.14590450	.13340351	.02582457	.31758309	.9048	.5015
23	.05487594	8.61001E-02	1.66937E-01	.65598793	.14271044	.13340351	.02543159	.31745432	.9524	.4998
24	.05591770	8.60004E-02	1.66562E-01	.65610434	.13971731	.13340351	.02503861	.31732555	1.0000	.4985
K-12 PHI = 90.0 Z = .10000										
3	.03404056	7.84464E-02	1.54596E-01	.65035462	.22130373	.14341825	.06846347	.31857806	0.0000	.5075
4	.03513781	7.90533E-02	1.57131E-01	.65746127	.21730474	.14341825	.04813115	.31662132	.0476	.5012
5	.03623506	7.95602E-02	1.59766E-01	.66560243	.21430690	.14341825	.04112604	.31610389	.0952	.4996
6	.03733231	7.99671E-02	1.62401E-01	.67474359	.20710789	.13979302	.03733232	.31593389	.1429	.4991
7	.03842957	8.01640E-02	1.64946E-01	.68488475	.20190888	.13797836	.03542942	.31578252	.1905	.4986
8	.03952682	8.03609E-02	1.67491E-01	.69502591	.19770987	.13617361	.03352659	.31564898	.2381	.4982
9	.04062407	8.04578E-02	1.69936E-01	.70516707	.19447719	.13447112	.03162376	.31553597	.2857	.4975
10	.04172132	8.05547E-02	1.72381E-01	.71530823	.19124451	.13282787	.02972093	.31542068	.3333	.4974
11	.04281857	8.06516E-02	1.74826E-01	.72544939	.18801184	.13119743	.02781812	.31530539	.3810	.4964
12	.04391582	8.07485E-02	1.77271E-01	.73559055	.18477913	.12956918	.02591527	.31519010	.4286	.4959
13	.04501307	8.08454E-02	1.79716E-01	.74573171	.18154642	.12802186	.02401242	.31492572	.4762	.4959
14	.04611032	8.09423E-02	1.82161E-01	.75587287	.17831370	.12647454	.02210957	.31473419	.5238	.4953
15	.04720757	8.10392E-02	1.84606E-01	.76601403	.17510102	.12492722	.02020672	.31452746	.5714	.4946
16	.04830482	8.11361E-02	1.87091E-01	.77615519	.17188834	.12342990	.01830387	.31430218	.6190	.4939
17	.04940207	8.12330E-02	1.89576E-01	.78629635	.16867567	.12193258	.01640102	.31405939	.6667	.4932
18	.05049932	8.13300E-02	1.92061E-01	.79643751	.16546300	.12043526	.01450817	.31379832	.7143	.4923
19	.05159657	8.14269E-02	1.94546E-01	.80657867	.16225033	.11893794	.01260532	.31351461	.7619	.4915
20	.05269382	8.15238E-02	1.97031E-01	.81671983	.15903765	.11744062	.01070247	.31321630	.8095	.4905
21	.05379107	8.16207E-02	1.99516E-01	.82686099	.15613496	.11594330	.00880962	.31291402	.8571	.4895
22	.05488832	8.17176E-02	2.01991E-01	.83700215	.15323227	.11444597	.00691677	.31259828	.9048	.4884
23	.05598557	8.18145E-02	2.04466E-01	.84714331	.15032958	.11294864	.00502392	.31225466	.9524	.4872
24	.05708282	8.19114E-02	2.06941E-01	.85728447	.14742689	.11145131	.00313107	.31189788	1.0000	.4860
K-13 PHI = 100.0 Z = .10000										
3	.03404056	7.18511E-02	1.45187E-01	.65836716	.22411804	.14632776	.06846347	.31450630	0.0000	.4949
4	.03519782	7.24832E-02	1.48702E-01	.66851868	.22096627	.14641768	.04133249	.312222875	.0476	.4874
5	.03635508	7.27932E-02	1.50333E-01	.67867020	.21691112	.14411690	.03433900	.31161835	.0952	.4855
6	.03751234	7.33953E-02	1.51964E-01	.68882172	.21285592	.14181612	.02734451	.31101383	.1429	.4831
7	.03866960	7.37053E-02	1.53595E-01	.69897324	.20880074	.13951534	.02035002	.31040931	.1905	.4805
8	.03982686	7.40153E-02	1.55226E-01	.70912476	.20474556	.13721456	.01335553	.30980479	.2381	.4785
9	.04098412	7.43253E-02	1.56857E-01	.71927628	.20069038	.13491378	.00636104	.30920027	.2857	.4763

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
23	.05919246	6.07128E-02	1.34445E-01	.71197866	.17299799	.16411510	.00821371	.30083058	.9524	.4519
24	.06108007	6.05041E-02	1.33757E-01	.71344722	.17052168	.10521019	.00366180	.30028195	1.0000	.4508
K=16 PHI =130.0 Z = .100000										
J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.03404056	5.82509E-02	1.24978E-01	.68162203	.23202130	.12433721	.06846347	.30521542	0.0000	.4661
4	.03539391	5.87659E-02	1.29351E-01	.69041271	.23653968	.12511565	.02850202	.30130276	.0476	.4519
5	.03674727	5.90918E-02	1.30363E-01	.69423774	.23748621	.12574368	.01751469	.30040314	.0952	.4512
6	.03810063	5.93910E-02	1.31689E-01	.69576094	.23840636	.12631272	.01450353	.30031367	.1429	.4509
7	.03945398	5.96609E-02	1.32843E-01	.69754428	.23934919	.12684075	.01230376	.30023576	.1905	.4507
8	.04080734	5.97589E-02	1.32671E-01	.69871514	.24074746	.12722261	.01076509	.30018231	.2381	.4505
9	.04216070	5.98524E-02	1.32606E-01	.70028423	.24166703	.12741018	.00732334	.30015913	.2857	.4505
10	.04351406	5.99292E-02	1.32601E-01	.70166368	.24219547	.12747442	.00678571	.30013979	.3333	.4503
11	.04486741	5.99934E-02	1.32604E-01	.70308092	.24263447	.12741054	.00625054	.30011348	.3810	.4501
12	.04622077	5.98534E-02	1.32624E-01	.70453719	.24298413	.12723407	.00571503	.29993355	.4286	.4498
13	.04757413	5.97447E-02	1.32591E-01	.70593400	.24324160	.12698262	.00518159	.29969309	.4762	.4495
14	.04892748	5.96135E-02	1.32474E-01	.70727152	.24340420	.12665179	.00464917	.29939739	.5238	.4491
15	.05028084	5.94784E-02	1.32345E-01	.70854408	.24348167	.12624416	.00412101	.29904655	.5714	.4486
16	.05163420	5.92794E-02	1.32195E-01	.70975237	.24348233	.12576320	.00360464	.29865088	.6190	.4482
17	.05298755	5.89931E-02	1.31828E-01	.71091553	.24340971	.12521310	.00310164	.29821706	.6667	.4475
18	.05434091	5.87159E-02	1.31404E-01	.71194436	.24326333	.12459189	.00261297	.29775040	.7143	.4469
19	.05569427	5.83937E-02	1.30870E-01	.71293836	.24304576	.12391055	.00214705	.29726957	.7619	.4461
20	.05704763	5.80435E-02	1.30263E-01	.71379229	.24275457	.12316424	.00171482	.29674249	.8095	.4453
21	.05840098	5.76257E-02	1.29591E-01	.71451022	.24240154	.12234581	.00130251	.29618012	.8571	.4443
22	.05975434	5.72094E-02	1.28936E-01	.71509173	.24199739	.12146734	.00090824	.29559424	.9048	.4434
23	.06110770	5.66388E-02	1.28126E-01	.71554447	.24155285	.12053917	.00053491	.29497716	.9524	.4424
24	.06246105	5.61478E-02	1.27149E-01	.72049346	.24105015	.11950415	.00018650	.29435823	1.0000	.4409
K=17 PHI =140.0 Z = .100000										
J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.03404056	5.58591E-02	1.21250E-01	.68807753	.23432478	.10560774	.06846347	.30349137	0.0000	.4605
4	.03545605	5.61811E-02	1.25779E-01	.69826040	.23311711	.10730523	.03335614	.29888749	.0476	.4467
5	.03687150	5.64671E-02	1.27192E-01	.70114914	.23263160	.10790933	.01218709	.29797744	.0952	.4440
6	.03828689	5.66711E-02	1.27350E-01	.70374723	.23178155	.10752023	.01019486	.29785509	.1429	.4436
7	.03970234	5.68032E-02	1.28104E-01	.70411843	.23066973	.10715610	.00744954	.29780192	.1905	.4434
8	.04111792	5.68352E-02	1.28366E-01	.70548291	.23118116	.10693517	.00740083	.29772391	.2381	.4432
9	.04253339	5.69201E-02	1.28459E-01	.70686694	.23150042	.10672940	.00670885	.29769263	.2857	.4431
10	.04394887	5.69591E-02	1.28401E-01	.70826295	.23163349	.10658604	.00611749	.29760612	.3333	.4428
11	.04536434	5.68510E-02	1.28191E-01	.70967163	.23174198	.10650357	.00558165	.29753046	.3810	.4426
12	.04677981	5.67224E-02	1.28133E-01	.71105625	.23172428	.10643257	.00513870	.29741369	.4286	.4423
13	.04819529	5.66224E-02	1.28133E-01	.71147866	.23168292	.10637633	.00471454	.29728949	.4762	.4419
14	.04961076	5.65313E-02	1.27883E-01	.71284310	.23155178	.10632077	.00431124	.29713399	.5238	.4414
15	.05102623	5.64313E-02	1.27574E-01	.71332629	.23137150	.10627168	.00391851	.29696122	.5714	.4409
16	.05244171	5.63155E-02	1.27214E-01	.71381949	.23114134	.10622810	.00352486	.29676284	.6190	.4403
17	.05385718	5.61917E-02	1.26775E-01	.71432271	.23085120	.10618981	.00314085	.29653800	.6667	.4397
18	.05527265	5.59461E-02	1.26330E-01	.71483671	.23051408	.10615705	.00275604	.29629354	.7143	.4389
19	.05668813	5.56861E-02	1.25736E-01	.71536046	.23013194	.10612926	.00237166	.29602995	.7619	.4381
20	.05810360	5.47149E-02	1.25141E-01	.72041519	.22961144	.10610718	.00200323	.29571153	.8095	.4372
21	.05951907	5.42582E-02	1.24404E-01	.72094234	.22915616	.10608991	.00164991	.29534488	.8571	.4362
22	.06093455	5.38028E-02	1.23676E-01	.72146950	.22867634	.10607264	.00130631	.29498700	.9048	.4351
23	.06235002	5.33514E-02	1.22866E-01	.72199665	.22819751	.10605537	.00096282	.29464920	.9524	.4336
24	.06376549	5.26544E-02	1.21788E-01	.72655191	.22754757	.10603812	.00061931	.29430630	1.0000	.4323
K=18 PHI =150.0 Z = .100000										
J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	.03404056	5.4326E-02	1.18914E-01	.69337093	.23602644	.081378a3	.06846347	.30229318	0.0000	.4569
4	.03551087	5.45156E-02	1.23594E-01	.70417461	.23634025	.081378a3	.01801550	.29703817	.0476	.4412
5	.03698119	5.46852E-02	1.24634E-01	.70685088	.23565500	.081378a3	.00916410	.29623206	.0952	.4384
6	.03845150	5.47940E-02	1.24794E-01	.70952715	.23497955	.081378a3	.00711910	.29609758	.1429	.4366
7	.03992182	5.48386E-02	1.25150E-01	.71220342	.23431460	.081378a3	.00617679	.29603466	.1905	.4382
8	.04139213	5.48531E-02	1.25262E-01	.71487970	.23365067	.081378a3	.00523426	.29594178	.2381	.4379

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
9	04286295	5.48124E-02	1.25224E-01	71182446	22275318	07126700	00486900	29587622	2657	4377
10	04435276	5.47421E-02	1.25156E-01	71360104	22025471	07571945	00413801	29576773	3333	4374
11	04569307	5.46332E-02	1.24995E-01	71414184	21776759	07435051	00352048	29566590	3810	4371
12	04727339	5.44875E-02	1.24782E-01	71527786	21537888	07327048	00385633	29551782	4286	4367
13	04874570	5.43106E-02	1.24568E-01	71602430	21303216	07187059	00368237	29536360	4762	4362
14	05021402	5.41271E-02	1.24348E-01	71675710	21082038	07046618	00351815	29521826	5238	4357
15	05168433	5.39374E-02	1.24128E-01	71748055	20863635	06906277	00335407	29507240	5714	4351
16	05315465	5.37525E-02	1.23911E-01	72035218	20640093	06765832	00319018	29492692	6190	4346
17	05462496	5.35694E-02	1.23697E-01	72120736	20417650	06625381	00302614	29478172	6667	4341
18	05609528	5.33882E-02	1.23486E-01	72206242	20195207	06484924	00286215	29463682	7143	4336
19	05756559	5.32087E-02	1.23278E-01	72291744	19972764	06344465	00269757	29449217	7619	4331
20	05903591	5.30309E-02	1.23073E-01	72377244	19750321	06204006	00253300	29434769	8095	4326
21	06050622	5.28546E-02	1.22870E-01	72462744	19527878	06063547	00236842	29420321	8571	4321
22	06197654	5.26794E-02	1.22669E-01	72548244	19305435	05923088	00220384	29405872	9048	4316
23	06344685	5.25052E-02	1.22469E-01	73057767	18918990	05782629	00203926	29391424	9524	4299
24	06491717	4.98977E-02	1.17296E-01	73335820	18537552	05642166	00187468	29168485	1.0000	4254

K=19 PHI=160.0 Z=.100000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	03404056	5.34476E-02	1.17527E-01	69714530	23731152	05366352	06861637	30158487	0.0000	4548
4	03555365	5.35250E-02	1.12434E-01	70905540	23498240	05187370	01272592	29570505	0476	4372
5	03706674	5.35735E-02	1.23041E-01	71111533	23458465	05218611	00654500	29508123	1052	4364
6	03857983	5.35972E-02	1.23181E-01	71222874	23362549	05250049	00518933	29498253	1429	4351
7	04009292	5.36266E-02	1.23321E-01	71334212	23266633	05281488	00383400	29487282	1905	4347
8	04160601	5.36575E-02	1.23461E-01	71445549	23170719	05312927	00257852	29476311	2381	4343
9	04311911	5.36892E-02	1.23601E-01	71556887	23074803	05344366	00132284	29465340	2857	4341
10	04463220	5.37216E-02	1.23741E-01	71668224	22978887	05375805	00016712	29454369	3333	4338
11	04614529	5.37549E-02	1.23881E-01	71779562	22882971	05407244	00001052	29443398	3810	4336
12	04765839	5.37891E-02	1.24021E-01	71890900	22787055	05438683	00000000	29432427	4286	4332
13	04917148	5.38240E-02	1.24161E-01	72002238	22691139	05470122	00000000	29421456	4762	4328
14	05068457	5.38596E-02	1.24301E-01	72113576	22595223	05501561	00000000	29410485	5238	4323
15	05219766	5.38959E-02	1.24441E-01	72224914	22500307	05533000	00000000	29399514	5714	4318
16	05371075	5.39329E-02	1.24581E-01	72336252	22405391	05564439	00000000	29388543	6190	4313
17	05522384	5.39706E-02	1.24721E-01	72447590	22310475	05595878	00000000	29377572	6667	4308
18	05673693	5.40089E-02	1.24861E-01	72558928	22215559	05627317	00000000	29366601	7143	4304
19	05825002	5.40476E-02	1.25001E-01	72670266	22120643	05658756	00000000	29355630	7619	4299
20	05976311	5.40869E-02	1.25141E-01	72781604	22025727	05690195	00000000	29344659	8095	4294
21	06127620	5.41266E-02	1.25281E-01	72892942	21930811	05721634	00000000	29333688	8571	4289
22	06278929	5.41669E-02	1.25421E-01	73004280	21835895	05753073	00000000	29322717	9048	4284
23	06430238	4.85646E-02	1.15108E-01	73458455	19120372	05612612	00184183	29049410	9524	4258
24	06581549	4.79135E-02	1.14001E-01	73659594	18819918	05472151	00180464	28992713	1.0000	4203

K=20 PHI=170.0 Z=.100000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	03404056	5.30018E-02	1.16825E-01	69258885	23905035	02642456	06861637	30122418	0.0000	4537
4	03556110	5.30866E-02	1.21974E-01	71216010	23587852	02941182	00653642	29492365	0476	4349
5	03707215	5.31934E-02	1.22193E-01	71374653	23472077	03016789	00528095	29449038	0952	4336
6	03858274	5.32913E-02	1.22412E-01	71533296	23356302	03082460	00444294	29436859	1429	4329
7	04009433	5.33892E-02	1.22631E-01	71691939	23240527	03148131	00376999	29424690	1905	4322
8	04160592	5.34871E-02	1.22850E-01	71850582	23124752	03213782	00310566	29412521	2381	4315
9	04311751	5.35850E-02	1.23069E-01	72009225	23008977	03279525	00242123	29400352	2857	4308
10	04462910	5.36829E-02	1.23288E-01	72167868	22893202	03345268	00170673	29388183	3333	4301
11	04614069	5.37808E-02	1.23507E-01	72326511	22777427	03411011	00108820	29376014	3810	4294
12	04765228	5.38787E-02	1.23726E-01	72485154	22661652	03476754	00047172	29363845	4286	4286
13	04916387	5.39766E-02	1.23945E-01	72643797	22545877	03542497	00000000	29351676	4762	4300
14	05067546	5.40745E-02	1.24164E-01	72802440	22430102	03608240	00000000	29339507	5238	4293
15	05218705	5.41724E-02	1.24383E-01	72961083	22314327	03673983	00000000	29327338	5714	4286
16	05369864	5.42703E-02	1.24602E-01	73119726	22198552	03739726	00000000	29315169	6190	4278
17	05521023	5.43682E-02	1.24821E-01	73278369	22082777	03805469	00000000	29303000	6667	4269
18	05672182	5.44661E-02	1.25040E-01	73437012	21967002	03871212	00000000	29290831	7143	4259
19	05823341	5.45640E-02	1.25259E-01	73595655	21851227	03936955	00000000	29278662	7619	4254
20	06177039	4.87555E-02	1.15441E-01	73309586	19524008	05626438	00163562	29110119	8095	4237

J	R	P	RHO	U	V	W	(S-SINF)/CY	A	T	H/HT
22	.06331093	4.82052E-02	1.14516E-01	.73479557	.19657570	.02328817	.00156734	.29015406	.9048	.4209
23	.06485148	4.74366E-02	1.13213E-01	.73702228	.19313920	.02217144	.00151921	.28948365	.9524	.4190
24	.06639203	4.67370E-02	1.12023E-01	.73906799	.18976996	.02193724	.00145106	.28886283	1.0000	.4172
K=21 PHI =180.0 Z = .100000										
3	.03404056	5.28402E-02	1.16572E-01	.69995947	.23826945	0.00096700	.06846347	.30109281	0.0000	.4533
4	.03588996	5.28874E-02	1.21809E-01	.71319961	.23705515	0.00096700	.00787640	.29463527	.0476	.4342
5	.03713936	5.27904E-02	1.21879E-01	.71461269	.23704179	0.00096700	.00519157	.29432587	.0952	.4331
6	.03868876	5.27257E-02	1.21849E-01	.71573087	.23704179	0.00096700	.00444770	.29417212	.1429	.4327
7	.04023816	5.26294E-02	1.21743E-01	.71673656	.23337450	0.00096700	.00368094	.29403772	.1905	.4323
8	.04178757	5.24923E-02	1.21535E-01	.71774019	.23011639	0.00096700	.00343423	.29390313	.2381	.4319
9	.04333697	5.23578E-02	1.21374E-01	.71873714	.22744497	0.00096700	.00323683	.29376985	.2857	.4315
10	.04488637	5.21892E-02	1.21234E-01	.71971062	.22563370	0.00096700	.00306841	.29360564	.3333	.4310
11	.04643577	5.19756E-02	1.20738E-01	.72084068	.22340066	0.00096700	.00279933	.29342149	.3810	.4305
12	.04798517	5.17481E-02	1.20374E-01	.72193598	.22115961	0.00096700	.00253942	.29321656	.4266	.4299
13	.04953458	5.15035E-02	1.19988E-01	.72306109	.21893707	0.00096700	.00227568	.29299377	.4762	.4292
14	.05108398	5.12876E-02	1.19581E-01	.72421328	.21677353	0.00096700	.00222668	.29275394	.5238	.4285
15	.05263338	5.09262E-02	1.19064E-01	.72540428	.21454633	0.00096700	.00207461	.29249211	.5714	.4278
16	.05418278	5.05954E-02	1.18517E-01	.72663221	.21229118	0.00096700	.00196328	.29221160	.6190	.4269
17	.05573218	5.03354E-02	1.17917E-01	.72791133	.20998170	0.00096700	.00184960	.29189450	.6667	.4260
18	.05728159	4.98519E-02	1.17281E-01	.72925466	.20764633	0.00096700	.00175755	.29156956	.7143	.4251
19	.05883099	4.94053E-02	1.16537E-01	.73071873	.20528970	0.00096700	.00167327	.29118618	.7619	.4239
20	.06048059	4.89518E-02	1.15782E-01	.73240692	.20294014	0.00096700	.00159430	.29079467	.8095	.4228
21	.06192979	4.83873E-02	1.14829E-01	.73554410	.19959527	0.00096700	.00152962	.29030535	.8571	.4214
22	.06347019	4.78273E-02	1.13487E-01	.73961219	.19723066	0.00096700	.00145788	.28981889	.9048	.4200
23	.06502060	4.70485E-02	1.12559E-01	.73788403	.19374783	0.00096700	.00140976	.28913282	.9524	.4180
24	.06657800	4.63281E-02	1.11331E-01	.73998590	.19050454	0.00096700	.00133608	.28848878	1.0000	.4161

X/L - SURFACE FLOW VARIABLES AT Z = .100000
 .0010000 DZDT= 1.199208 ITER= 500

PHI	RB	CP	P/PINF	R/RINF	M-Z	M-R	M PHI	A	COMP	H/HT	TEMP	(S-S.INF)/CV
0.0	.0340	.5074	3.8655E+00	2.5015E+00	1.7784	.6554	0.0090	3.4241E-01	1.0000	.58622	.00	6.8463E-02
10.0	.0340	.4954	3.8363E+00	2.4814E+00	1.7820	.6066	.0416	3.4205E-01	1.0000	.58498	.00	6.8463E-02
20.0	.0340	.4809	3.7531E+00	2.4495E+00	1.7924	.6102	.1227	3.4209E-01	1.0000	.58133	.00	6.8463E-02
30.0	.0340	.4576	3.6304E+00	2.3871E+00	1.8103	.6162	.1823	3.323E-01	1.0000	.57537	.00	6.8463E-02
40.0	.0340	.4272	3.4460E+00	2.3044E+00	1.8347	.6245	.2395	3.3684E-01	1.0000	.56731	.00	6.8463E-02
50.0	.0340	.3913	3.2403E+00	2.2055E+00	1.8658	.6350	.2936	3.3889E-01	1.0000	.55742	.00	6.8463E-02
60.0	.0340	.3519	3.0147E+00	2.0944E+00	1.9023	.6476	.3451	3.3846E-01	1.0000	.54605	.00	6.8463E-02
70.0	.0340	.3110	2.7727E+00	1.9711E+00	1.9443	.6620	.3910	3.2654E-01	1.0000	.53360	.00	6.8463E-02
80.0	.0340	.2707	2.5151E+00	1.8361E+00	1.9918	.6779	.4333	3.2264E-01	1.0000	.52055	.00	6.8463E-02
90.0	.0340	.2327	2.2407E+00	1.7004E+00	2.0414	.6949	.4702	3.1935E-01	1.0000	.50746	.00	6.8463E-02
100.0	.0340	.1985	1.9501E+00	1.5745E+00	2.0927	.7224	.4951	3.1461E-01	1.0000	.49489	.00	6.8463E-02
110.0	.0340	.1692	1.6503E+00	1.4649E+00	2.1454	.7566	.4943	3.1023E-01	1.0000	.48346	.00	6.8463E-02
120.0	.0340	.1456	1.3385E+00	1.4649E+00	2.1907	.7947	.4643	3.0723E-01	1.0000	.47375	.00	6.8463E-02
130.0	.0340	.1279	1.1321E+00	1.4034E+00	2.2325	.7600	.4073	3.0533E-01	1.0000	.46609	.00	6.8463E-02
140.0	.0340	.1154	1.0608E+00	1.3642E+00	2.2672	.7218	.3480	3.0342E-01	1.0000	.46054	.00	6.8463E-02
150.0	.0340	.1075	1.0154E+00	1.3414E+00	2.2937	.7658	.2892	3.0222E-01	1.0000	.45691	.00	6.8463E-02
160.0	.0340	.1026	1.0000E+00	1.3258E+00	2.3116	.7869	.1787	3.0158E-01	1.0000	.45477	.00	6.8463E-02
170.0	.0340	.1026	1.5766E+00	1.3179E+00	2.3214	.7502	.0477	3.0123E-01	1.0000	.45368	.00	6.8463E-02
180.0	.0340	.0975	1.5713E+00	1.3150E+00	2.3247	.7913	0.0000	3.0109E-01	1.0000	.45328	.00	6.8463E-02

BODY RND SHOCK CEOMETRY AT Z = .100

PHI	RB	DBD/CZ	DBB/DPHI	RS	DBS/DPHI
0.0	.0340	.3404	0.0000	.0515	0.0000
10.0	.0340	.3404	0.0000	.0516	.0008
20.0	.0340	.3404	0.0000	.0519	.0016
30.0	.0340	.3404	0.0000	.0521	.0024
40.0	.0340	.3404	0.0000	.0526	.0022
50.0	.0340	.3404	0.0000	.0522	.0040
60.0	.0340	.3404	0.0000	.0547	.0044
70.0	.0340	.3404	0.0000	.0549	.0044
80.0	.0340	.3404	0.0000	.0559	.0044
90.0	.0340	.3404	0.0000	.0571	.0070
100.0	.0340	.3404	0.0000	.0563	.0075
110.0	.0340	.3404	0.0000	.0597	.0078
120.0	.0340	.3404	0.0000	.0611	.0078
130.0	.0340	.3404	0.0000	.0635	.0077
140.0	.0340	.3404	0.0000	.0638	.0077
150.0	.0340	.3404	0.0000	.0649	.0079
160.0	.0340	.3404	0.0000	.0658	.0079
170.0	.0340	.3404	0.0000	.0654	.0079
180.0	.0340	.3404	0.0000	.0666	.0079

FLOW FIELD DATA IS STORED ON DISK1

MACH = 2.860000
 ALPHA = 10.000000
 GAMMA = 1.400
 SIGMA = 9.34

Z-INITIAL = .10
 Z-FINAL = 33.80
 PHI-ZERO = 90.00

NIT = 20
 NIPHI = 18
 METHCO ORDER = 2
 NITER = 9999
 NPRINT = 0
 IPRINT = 1
 NCOPIE = 2
 NUPRINT = 0
 NREAL = 0

DZ/DI = 1.199 INITIALLY
 DELTA-X = .150
 DELTA-Y = .400

DISK1 = 1
 DISK2 = 3
 TAPE1 = 1
 TAPE2 = 1

PERCENT OF MAX. STEP SIZE = .90
 METHCO = 2
 BETA COMO = -1
 BETA = 0.000
 OMEGA = 0.000

PINF = .336308E-01 RHOIN = .880401E-01 QINF = .787790E+00
 GASCON = 1.7160E+03

K = 3	PHI = 0.000000	UINF = .775830	VINF = -.116830	WINF = 0.000000
K = 4	PHI = 10.000000	UINF = .775830	VINF = -.134721	WINF = .023755
K = 5	PHI = 20.000000	UINF = .775830	VINF = -.128550	WINF = .046788
K = 6	PHI = 30.000000	UINF = .775830	VINF = -.118172	WINF = .068100
K = 7	PHI = 40.000000	UINF = .775830	VINF = -.112675	WINF = .087533
K = 8	PHI = 50.000000	UINF = .775830	VINF = -.097913	WINF = 104795
K = 9	PHI = 60.000000	UINF = .775830	VINF = -.068400	WINF = 118172
K = 10	PHI = 70.000000	UINF = .775830	VINF = -.046788	WINF = 128550
K = 11	PHI = 80.000000	UINF = .775830	VINF = -.023755	WINF = 134721
K = 12	PHI = 90.000000	UINF = .775830	VINF = -.000000	WINF = 136500
K = 13	PHI = 100.000000	UINF = .775830	VINF = .023755	WINF = 134721
K = 14	PHI = 110.000000	UINF = .775830	VINF = .046788	WINF = 128550
K = 15	PHI = 120.000000	UINF = .775830	VINF = .068100	WINF = 118172
K = 16	PHI = 130.000000	UINF = .775830	VINF = .087533	WINF = 104795
K = 17	PHI = 140.000000	UINF = .775830	VINF = .104795	WINF = 687933
K = 18	PHI = 150.000000	UINF = .775830	VINF = 118172	WINF = 848100
K = 19	PHI = 160.000000	UINF = .775830	VINF = 128550	WINF = 946788
K = 20	PHI = 170.000000	UINF = .775830	VINF = 134721	WINF = 1023755
K = 21	PHI = 180.000000	UINF = .775830	VINF = 136500	WINF = 1000000

RAOIAL MESH DESCRIPTION

J= 3	TRU= 0.	XA = 0.	TXI =	TXI =	TXI = C.
J= 4	TRU= .4762E-01	XI = .4762E-01	TXI =	TXI = .1000E+01	TXI = 0.
J= 5	TRU= .9524E-01	XI = .9524E-01	TXI =	TXI = .1000E+01	TXI = 0.
J= 6	TRU= .1429E+00	XI = .1429E+00	TXI =	TXI = .1000E+01	TXI = 0.
J= 7	TRU= .1905E+00	XI = .1905E+00	TXI =	TXI = .1000E+01	TXI = 0.
J= 8	TRU= .2381E+00	XI = .2381E+00	TXI =	TXI = .1000E+01	TXI = 0.
J= 9	TRU= .2857E+00	XI = .2857E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=10	TRU= .3333E+00	XI = .3333E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=11	TRU= .3810E+00	XI = .3810E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=12	TRU= .4286E+00	XI = .4286E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=13	TRU= .4762E+00	XI = .4762E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=14	TRU= .5238E+00	XI = .5238E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=15	TRU= .5714E+00	XI = .5714E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=16	TRU= .6190E+00	XI = .6190E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=17	TRU= .6667E+00	XI = .6667E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=18	TRU= .7143E+00	XI = .7143E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=19	TRU= .7619E+00	XI = .7619E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=20	TRU= .8095E+00	XI = .8095E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=21	TRU= .8571E+00	XI = .8571E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=22	TRU= .9048E+00	XI = .9048E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=23	TRU= .9524E+00	XI = .9524E+00	TXI =	TXI = .1000E+01	TXI = 0.
J=24	TRU= .1000E+01	XI = .1000E+01	TXI =	TXI = .1000E+01	TXI = 0.

PERIDIARIAL MESH DESCRIPTION

K	R	P	RHO	U	V	Z	M	(S-SINF)/CY	A	T	H/HT
K=2	ETA=	-.1745E+00	PHI=	-.1745E+00	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=3	ETA=	0.	PHI=	0.	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=4	ETA=	.1745E+00	PHI=	.1745E+00	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=5	ETA=	.3491E+00	PHI=	.3491E+00	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=6	ETA=	.5236E+00	PHI=	.5236E+00	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=7	ETA=	.6981E+00	PHI=	.6981E+00	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=8	ETA=	.8727E+00	PHI=	.8727E+00	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=9	ETA=	1.047E+01	PHI=	1.047E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=10	ETA=	1.222E+01	PHI=	1.222E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=11	ETA=	1.397E+01	PHI=	1.397E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=12	ETA=	1.571E+01	PHI=	1.571E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=13	ETA=	1.745E+01	PHI=	1.745E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=14	ETA=	1.920E+01	PHI=	1.920E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=15	ETA=	2.094E+01	PHI=	2.094E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=16	ETA=	2.268E+01	PHI=	2.268E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=17	ETA=	2.443E+01	PHI=	2.443E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=18	ETA=	2.618E+01	PHI=	2.618E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=19	ETA=	2.793E+01	PHI=	2.793E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=20	ETA=	2.967E+01	PHI=	2.967E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=21	ETA=	3.142E+01	PHI=	3.142E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	
K=22	ETA=	3.316E+01	PHI=	3.316E+01	DTIL=	.1000E+01	DTIL=	0.	DTIL=	0.	

FLOW FIELD DATA WAS READ FROM DISK1

J	R	P	RHO	U	V	Z	M	(S-SINF)/CY	A	T	H/HT
3	.03404047	1.29982E-01	2.21729E-01	.60894191	.20728665	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
4	.03487203	1.28931E-01	2.21667E-01	.61135050	.20920283	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
5	.03570360	1.27935E-01	2.21625E-01	.61370994	.19154126	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
6	.03653517	1.26941E-01	2.21604E-01	.61604464	.18117663	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
7	.03736674	1.25947E-01	2.20533E-01	.61827195	.18100950	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
8	.03819831	1.24953E-01	2.19945E-01	.62049809	.17584594	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
9	.03902987	1.23959E-01	2.19127E-01	.62262424	.16510216	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
10	.03986144	1.22965E-01	2.18184E-01	.62475039	.15434838	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
11	.04069301	1.21971E-01	2.17190E-01	.62687654	.14359460	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
12	.04152458	1.20977E-01	2.16196E-01	.62900269	.13284082	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
13	.04235614	1.20000E-01	2.15202E-01	.63112884	.12208704	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
14	.04318771	1.19043E-01	2.14208E-01	.63321686	.11133326	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
15	.04401928	1.18086E-01	2.13214E-01	.63530488	.10057948	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
16	.04485085	1.17129E-01	2.12220E-01	.63739290	.09082570	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
17	.04568242	1.16172E-01	2.11226E-01	.63948092	.08107192	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
18	.04651398	1.15215E-01	2.10232E-01	.64156894	.07131814	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
19	.04734555	1.14258E-01	2.09238E-01	.64365696	.06156436	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
20	.04817712	1.13301E-01	2.08244E-01	.64574498	.05181058	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
21	.04900869	1.12344E-01	2.07250E-01	.64783300	.04205680	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
22	.04984025	1.11387E-01	2.06256E-01	.65013366	.03230302	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
23	.05067182	1.10430E-01	2.05262E-01	.65243432	.02254924	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
24	.05150339	1.11961E-01	1.99308E-01	.65473498	.01279546	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862

K=3 PHI = 0.0 Z = .100000

K=4 PHI = 10.0 Z = .100000

J	R	P	RHO	U	V	Z	M	(S-SINF)/CY	A	T	H/HT
3	.03404047	1.29025E-01	2.20501E-01	.60952474	.20748505	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
4	.03487203	1.28070E-01	2.20490E-01	.61191333	.20934379	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
5	.03570360	1.27065E-01	2.20287E-01	.61430192	.19174119	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
6	.03653517	1.26060E-01	2.19930E-01	.61669051	.18131374	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
7	.03736674	1.25055E-01	2.19471E-01	.61907910	.17188633	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
8	.03819831	1.24050E-01	2.18879E-01	.62146769	.16245892	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
9	.03902987	1.23045E-01	2.18195E-01	.62385628	.15303151	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
10	.03986144	1.22040E-01	2.17411E-01	.62624487	.14360410	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
11	.04069301	1.21035E-01	2.16627E-01	.62863346	.13417669	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862
12	.04152458	1.20030E-01	2.15843E-01	.63102205	.12474928	0.00000000	0.00000000	.06846347	.34240969	0.0000	.5862

J	R	P	RHO	U	Y	Z	W	(S-SINF)/CV	A	T	H/HT
13	.04238881	1.24074E-01	2.14568E-01	.63172672	.14918435	.02039975	.06780202	.34007341	.4762	.5782	
14	.04322364	1.23181E-01	2.13471E-01	.63152572	.14954750	.02173573	.02788969	.33971770	.5238	.5770	
15	.04405848	1.22235E-01	2.12304E-01	.63137899	.15011539	.02321159	.06781879	.33933669	.6190	.5758	
16	.04489331	1.21237E-01	2.11073E-01	.63123509	.15071735	.02469466	.06778156	.33893683	.6714	.5744	
17	.04572815	1.20187E-01	2.09769E-01	.64002650	.15140427	.02625573	.06774708	.33851180	.6667	.5730	
18	.04656298	1.19088E-01	2.08497E-01	.64021131	.15215267	.02792394	.06771462	.33806327	.7143	.5714	
19	.04739782	1.17932E-01	2.06959E-01	.64042133	.15291878	.02961494	.06768490	.33758975	.7619	.5698	
20	.04823265	1.16728E-01	2.05232E-01	.64063228	.15369496	.03132501	.06765607	.33715917	.8095	.5682	
21	.04906748	1.15495E-01	2.03397E-01	.64084389	.15448746	.03306168	.06762834	.33673650	.8571	.5664	
22	.04990232	1.14152E-01	2.02100E-01	.65066468	.15529123	.03481418	.06760151	.33632125	.9048	.5645	
23	.05073715	1.12725E-01	2.00640E-01	.65236696	.15610670	.03658198	.06757493	.33590704	.9524	.5625	
24	.05157199	1.11349E-01	1.98659E-01	.65514775	.15693483	.03837483	.06754826	.33549152	1.0000	.5605	

K= 5 PHI = 20.0 Z = .100000

J	R	P	RHO	U	Y	Z	W	(S-SINF)/CV	A	T	H/HT
3	.03404047	1.26235E-01	2.17131E-01	.61124959	.20807219	.04184351	.06846347	.34097772	0.0000	.5813	
4	.03489497	1.26234E-01	2.17243E-01	.61375304	.20114519	.04207871	.06782304	.34050336	.0476	.5811	
5	.03572948	1.26079E-01	2.17144E-01	.61618790	.19458183	.04187759	.06735082	.34019221	.0952	.5807	
6	.03657399	1.25843E-01	2.16873E-01	.61850723	.18835495	.04164597	.06679457	.34066310	.1429	.5803	
7	.03741849	1.25450E-01	2.16498E-01	.62073925	.18276236	.04137816	.06627015	.34049172	.1905	.5797	
8	.03826300	1.25047E-01	2.15876E-01	.62280470	.17688640	.04111091	.06575633	.34228440	.2381	.5790	
9	.03910750	1.24552E-01	2.15356E-01	.62482212	.17100784	.04083323	.06524282	.34066268	.2857	.5782	
10	.03995201	1.23971E-01	2.14837E-01	.62682389	.16515403	.04057454	.06472885	.33981075	.3333	.5774	
11	.04079652	1.23355E-01	2.14336E-01	.62879460	.16048661	.04032458	.06422485	.33928867	.3810	.5764	
12	.04164102	1.22524E-01	2.13849E-01	.63152033	.15546179	.04008243	.06372642	.33922499	.4286	.5754	
13	.04248553	1.21744E-01	2.13394E-01	.63359679	.15052960	.04031746	.06323219	.33889624	.4762	.5743	
14	.04333003	1.20889E-01	2.12951E-01	.63558201	.14582504	.04031966	.06275693	.33854550	.5238	.5731	
15	.04417454	1.19937E-01	2.12608E-01	.63748230	.14117121	.04067820	.06228124	.33817192	.5714	.5718	
16	.04501905	1.18939E-01	2.12276E-01	.63930480	.13660487	.04020326	.06180417	.33777611	.6190	.5705	
17	.04586355	1.18037E-01	2.11942E-01	.64113917	.13211452	.03990237	.06132456	.33735765	.6667	.5691	
18	.04670806	1.17169E-01	2.11648E-01	.64298474	.12769171	.03959615	.06084860	.33691621	.7143	.5676	
19	.04755257	1.16380E-01	2.11350E-01	.64483030	.12330770	.03928633	.06037348	.33645029	.7619	.5660	
20	.04839707	1.15607E-01	2.11058E-01	.64667686	.11896168	.038981923	.06000439	.33595644	.8095	.5643	
21	.04924158	1.14750E-01	2.10775E-01	.65013698	.11461950	.03867682	.06050749	.33543992	.8571	.5626	
22	.05008608	1.13850E-01	2.10491E-01	.65272741	.11027170	.03837120	.06002547	.33489585	.9048	.5608	
23	.05093059	1.12880E-01	2.10206E-01	.65542689	.10592582	.03806475	.06049686	.33433430	.9524	.5588	
24	.05177510	1.09549E-01	1.97315E-01	.65669121	.10160711	.038395007	.06048972	.33371983	1.0000	.5568	

K= 6 PHI = 30.0 Z = .100000

J	R	P	RHO	U	Y	Z	W	(S-SINF)/CV	A	T	H/HT
3	.03404047	1.21756E-01	2.11612E-01	.61408803	.20903268	.06184440	.06846347	.33922640	0.0000	.5754	
4	.03490124	1.21836E-01	2.12018E-01	.61684737	.20219132	.06219458	.06443570	.33801278	.0476	.5746	
5	.03576202	1.21965E-01	2.12384E-01	.61939484	.19590694	.06181302	.06394608	.33886612	.0952	.5742	
6	.03662880	1.22159E-01	2.12945E-01	.62176009	.18974472	.06147042	.06443882	.33872915	.1429	.5737	
7	.03748358	1.22392E-01	2.13688E-01	.62401528	.18373735	.06109942	.06431882	.33859447	.1905	.5731	
8	.03834436	1.22637E-01	2.14274E-01	.62612046	.17823112	.06069942	.06374559	.33835306	.2381	.5724	
9	.03920513	1.22884E-01	2.14771E-01	.62807635	.17281774	.06035160	.06305463	.33812272	.2857	.5716	
10	.04006591	1.19957E-01	2.14015E-01	.63018451	.16758109	.06000402	.06232922	.33787482	.3333	.5708	
11	.04092669	1.19365E-01	2.09459E-01	.63257066	.16284510	.05970233	.06209286	.33759814	.3810	.5699	
12	.04178747	1.18705E-01	2.08671E-01	.63462316	.15764734	.05945879	.06247921	.33730122	.4286	.5689	
13	.04264825	1.17948E-01	2.07801E-01	.63665623	.15249121	.05922424	.06245577	.33698037	.4762	.5678	
14	.04350902	1.17185E-01	2.06867E-01	.63867855	.14828335	.05900952	.06222184	.33663846	.5238	.5666	
15	.04436980	1.16392E-01	2.05958E-01	.64067938	.14428709	.05880416	.06201529	.33627467	.5714	.5654	
16	.04523058	1.15516E-01	2.04977E-01	.64265101	.13928877	.05861924	.06182743	.33588944	.6190	.5641	
17	.04609136	1.14595E-01	2.02624E-01	.64459239	.13428799	.05845913	.06165368	.33548238	.6667	.5627	
18	.04695214	1.13644E-01	2.02413E-01	.64650156	.12937122	.05831172	.06149866	.33505513	.7143	.5613	
19	.04781291	1.12580E-01	2.03112E-01	.64837827	.12453786	.05817545	.06135757	.33460024	.7619	.5598	
20	.04867369	1.11516E-01	1.99765E-01	.65022085	.12078133	.05804199	.06122953	.33412911	.8095	.5582	
21	.04953447	1.10370E-01	1.98331E-01	.65208294	.11724512	.05791664	.06111591	.33361806	.8571	.5565	
22	.05039525	1.09184E-01	1.96831E-01	.65394066	.11376223	.05779215	.06099245	.33309237	.9048	.5548	
23	.05125603	1.07907E-01	1.95194E-01	.65571026	.10946185	.05766743	.06086896	.33251456	.9524	.5528	
24	.05211680	1.06659E-01	1.93585E-01	.65721666	.10515363	.05754300	.060868293	.33194540	1.0000	.5508	

K=12 PHI = 90.0 Z = .10000

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
3	.03404047	7.04464E-02	1.54566E-01	.65035402	.28138373	.14351625	.06446347	.31857806	0.0000	.5075
4	.03513772	7.50539E-02	1.57713E-01	.65846127	.21725474	.14357450	.04813115	.31621132	.0476	.5012
5	.03623498	7.92638E-02	1.59192E-01	.65962443	.141606367	.141606367	.04112604	.31610389	.0952	.4996
6	.03733224	7.92638E-02	1.60548E-01	.66121933	.21725474	.13974902	.03783202	.31593389	.1429	.4981
7	.03842950	8.01521E-02	1.60817E-01	.66444832	.21725474	.13790336	.0353392	.31578258	.1905	.4966
8	.03952676	8.03714E-02	1.61334E-01	.66859187	.15338270	.13618701	.03328059	.31563999	.2391	.4982
9	.04062401	8.04874E-02	1.61871E-01	.67474207	.15338270	.13447119	.03134359	.31550597	.2857	.4978
10	.04172127	8.05511E-02	1.62424E-01	.68391493	.15338270	.13275537	.02949711	.31537111	.3333	.4974
11	.04281853	8.05741E-02	1.62997E-01	.69619188	.18191710	.13103954	.02776812	.31523504	.3810	.4969
12	.04391579	8.05642E-02	1.63596E-01	.71159205	.18191710	.12932381	.02614612	.31509895	.4286	.4964
13	.04501304	8.05301E-02	1.64224E-01	.72914021	.18101132	.12760807	.02462911	.31496286	.4762	.4959
14	.04611030	8.04724E-02	1.64874E-01	.74952900	.17715226	.12589232	.02321290	.31482678	.5238	.4953
15	.04720756	8.03938E-02	1.65549E-01	.77393589	.17453232	.12417658	.02189678	.31469070	.5714	.4946
16	.04830482	7.92974E-02	1.66244E-01	.80349495	.17191232	.12246084	.02058125	.31455462	.6190	.4939
17	.04940208	7.79274E-02	1.66961E-01	.83849169	.16929232	.12074510	.01926572	.31441854	.6667	.4932
18	.05049934	7.63111E-02	1.67704E-01	.88013518	.16667232	.11902936	.01795020	.31428246	.7143	.4923
19	.05159660	7.45051E-02	1.68474E-01	.93893375	.16405232	.11731362	.01663468	.31414638	.7619	.4915
20	.05269386	7.25091E-02	1.69284E-01	.10209493	.16143232	.11559788	.01531916	.31401030	.8095	.4905
21	.05379112	7.05131E-02	1.70134E-01	.11684592	.15881232	.11388214	.01400364	.31387422	.8571	.4895
22	.05488838	7.70371E-02	1.71024E-01	.13411690	.15619232	.11216640	.01268812	.31373814	.9048	.4884
23	.05598564	7.64011E-02	1.71944E-01	.15497797	.15357232	.11045066	.01137260	.31360206	.9524	.4872
24	.05708290	7.58304E-02	1.72904E-01	.18135403	.15100232	.10873492	.01005708	.31346598	1.0000	.4860

K=13 PHI =100.0 Z = .10000

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
3	.03404047	7.18511E-02	1.45187E-01	.65878716	.28411804	.14632776	.06446347	.31466630	0.0000	.4949
4	.03513772	7.24212E-02	1.46702E-01	.66518388	.25035637	.14617628	.04373049	.31222875	.0476	.4874
5	.03623498	7.29245E-02	1.48034E-01	.66859881	.21621112	.14411608	.03543900	.31161835	.0952	.4855
6	.03733224	7.33755E-02	1.51314E-01	.67075761	.21191542	.14205691	.03187008	.31146593	.1429	.4851
7	.03842950	7.37692E-02	1.52114E-01	.67421357	.20756723	.13999613	.02871258	.31130343	.1905	.4845
8	.03952676	7.37692E-02	1.52670E-01	.67842933	.20400948	.13791759	.026467493	.31123336	.2381	.4843
9	.04062401	7.35538E-02	1.53226E-01	.68439719	.20135417	.13583875	.02431725	.31116329	.2857	.4839
10	.04172127	7.31891E-02	1.53782E-01	.69297417	.19870345	.13375991	.02226660	.31109322	.3333	.4836
11	.04281853	7.41513E-02	1.54338E-01	.70449561	.19605273	.13168107	.02021608	.31092315	.3810	.4833
12	.04391579	7.45744E-02	1.54894E-01	.71818777	.19340201	.12960223	.01816556	.31075308	.4286	.4829
13	.04501304	7.45744E-02	1.55450E-01	.73449519	.19075129	.12752339	.01611504	.31058301	.4762	.4825
14	.04611030	7.37371E-02	1.55450E-01	.75449519	.18810057	.12544455	.01406452	.31041294	.5238	.4820
15	.04720756	7.37371E-02	1.55450E-01	.78049519	.18544985	.12336566	.01201400	.31024287	.5714	.4814
16	.04830482	7.33333E-02	1.55450E-01	.81449519	.18279913	.12128677	.01006348	.31007280	.6190	.4808
17	.04940208	7.26667E-02	1.52633E-01	.85849519	.18014841	.11920788	.00811296	.30990273	.6667	.4802
18	.05049934	7.26667E-02	1.54894E-01	.91449519	.17749769	.11712899	.00616244	.30973266	.7143	.4794
19	.05159660	7.26667E-02	1.57058E-01	.98049519	.17484701	.11504910	.00421192	.30956259	.7619	.4787
20	.05269386	7.22333E-02	1.57058E-01	.105849519	.17219633	.11296921	.00226140	.30939252	.8095	.4778
21	.05379112	7.17666E-02	1.50234E-01	.11407077	.16954565	.11088932	.00031088	.30922245	.8571	.4769
22	.05488838	7.13333E-02	1.44889E-01	.12450425	.16689497	.10880943	.00036034	.30905238	.9048	.4759
23	.05718719	7.07667E-02	1.49666E-01	.13849439	.16424429	.10672954	.00041080	.30888231	.9524	.4747
24	.05839516	7.02467E-02	1.40309E-01	.15662554	.16159380	.10464961	.00046126	.30871224	1.0000	.4737

K=14 PHI =110.0 Z = .10000

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
3	.03404047	6.62094E-02	1.36931E-01	.66859251	.22688074	.14436008	.04446347	.31095275	0.0000	.4835
4	.03513772	6.68214E-02	1.40818E-01	.67404466	.22020703	.14436008	.03689011	.30869912	.0476	.4745
5	.03623498	6.73245E-02	1.42898E-01	.67759758	.22162713	.14201458	.02918052	.30735610	.0952	.4723
6	.03733224	6.77591E-02	1.43540E-01	.68121933	.21695543	.13977124	.02586971	.30722030	.1429	.4719
7	.03842950	6.80456E-02	1.44116E-01	.68484108	.21338374	.13752675	.02255885	.30708398	.1905	.4715
8	.03952676	6.82092E-02	1.44867E-01	.68949519	.21081205	.13528228	.02024736	.30694766	.2381	.4713
9	.04062401	6.84426E-02	1.45276E-01	.69514951	.20824036	.13303781	.01793580	.30681134	.2857	.4711
10	.04172127	6.85426E-02	1.45554E-01	.70180389	.20566867	.13079334	.01562424	.30667502	.3333	.4709

K - 7 PHI = 40.0 Z = .10000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	M/HT
3	.03404047	1.15991E-01	2.04260E-01	.61799512	.21036995	.04062998	.06046347	.33684249	0.0000	.5673
4	.03492405	1.16061E-01	2.05072E-01	.62119210	.20933821	.04117234	.06451413	.33643859	.0476	.5660
5	.03580763	1.16061E-01	2.05072E-01	.62119210	.19770355	.04051181	.06283950	.33624677	.0952	.5653
6	.03659121	1.15991E-01	2.05173E-01	.62612570	.1972127	.03997667	.06190452	.33609825	.1429	.5648
7	.03737479	1.15802E-01	2.05273E-01	.62612570	.18571956	.03947442	.06109742	.33590947	.1905	.5642
8	.03815837	1.15613E-01	2.05373E-01	.62612570	.18397465	.03904413	.06030078	.33572071	.2381	.5635
9	.03894195	1.15424E-01	2.05473E-01	.62612570	.18222974	.03861384	.05950408	.33553204	.2857	.5628
10	.03972553	1.15235E-01	2.05573E-01	.62612570	.18048483	.03818355	.05870743	.33534328	.3333	.5620
11	.04050911	1.15046E-01	2.05673E-01	.62612570	.17873992	.03775326	.05791078	.33515452	.3810	.5611
12	.04129269	1.14857E-01	2.05773E-01	.62612570	.17699501	.03732297	.05711413	.33496576	.4286	.5601
13	.04207627	1.14668E-01	2.05873E-01	.62612570	.17525010	.03689268	.05631748	.33477701	.4762	.5591
14	.04285985	1.14479E-01	2.05973E-01	.62612570	.17350519	.03646239	.05552083	.33458825	.5238	.5580
15	.04364343	1.14290E-01	2.06073E-01	.62612570	.17176028	.03603210	.05472418	.33439950	.5714	.5568
16	.04442701	1.14101E-01	2.06173E-01	.62612570	.17001537	.03560181	.05392753	.33421075	.6190	.5556
17	.04521059	1.13912E-01	2.06273E-01	.62612570	.16827046	.03517152	.05313088	.33402200	.6667	.5543
18	.04599417	1.13723E-01	2.06373E-01	.62612570	.16652555	.03474123	.05233423	.33383325	.7143	.5532
19	.04677775	1.13534E-01	2.06473E-01	.62612570	.16478064	.03431094	.05153758	.33364450	.7619	.5520
20	.04756133	1.13345E-01	2.06573E-01	.62612570	.16303573	.03388065	.05074093	.33345575	.8095	.5509
21	.04834491	1.13156E-01	2.06673E-01	.62612570	.16129082	.03345036	.04994428	.33326700	.8571	.5498
22	.04912849	1.12967E-01	2.06773E-01	.62612570	.15954591	.03302007	.04914763	.33307825	.9048	.5486
23	.04991207	1.12778E-01	2.06873E-01	.62612570	.15780100	.03258978	.04835098	.33288950	.9524	.5474
24	.05069565	1.12589E-01	2.06973E-01	.62612570	.15605609	.03215949	.04755434	.33270075	1.0000	.5462

K - 8 PHI = 50.0 Z = .10000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	M/HT
3	.03404047	1.09073E-01	1.95044E-01	.62200276	.21207465	.04062998	.06046347	.33389369	0.0000	.5574
4	.03492405	1.09144E-01	1.96733E-01	.62612570	.20933821	.04117234	.06211074	.33355562	.0476	.5553
5	.03580763	1.09215E-01	1.97255E-01	.62974624	.19770355	.04051181	.06055824	.33300744	.0952	.5545
6	.03659121	1.09286E-01	1.97777E-01	.63335478	.1972127	.03997667	.05910864	.33245924	.1429	.5532
7	.03737479	1.09357E-01	1.97777E-01	.63335478	.18571956	.03947442	.05820151	.33191104	.1905	.5520
8	.03815837	1.09428E-01	1.97777E-01	.63335478	.18397465	.03904413	.05730438	.33136284	.2381	.5509
9	.03894195	1.09499E-01	1.97777E-01	.63335478	.18222974	.03861384	.05640725	.33081464	.2857	.5498
10	.03972553	1.09570E-01	1.97777E-01	.63335478	.18048483	.03818355	.05551012	.33026644	.3333	.5486
11	.04050911	1.09641E-01	1.97777E-01	.63335478	.17873992	.03775326	.05461299	.32971824	.3810	.5474
12	.04129269	1.09712E-01	1.97777E-01	.63335478	.17699501	.03732297	.05371586	.32917004	.4286	.5462
13	.04207627	1.09783E-01	1.97777E-01	.63335478	.17525010	.03689268	.05281873	.32862184	.4762	.5450
14	.04285985	1.09854E-01	1.97777E-01	.63335478	.17350519	.03646239	.05192160	.32807364	.5238	.5438
15	.04364343	1.09925E-01	1.97777E-01	.63335478	.17176028	.03603210	.05102447	.32752544	.5714	.5426
16	.04442701	1.09996E-01	1.97777E-01	.63335478	.17001537	.03560181	.05012734	.32697724	.6190	.5414
17	.04521059	1.10067E-01	1.97777E-01	.63335478	.16827046	.03517152	.04923021	.32642904	.6667	.5402
18	.04599417	1.10138E-01	1.97777E-01	.63335478	.16652555	.03474123	.04833308	.32588084	.7143	.5390
19	.04677775	1.10209E-01	1.97777E-01	.63335478	.16478064	.03431094	.04743595	.32533264	.7619	.5378
20	.04756133	1.10280E-01	1.97777E-01	.63335478	.16303573	.03388065	.04653882	.32478444	.8095	.5366
21	.04834491	1.10351E-01	1.97777E-01	.63335478	.16129082	.03345036	.04564169	.32423624	.8571	.5354
22	.04912849	1.10422E-01	1.97777E-01	.63335478	.15954591	.03302007	.04474456	.32368804	.9048	.5342
23	.04991207	1.10493E-01	1.97777E-01	.63335478	.15780100	.03258978	.04384743	.32313984	.9524	.5330
24	.05069565	1.10564E-01	1.97777E-01	.63335478	.15605609	.03215949	.04295030	.32259164	1.0000	.5318

K - 9 PHI = 60.0 Z = .10000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	M/HT
3	.03404047	1.01380E-01	1.85674E-01	.62892130	.21133767	.04062998	.06046347	.33016993	0.0000	.5461
4	.03492405	1.01451E-01	1.87363E-01	.63252976	.20933821	.04117234	.06211074	.32952264	.0476	.5430
5	.03580763	1.01522E-01	1.89052E-01	.63613822	.19770355	.04051181	.06055824	.32887544	.0952	.5420
6	.03659121	1.01593E-01	1.90741E-01	.63974668	.1972127	.03997667	.05910864	.32822824	.1429	.5410
7	.03737479	1.01664E-01	1.92430E-01	.64335514	.18571956	.03947442	.05820151	.32758104	.1905	.5400
8	.03815837	1.01735E-01	1.94119E-01	.64696360	.18397465	.03904413	.05730438	.32693384	.2381	.5390
9	.03894195	1.01806E-01	1.95808E-01	.65057206	.18222974	.03861384	.05640725	.32628664	.2857	.5378
10	.03972553	1.01877E-01	1.97497E-01	.65418052	.18048483	.03818355	.05551012	.32563944	.3333	.5366
11	.04050911	1.01948E-01	1.99186E-01	.65778898	.17873992	.03775326	.05461299	.32499224	.3810	.5354
12	.04129269	1.02019E-01	2.00875E-01	.66139744	.17699501	.03732297	.05371586	.32434504	.4286	.5342
13	.04207627	1.02090E-01	2.02564E-01	.66500590	.17525010	.03689268	.05281873	.32369784	.4762	.5330
14	.04285985	1.02161E-01	2.04253E-01	.66861436	.17350519	.03646239	.05192160	.32305064	.5238	.5318
15	.04364343	1.02232E-01	2.05942E-01	.67222282	.17176028	.03603210	.05102447	.32240344	.5714	.5306
16	.04442701	1.02303E-01	2.07631E-01	.67583128	.17001537	.03560181	.05012734	.32175624	.6190	.5294
17	.04521059	1.02374E-01	2.09320E-01	.67943974	.16827046	.03517152	.04923021	.32110904	.6667	.5282
18	.04599417	1.02445E-01	2.11009E-01	.68304820	.16652555	.03474123	.04833308	.32046184	.7143	.5270
19	.04677775	1.02516E-01	2.12698E-01	.68665666	.16478064	.03431094	.04743595	.31981464	.7619	.5258
20	.04756133	1.02587E-01	2.14387E-01	.69026512	.16303573	.03388065	.04653882	.31916744	.8095	.5246
21	.04834491	1.02658E-01	2.16076E-01	.69387358	.16129082	.03345036	.04564169	.31852024	.8571	.5234
22	.04912849	1.02729E-01	2.17765E-01	.69748204	.15954591	.03302007	.04474456	.31787304	.9048	.5222
23	.04991207	1.02800E-01	2.19454E-01	.70109050	.15780100	.03258978	.04384743	.31722584	.9524	.5210
24	.05069565	1.02871E-01	2.21143E-01	.70469896	.15605609	.03215949	.04295030	.31657864	1.0000	.5198

	J	R	P	RHO	U	PHI	70.0	Z	100000	(S-SINF)/CV	A	T	H/HT
12	.04258322	1.01065E-01	1.98101E-01	6.50312522	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
13	.04258322	1.01065E-01	1.87646E-01	6.52157225	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
14	.04258322	1.01065E-01	1.87122E-01	6.51979799	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
15	.04258322	1.01065E-01	1.86557E-01	6.51802373	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
16	.04258322	1.01065E-01	1.85992E-01	6.51624947	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
17	.04258322	1.01065E-01	1.85427E-01	6.51447521	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
18	.04258322	1.01065E-01	1.84862E-01	6.51270095	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
19	.04258322	1.01065E-01	1.84297E-01	6.51092669	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
20	.04258322	1.01065E-01	1.83732E-01	6.50915243	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
21	.04258322	1.01065E-01	1.83167E-01	6.50737817	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
22	.04258322	1.01065E-01	1.82602E-01	6.50560391	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
23	.04258322	1.01065E-01	1.82037E-01	6.50382965	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
24	.04258322	1.01065E-01	1.81472E-01	6.50205539	1.49702900	1.0947875	0.292676	3.2780952	4.286	5313			
3	.0394047	9.35232E-02	1.75270E-01	6.5333098	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
4	.0394047	9.35232E-02	1.74705E-01	6.4915743	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
5	.0394047	9.35232E-02	1.74140E-01	6.4498488	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
6	.0394047	9.35232E-02	1.73575E-01	6.4081233	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
7	.0394047	9.35232E-02	1.73010E-01	6.3663978	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
8	.0394047	9.35232E-02	1.72445E-01	6.3246723	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
9	.0394047	9.35232E-02	1.71880E-01	6.2829468	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
10	.0394047	9.35232E-02	1.71315E-01	6.2412213	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
11	.0394047	9.35232E-02	1.70750E-01	6.1994958	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
12	.0394047	9.35232E-02	1.70185E-01	6.1577703	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
13	.0394047	9.35232E-02	1.69620E-01	6.1160448	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
14	.0394047	9.35232E-02	1.69055E-01	6.0743193	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
15	.0394047	9.35232E-02	1.68490E-01	6.0325938	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
16	.0394047	9.35232E-02	1.67925E-01	5.9908683	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
17	.0394047	9.35232E-02	1.67360E-01	5.9491428	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
18	.0394047	9.35232E-02	1.66795E-01	5.9074173	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
19	.0394047	9.35232E-02	1.66230E-01	5.8656918	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
20	.0394047	9.35232E-02	1.65665E-01	5.8239663	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
21	.0394047	9.35232E-02	1.65100E-01	5.7822408	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
22	.0394047	9.35232E-02	1.64535E-01	5.7405153	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
23	.0394047	9.35232E-02	1.63970E-01	5.6987898	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
24	.0394047	9.35232E-02	1.63405E-01	5.6570643	2.16262350	1.2242415	0.6416317	3.2646034	0.0000	5336			
1	.0362261	8.63129E-02	1.64732E-01	6.42670326	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
2	.0362261	8.63129E-02	1.64167E-01	6.3849777	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
3	.0362261	8.63129E-02	1.63602E-01	6.3432522	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
4	.0362261	8.63129E-02	1.63037E-01	6.3015267	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
5	.0362261	8.63129E-02	1.62472E-01	6.2598012	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
6	.0362261	8.63129E-02	1.61907E-01	6.2180757	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
7	.0362261	8.63129E-02	1.61342E-01	6.1763502	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
8	.0362261	8.63129E-02	1.60777E-01	6.1346247	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
9	.0362261	8.63129E-02	1.60212E-01	6.0928992	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
10	.0362261	8.63129E-02	1.59647E-01	6.0511737	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
11	.0362261	8.63129E-02	1.59082E-01	6.0094482	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
12	.0362261	8.63129E-02	1.58517E-01	5.9677227	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
13	.0362261	8.63129E-02	1.57952E-01	5.9259972	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
14	.0362261	8.63129E-02	1.57387E-01	5.8842717	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
15	.0362261	8.63129E-02	1.56822E-01	5.8425462	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
16	.0362261	8.63129E-02	1.56257E-01	5.8008207	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
17	.0362261	8.63129E-02	1.55692E-01	5.7590952	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
18	.0362261	8.63129E-02	1.55127E-01	5.7173697	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
19	.0362261	8.63129E-02	1.54562E-01	5.6756442	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
20	.0362261	8.63129E-02	1.53997E-01	5.6339187	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
21	.0362261	8.63129E-02	1.53432E-01	5.5921932	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
22	.0362261	8.63129E-02	1.52867E-01	5.5504677	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
23	.0362261	8.63129E-02	1.52302E-01	5.5087422	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			
24	.0362261	8.63129E-02	1.51737E-01	5.4670167	2.19715113	1.13659183	0.6846317	3.2646034	0.0000	5306			

J	R	P	RHO	U	V	W	T	A	H/HT
11	04381258	6.85817E-02	1.45711E-01	6.6779924	1.98715453	1.29464600	0.1684831	30681197	4707
12	04503409	6.85695E-02	1.45782E-01	6.6527651	1.9717685	1.2770200	0.1788275	30670928	4704
13	04625560	6.85601E-02	1.45752E-01	6.6505493	1.9707631	1.2756796	0.1755359	30659992	4766
14	04747712	6.85454E-02	1.45740E-01	6.6491294	1.9696411	1.2746083	0.1742293	30646248	4696
15	04869863	6.85311E-02	1.45740E-01	6.6471749	1.9682114	1.2735214	0.1728620	30631295	4691
16	04992014	6.85178E-02	1.45740E-01	6.6454676	1.9668448	1.2724345	0.1714949	30616342	4686
17	05114166	6.85045E-02	1.44803E-01	6.6438144	1.9654782	1.2713476	0.1701279	30601389	4680
18	05236317	6.84912E-02	1.44803E-01	6.6421612	1.9641118	1.2702607	0.1687609	30586436	4674
19	05358468	6.84779E-02	1.44074E-01	6.6405080	1.9627454	1.2691738	0.1673942	30571483	4666
20	05480620	6.84646E-02	1.43574E-01	6.6388548	1.9613790	1.2680869	0.1660275	30556530	4658
21	05602771	6.84513E-02	1.42960E-01	6.6372016	1.9600126	1.2670000	0.1646608	30541577	4650
22	05724923	6.84380E-02	1.42346E-01	6.6355484	1.9586462	1.2659131	0.1632941	30526624	4642
23	05847074	6.84247E-02	1.41732E-01	6.6338952	1.9572798	1.2648262	0.1619274	30511671	4634
24	05969225	6.84114E-02	1.41118E-01	6.6322420	1.9559134	1.2637393	0.1605607	30496718	4626
3	03404047	6.16737E-02	1.30111E-01	6.7943565	2.0796988	1.17420816	0.06846347	30781603	0.0000
4	03532907	6.22479E-02	1.34352E-01	6.7429411	2.0718765	1.1729453	0.0749453	30436003	0.0476
5	03661667	6.26909E-02	1.36961E-01	6.6925256	2.0640542	1.1716825	0.0814272	30356418	0.0952
6	03790327	6.30521E-02	1.38937E-01	6.6421101	2.0562319	1.1704197	0.0879091	30276833	0.1429
7	03918987	6.33347E-02	1.37650E-01	6.6949459	2.1161816	1.1691569	0.0943910	30335215	0.1905
8	04047647	6.35472E-02	1.36143E-01	6.9114978	2.1761324	1.1678942	0.1008729	30393597	0.2381
9	04176307	6.36847E-02	1.34446E-01	6.9262719	2.2360832	1.1666314	0.1073548	30352743	0.2857
10	04304967	6.37674E-02	1.32675E-01	6.9410467	2.2960340	1.1653686	0.1138367	30311889	0.3333
11	04433627	6.37702E-02	1.30804E-01	6.9558215	2.3559848	1.1641058	0.1203186	30271035	0.3809
12	04562287	6.37027E-02	1.28877E-01	6.9705963	2.4159356	1.1628430	0.1268005	30230181	0.4285
13	04690947	6.37055E-02	1.26950E-01	6.9853711	2.4758864	1.1615802	0.1332824	30189327	0.4761
14	04819607	6.37083E-02	1.25023E-01	6.9999459	2.5358372	1.1603174	0.1397643	30148473	0.5237
15	04948267	6.37111E-02	1.23096E-01	7.0145207	2.5957880	1.1590546	0.1462462	30107619	0.5713
16	05076927	6.37139E-02	1.21169E-01	7.0290955	2.6557388	1.1577918	0.1527281	30066765	0.6189
17	05205587	6.37167E-02	1.19242E-01	7.0436703	2.7156896	1.1565290	0.1592100	30025911	0.6665
18	05334247	6.37195E-02	1.17315E-01	7.0582451	2.7756404	1.1552662	0.1656919	29985057	0.7141
19	05462907	6.37223E-02	1.15388E-01	7.0728199	2.8355912	1.1540034	0.1721738	29944203	0.7617
20	05591567	6.37251E-02	1.13461E-01	7.0873947	2.8955420	1.1527406	0.1786557	29903349	0.8093
21	05720227	6.37279E-02	1.11534E-01	7.1019695	2.9554928	1.1514778	0.1851376	29862495	0.8569
22	05848887	6.37307E-02	1.09607E-01	7.1165443	3.0154436	1.1502150	0.1916195	29821641	0.9045
23	05977547	6.37335E-02	1.07680E-01	7.1311191	3.0753944	1.1489522	0.1981014	29780787	0.9521
24	06106207	6.37363E-02	1.05753E-01	7.1456939	3.1353452	1.1476894	0.2045833	29739933	1.0000
3	03404047	5.82509E-02	1.24979E-01	6.6162203	2.072710	1.2436721	0.06846347	30531542	0.0000
4	03532907	5.97059E-02	1.24372E-01	6.6941271	2.0705368	1.2413165	0.0749453	30130276	0.0476
5	03661667	6.20019E-02	1.30925E-01	6.6429411	2.0627134	1.2389609	0.0814272	30640314	0.0952
6	03816055	6.25959E-02	1.31679E-01	6.6925256	2.0548906	1.2366053	0.0879091	30031367	0.1429
7	03945391	6.30439E-02	1.32433E-01	6.6411101	2.0470672	1.2342497	0.0943910	30023576	0.1905
8	04074719	6.34919E-02	1.32187E-01	6.6949459	2.0392438	1.2318941	0.1008729	30015785	0.2381
9	04204063	6.39399E-02	1.31941E-01	6.9114978	2.0314204	1.2295385	0.1073548	30007994	0.2857
10	04333400	6.43879E-02	1.31695E-01	6.9262719	2.0235970	1.2271829	0.1138367	29999203	0.3333
11	04462743	6.48359E-02	1.31449E-01	6.9410467	2.0157736	1.2248273	0.1203186	29990412	0.3809
12	04592086	6.52839E-02	1.31203E-01	6.9558215	2.0079502	1.2224717	0.1268005	29981621	0.4285
13	04721429	6.57319E-02	1.30957E-01	6.9705963	2.0001268	1.2201161	0.1332824	29972830	0.4761
14	04850772	6.61799E-02	1.30711E-01	6.9853711	1.9923034	1.2177605	0.1397643	29964039	0.5237
15	04980115	6.66279E-02	1.30465E-01	6.9999459	1.9844800	1.2154049	0.1462462	29955248	0.5713
16	05109458	6.70759E-02	1.30219E-01	7.0145207	1.9766566	1.2130493	0.1527281	29946457	0.6189
17	05238801	6.75239E-02	1.29973E-01	7.0290955	1.9688332	1.2106937	0.1592100	29937666	0.6665
18	05368144	6.79719E-02	1.29727E-01	7.0436703	1.9610098	1.2083381	0.1656919	29928875	0.7141
19	05497487	6.84199E-02	1.29481E-01	7.0582451	1.9531864	1.2059825	0.1721738	29920084	0.7617
20	05626830	6.88679E-02	1.29235E-01	7.0728199	1.9453630	1.2036269	0.1786557	29911293	0.8093
21	05756173	6.93159E-02	1.28989E-01	7.0873947	1.9375396	1.2012713	0.1851376	29902502	0.8569
22	05885516	6.97639E-02	1.28743E-01	7.1019695	1.9297162	1.1989157	0.1916195	29893711	0.9045
23	06014859	7.02119E-02	1.28497E-01	7.1165443	1.9218928	1.1965599	0.1981014	29884920	0.9521
24	06144202	7.06599E-02	1.28251E-01	7.1311191	1.9140694	1.1942043	0.2045833	29876129	1.0000

K-15 PHI =130.0 Z = .100000

K-16 PHI =130.0 Z = .100000

J	R	P	RHO	U	V	W	T	A	H/HT
3	03404047	5.82509E-02	1.24979E-01	6.6162203	2.072710	1.2436721	0.06846347	30531542	0.0000
4	03532907	5.97059E-02	1.24372E-01	6.6941271	2.0705368	1.2413165	0.0749453	30130276	0.0476
5	03661667	6.20019E-02	1.30925E-01	6.6429411	2.0627134	1.2389609	0.0814272	30640314	0.0952
6	03816055	6.25959E-02	1.31679E-01	6.6925256	2.0548906	1.2366053	0.0879091	30031367	0.1429
7	03945391	6.30439E-02	1.32433E-01	6.6411101	2.0470672	1.2342497	0.0943910	30023576	0.1905
8	04074719	6.34919E-02	1.32187E-01	6.6949459	2.0392438	1.2318941	0.1008729	30015785	0.2381
9	04204063	6.39399E-02	1.31941E-01	6.9114978	2.0314204	1.2295385	0.1073548	30007994	0.2857
10	04333400	6.43879E-02	1.31695E-01	6.9262719	2.0235970	1.2271829	0.1138367	29999203	0.3333
11	04462743	6.48359E-02	1.31449E-01	6.9410467	2.0157736	1.2248273	0.1203186	29990412	0.3809
12	04592086	6.52839E-02	1.31203E-01	6.9558215	2.0079502	1.2224717	0.1268005	29981621	0.4285
13	04721429	6.57319E-02	1.30957E-01	6.9705963	2.0001268	1.2201161	0.1332824	29972830	0.4761
14	04850772	6.61799E-02	1.30711E-01	6.9853711	1.9923034	1.2177605	0.1397643	29964039	0.5237
15	04980115	6.66279E-02	1.30465E-01	6.9999459	1.9844800	1.2154049	0.1462462	29955248	0.5713
16	05109458	6.70759E-02	1.30219E-01	7.0145207	1.9766566	1.2130493	0.1527281	29946457	0.6189
17	05238801	6.75239E-02	1.29973E-01	7.0290955	1.9688332	1.2106937	0.1592100	29937666	0.6665
18	05368144	6.79719E-02	1.29727E-01	7.0436703	1.9610098	1.2083381	0.1656919	29928875	0.7141
19	05497487	6.84199E-02	1.29481E-01	7.0582451	1.9531864	1.2059825	0.1721738	29920084	0.7617
20	05626830	6.88679E-02	1.29235E-01	7.0728199	1.9453630	1.2036269	0.1786557	29911293	0.8093
21	05756173	6.93159E-02	1.28989E-01	7.0873947	1.9375396	1.2012713	0.1851376	29902502	0.8569
22	05885516	6.97639E-02	1.28743E-01	7.1019695	1.9297162	1.1989157	0.1916195	29893711	0.9045
23	06014859	7.02119E-02	1.28497E-01	7.1165443	1.9218928	1.1965599	0.1981014	29884920	0.9521
24	06144202	7.06599E-02	1.28251E-01	7.1311191	1.9140694	1.1942043	0.2045833	29876129	1.0000

J	R	P	RHO	U	V	Z	W	(S-SINF)/CV	A	T	H/HT
24	.06246105	5.61478E-02	1.27342E-01	.72049346	.17650415	.07288560	.00546150	.29695923	1.0000	.4409	
K=17 PHI =140.0 Z = .10000											
3	.03404047	5.58581E-02	1.21290E-01	.68807753	.23472478	.10566074	.06446347	.30259318	0.0000	.4605	
4	.03545594	5.61815E-02	1.25778E-01	.68827640	.23171711	.10725252	.023355618	.29888749	.0076	.4487	
5	.03667142	5.64511E-02	1.27192E-01	.70116354	.23145150	.10748593	.02318709	.29791744	.0552	.4436	
6	.03828590	5.66711E-02	1.27531E-01	.70274723	.22748715	.11375233	.01019486	.29785509	.1429	.4434	
7	.03970239	5.68031E-02	1.28101E-01	.70411243	.22468973	.12158210	.00974954	.29780192	.1905	.4431	
8	.04111785	5.68911E-02	1.28368E-01	.70546381	.22178516	.08555171	.00740063	.29772391	.2381	.4431	
9	.04253333	5.69307E-02	1.28459E-01	.70666341	.21930472	.04712960	.00650885	.29769263	.2857	.4428	
10	.04394891	5.69591E-02	1.28469E-01	.70792495	.21633154	.00569054	.00317491	.29766312	.3333	.4426	
11	.04536429	5.68511E-02	1.28491E-01	.70926163	.21324278	.00423857	.00087385	.29763204	.3810	.4426	
12	.04677976	5.67361E-02	1.28339E-01	.71058233	.21122478	.00261963	.00045870	.29761369	.4286	.4423	
13	.04819524	5.66221E-02	1.28111E-01	.71194786	.20918752	.00114613	.00021454	.29759949	.4762	.4419	
14	.04961072	5.64551E-02	1.27889E-01	.71336816	.20745176	.00047267	.00013324	.29758399	.5238	.4414	
15	.05102720	5.62511E-02	1.27574E-01	.71484329	.20617740	.00016658	.000075117	.29756812	.5714	.4409	
16	.05244167	5.60161E-02	1.27212E-01	.71637991	.20516188	.00016730	.00015446	.29755284	.6190	.4403	
17	.05385715	5.57411E-02	1.26779E-01	.71798649	.20425100	.00010285	.00010285	.29753760	.6667	.4397	
18	.05527263	5.54021E-02	1.26252E-01	.71968271	.20343268	.00006905	.00006904	.29752234	.7143	.4389	
19	.05668810	5.50621E-02	1.25735E-01	.72140466	.20270379	.00004676	.00004676	.29750709	.7619	.4381	
20	.05810358	5.47148E-02	1.25141E-01	.72319419	.20206168	.000028178	.000028178	.29749183	.8095	.4372	
21	.05951906	5.42581E-02	1.24404E-01	.72504274	.20150591	.000016591	.000016591	.29747658	.8571	.4362	
22	.06093454	5.38038E-02	1.23576E-01	.72694235	.20102850	.000008231	.000008231	.29746133	.9048	.4351	
23	.06235001	5.33914E-02	1.22666E-01	.72889210	.20061751	.000002115	.000002115	.29744608	.9524	.4336	
24	.06376549	5.29544E-02	1.21788E-01	.73091791	.20026307	.000000000	.000000000	.29743083	1.0000	.4323	

K=18 PHI =150.0 Z = .10000

J	R	P	RHO	U	V	Z	W	(S-SINF)/CV	A	T	H/HT
3	.03404047	5.43226E-02	1.18914E-01	.69337383	.23026664	.08137863	.06446347	.30259318	0.0000	.4569	
4	.03551079	5.45156E-02	1.23574E-01	.70417161	.23036665	.08439688	.01601550	.29703187	.0476	.4412	
5	.03698111	5.46822E-02	1.24634E-01	.70683688	.23035500	.08178424	.00916410	.29623206	.0952	.4388	
6	.03845142	5.47914E-02	1.25162E-01	.70987487	.23032250	.08111190	.00609958	.29609958	.1429	.4364	
7	.03992174	5.48341E-02	1.25162E-01	.71304637	.22932360	.08455408	.00317679	.29603466	.1905	.4382	
8	.04139206	5.48551E-02	1.25062E-01	.71637375	.22831197	.07815013	.00137260	.29594118	.2381	.4379	
9	.04286238	5.47111E-02	1.24821E-01	.71984446	.22735119	.07287900	.00089000	.29587652	.2857	.4374	
10	.04433270	5.44723E-02	1.24516E-01	.72330504	.22635471	.06715945	.00035401	.29581173	.3333	.4377	
11	.04580302	5.41633E-02	1.24085E-01	.72681194	.22540558	.06186351	.00016190	.29574690	.3810	.4371	
12	.04727334	5.44672E-02	1.24785E-01	.73037786	.22446488	.05539418	.000365683	.29568217	.4286	.4367	
13	.04874366	5.43102E-02	1.24507E-01	.73405450	.22352116	.04819409	.00069237	.29561762	.4762	.4362	
14	.05021398	5.40511E-02	1.24118E-01	.73784110	.22258111	.04064318	.00084815	.29555306	.5238	.4357	
15	.05168430	5.36841E-02	1.23409E-01	.74174655	.22164115	.03250642	.00081800	.29548851	.5714	.4351	
16	.05315461	5.33221E-02	1.22374E-01	.74576118	.22070119	.02387812	.000329184	.29542385	.6190	.4344	
17	.05462493	5.29541E-02	1.22877E-01	.74989472	.21976119	.01483281	.000138752	.29535917	.6667	.4336	
18	.05609525	5.25821E-02	1.22332E-01	.75414826	.21882119	.00538594	.00007451	.29529452	.7143	.4328	
19	.05756557	5.22021E-02	1.21701E-01	.75850444	.21788119	.000000000	.000000000	.29522987	.7619	.4319	
20	.05903589	5.21576E-02	1.21015E-01	.76297169	.21694119	.000000000	.000000000	.29516522	.8095	.4309	
21	.06050621	5.16614E-02	1.20234E-01	.76754469	.21600119	.000000000	.000000000	.29510057	.8571	.4297	
22	.06197653	5.11711E-02	1.19415E-01	.77235782	.21506119	.000000000	.000000000	.29503592	.9048	.4285	
23	.06344685	5.04971E-02	1.18388E-01	.77741767	.21412119	.000000000	.000000000	.29497127	.9524	.4269	
24	.06491717	4.98877E-02	1.17296E-01	.78263520	.21318119	.000000000	.000000000	.29490662	1.0000	.4254	

K=19 PHI =100.0 Z = .10000

J	R	P	RHO	U	V	Z	W	(S-SINF)/CV	A	T	H/HT
3	.03404047	5.34476E-02	1.17521E-01	.69714538	.23711152	.05189252	.06446347	.30158447	0.0000	.4548	
4	.03553256	5.35295E-02	1.22434E-01	.70965740	.23620780	.05181170	.01212592	.29510505	.0476	.4372	
5	.03706886	5.35725E-02	1.23047E-01	.72111133	.23529405	.05036611	.00854500	.29508123	.0952	.4354	
6	.03857916	5.35944E-02	1.23184E-01	.73232594	.23430349	.05017475	.00318953	.29498253	.1429	.4351	
7	.04009285	5.35626E-02	1.23207E-01	.74344332	.23331732	.05159400	.00045836	.29488382	.1905	.4347	
8	.04160595	5.35051E-02	1.23153E-01	.75456049	.23233168	.05457719	.00005471	.29478513	.2381	.4345	
9	.04311905	5.34066E-02	1.23001E-01	.76568114	.23134623	.05555522	.000378124	.29468640	.2857	.4341	

J	R	P	RHO	U	V	W	(S-SINE)/CV	A	T	H/HT
10	04463214	5.32838E-02	1.22844E-01	71672.82	22319.12	05236132	00345382	29453423	3333	4339
11	04614524	5.31271E-02	1.22664E-01	71781.138	22646.329	05241842	00372652	29438944	3810	4333
12	04765833	5.29433E-02	1.22318E-01	71853.561	21833.5956	05244643	00351842	29421739	4286	4328
13	04917143	5.27272E-02	1.21978E-01	72066.83	21270.89	05249940	00286140	29403048	4762	4336
14	05068453	5.24845E-02	1.21551E-01	72123.75	213597499	05257891	00256261	29381945	5238	4310
15	052219762	5.22114E-02	1.21155E-01	72182.738	21121202	05261154	00256800	29359779	5714	4302
16	05371072	5.19155E-02	1.20636E-01	72263.29	20744.64	05267065	00244727	29333249	6190	4302
17	05522382	5.15747E-02	1.20111E-01	72364.69	20312.17	05272837	00231405	29304554	6667	4294
18	05671891	5.12131E-02	1.19513E-01	72486.97	20013.17	05278317	00218243	29274269	7143	4285
19	05822803	5.07544E-02	1.18848E-01	72630.02	20045.83	05284632	00205322	29249239	7619	4275
20	05976311	5.02929E-02	1.18104E-01	72785.61	19742.33	05291630	00192132	29220235	8095	4264
21	06127620	4.98244E-02	1.17321E-01	73050.40	19418.77	05299195	00179156	29195728	8571	4251
22	06278930	4.93599E-02	1.16536E-01	73440.02	19152.61	05307251	00165979	29172317	9048	4236
23	06430239	4.88946E-02	1.15706E-01	73958.55	18920.92	05315921	00153556	29149410	9524	4219
24	06581549	4.84335E-02	1.14801E-01	74609.94	18819.16	05325883	00142983	28992713	1.0000	4203

K=20 PHI =170.0 Z = .10000

J	R	P	RHO	U	V	W	(S-SINE)/CV	A	T	H/HT
3	03404047	5.30019E-02	1.16826E-01	69295.885	23603.95	02642565	04846347	30122418	0.0000	4537
4	03558987	5.27046E-02	1.21975E-01	71216.010	24847.852	02641543	04810442	29403265	0476	4349
5	03712157	5.23888E-02	1.22192E-01	71340.53	23612.677	02641638	04828095	29449018	1052	4336
6	03866212	5.20434E-02	1.22196E-01	71468.078	23476.866	02642760	04844294	28946859	1429	4333
7	04020267	5.28651E-02	1.22327E-01	71589.74	23112.17	02644957	04878999	29423567	1905	4329
8	04174322	5.27515E-02	1.21959E-01	71691.574	22743.660	02645335	04913056	29411998	2381	4322
9	04328377	5.26214E-02	1.21767E-01	71793.25	22472.462	02645705	04947078	29399049	2857	4322
10	04482432	5.24551E-02	1.21478E-01	71894.55	22241.445	02646080	04980578	29386258	3333	4317
11	04636487	5.23072E-02	1.21177E-01	72004.812	22047.24	02646452	04983230	29373258	3810	4312
12	04790542	5.20646E-02	1.20846E-01	72114.942	21883.66	02646812	04985852	29360337	4286	4306
13	04944597	5.18165E-02	1.20493E-01	72225.559	21733.30	02647172	04988499	29347419	4762	4300
14	05098652	5.15502E-02	1.20132E-01	72337.628	21610.332	02647562	04991203	29334514	5238	4293
15	05252707	5.12691E-02	1.19759E-01	72451.893	21503.565	02647954	04993935	29321618	5714	4286
16	05406762	5.09711E-02	1.19374E-01	72567.376	21403.74	02648321	04996682	29308723	6190	4278
17	05560817	5.06502E-02	1.18984E-01	72684.000	21310.952	02648683	04999430	29295828	6667	4269
18	05714872	5.03013E-02	1.18592E-01	72801.648	21224.322	02649031	05002177	29282933	7143	4259
19	05868927	4.99337E-02	1.18191E-01	72920.211	21143.540	02649375	05004923	29270038	7619	4249
20	06022983	4.95524E-02	1.17781E-01	73040.781	21068.493	02649716	05007669	29257143	8095	4237
21	06177038	4.91574E-02	1.17364E-01	73162.427	21000.005	02650052	05010416	29244248	8571	4223
22	06331093	4.87504E-02	1.16941E-01	73285.075	20937.570	02650383	05013161	29231353	9048	4209
23	06485148	4.83336E-02	1.16513E-01	73408.728	20879.350	02650709	05015907	29218458	9524	4190
24	06639203	4.79106E-02	1.16083E-01	73506.799	20825.956	02651032	05018654	28946363	1.0000	4172

K=21 PHI =180.0 Z = .10000

J	R	P	RHO	U	V	W	(S-SINE)/CV	A	T	H/HT
3	03104047	5.28103E-02	1.16574E-01	68995.947	23846.945	02648370	04846347	30109281	0.0000	4533
4	03258987	5.25044E-02	1.21975E-01	71219.561	24847.852	02648370	04810442	29403265	0476	4342
5	03412928	5.21975E-02	1.21875E-01	71461.669	23545.15	02648370	04815157	29432567	1052	4331
6	03566869	5.20222E-02	1.21849E-01	71524.297	23404.330	02648370	04824770	29417212	1429	4327
7	04022529	5.28244E-02	1.21743E-01	71635.56	23174.30	02648370	04858034	28943772	1905	4323
8	04178750	5.26923E-02	1.21539E-01	71746.119	23010.499	02648370	04881823	29330313	2381	4319
9	04333690	5.25184E-02	1.21324E-01	71857.114	22844.487	02648370	04905618	29316985	2857	4315
10	04489631	5.23592E-02	1.21106E-01	71978.52	22684.430	02648370	04929413	29303654	3333	4310
11	04645572	5.19754E-02	1.20638E-01	72099.668	22533.266	02648370	04953208	29290249	3810	4305
12	04801512	5.17483E-02	1.20358E-01	72220.812	22382.102	02648370	04977003	29276844	4286	4299
13	04957453	5.15051E-02	1.19991E-01	72342.949	22230.937	02648370	04980798	29263439	4762	4292
14	05113394	5.12524E-02	1.19624E-01	72465.086	22079.772	02648370	04984593	29250034	5238	4285
15	05269335	5.09901E-02	1.19257E-01	72587.223	21928.607	02648370	04988388	29236629	5714	4278
16	05425276	5.07274E-02	1.18890E-01	72709.360	21777.442	02648370	04992183	29223224	6190	4269
17	05581217	5.04647E-02	1.18523E-01	72831.497	21626.277	02648370	04995978	29209819	6667	4259
18	05737158	5.02020E-02	1.18156E-01	72953.634	21475.112	02648370	04999773	29196414	7143	4249
19	05893099	4.99393E-02	1.17789E-01	73075.771	21323.947	02648370	05003568	29183009	7619	4237
20	06049040	4.96766E-02	1.17422E-01	73197.908	21172.782	02648370	05007363	29169604	8095	4228
21	06204981	4.94139E-02	1.17055E-01	73320.045	21021.617	02648370	05011158	29156199	8571	4214
22	06360922	4.91512E-02	1.16688E-01	73442.182	20870.452	02648370	05014953	29142794	9048	4200
24	06616863	4.86885E-02	1.16083E-01	73906.799	20825.956	02651032	05018654	28946363	1.0000	4172

23	.06502859	4.70495E-02	1.12559E-01	.73789+03	.1937+783	0.00000000	.00140978	.25913252	.9524	.4180
24	.06657800	4.63281E-02	1.11331E-01	.75598590	.19000454	0.00000000	.00133808	.28848878	1.0000	.4161

X/L = .002959 DZDT = .01156 ITER = 0

PHI	RB	CP	P/PINF	R/RINF	M-Z	M-R	M-PHI	A	COMP	H/HT	TEMP	(S-S.INF)/CV
0.0	.0340	.5004	3.8654E+00	2.5012E+00	1.7784	.6054	0.0000	3.4241E-01	1.0000	.58622	.00	6.8463E-02
10.0	.0340	.4934	3.8705E+00	2.4831E+00	1.7840	.6076	.0618	3.4074E-01	1.0000	.59498	.00	6.8463E-02
20.0	.0340	.4869	3.8753E+00	2.4694E+00	1.7886	.6102	.1227	3.4094E-01	1.0000	.56153	.00	6.8463E-02
30.0	.0340	.4816	3.8809E+00	2.4618E+00	1.8105	.6142	.1843	3.3941E-01	1.0000	.57537	.00	6.8463E-02
40.0	.0340	.4772	3.8866E+00	2.4604E+00	1.8317	.6345	.2355	3.3694E-01	1.0000	.56731	.00	6.8463E-02
50.0	.0340	.4719	3.8933E+00	2.4785E+00	1.8656	.6350	.2936	3.3325E-01	1.0000	.55742	.00	6.8463E-02
60.0	.0340	.4659	3.9014E+00	2.4943E+00	1.9223	.6476	.3431	3.3041E-01	1.0000	.54605	.00	6.8463E-02
70.0	.0340	.4610	3.9110E+00	2.5177E+00	1.9448	.6520	.3870	3.2859E-01	1.0000	.53360	.00	6.8463E-02
80.0	.0340	.4570	3.9220E+00	2.5491E+00	1.9916	.6779	.4233	3.2263E-01	1.0000	.52055	.00	6.8463E-02
90.0	.0340	.4532	3.9343E+00	2.5931E+00	2.0414	.6949	.4652	3.1858E-01	1.0000	.50746	.00	6.8463E-02
100.0	.0340	.4496	3.9481E+00	2.6497E+00	2.0937	.7124	.4643	3.1461E-01	1.0000	.49489	.00	6.8463E-02
110.0	.0340	.4462	3.9634E+00	2.7193E+00	2.1434	.7276	.4657	3.1078E-01	1.0000	.48216	.00	6.8463E-02
120.0	.0340	.4430	3.9801E+00	2.7997E+00	2.1907	.7400	.4673	3.0531E-01	1.0000	.47375	.00	6.8463E-02
130.0	.0340	.4400	3.9981E+00	2.8904E+00	2.2325	.7498	.4680	3.0349E-01	1.0000	.46609	.00	6.8463E-02
140.0	.0340	.4374	4.0174E+00	2.9914E+00	2.2672	.7568	.4680	3.0229E-01	1.0000	.46034	.00	6.8463E-02
150.0	.0340	.4351	4.0381E+00	3.1028E+00	2.2937	.7608	.4682	3.0229E-01	1.0000	.45691	.00	6.8463E-02
160.0	.0340	.4331	4.0601E+00	3.2254E+00	2.3116	.7669	.4677	3.0158E-01	1.0000	.45477	.00	6.8463E-02
170.0	.0340	.4314	4.0841E+00	3.3597E+00	2.3214	.7902	.4677	3.0124E-01	1.0000	.45368	.00	6.8463E-02
180.0	.0340	.4300	4.1101E+00	3.5156E+00	2.3247	.7913	0.0000	3.0109E-01	1.0000	.45328	.00	6.8463E-02

BODY RWG SMOCK GEOMETRY AT Z = .100

PHI	RB	CP	P/PINF	R/RINF	M-Z	M-R	M-PHI	A	COMP	H/HT	TEMP	(S-S.INF)/CV
0.0	.0340	.5004	3.8654E+00	2.5012E+00	1.7784	.6054	0.0000	3.4241E-01	1.0000	.58622	.00	6.8463E-02
10.0	.0340	.4934	3.8705E+00	2.4831E+00	1.7840	.6076	.0618	3.4074E-01	1.0000	.59498	.00	6.8463E-02
20.0	.0340	.4869	3.8753E+00	2.4694E+00	1.7886	.6102	.1227	3.4094E-01	1.0000	.56153	.00	6.8463E-02
30.0	.0340	.4816	3.8809E+00	2.4618E+00	1.8105	.6142	.1843	3.3941E-01	1.0000	.57537	.00	6.8463E-02
40.0	.0340	.4772	3.8866E+00	2.4604E+00	1.8317	.6345	.2355	3.3694E-01	1.0000	.56731	.00	6.8463E-02
50.0	.0340	.4719	3.8933E+00	2.4785E+00	1.8656	.6350	.2936	3.3325E-01	1.0000	.55742	.00	6.8463E-02
60.0	.0340	.4659	3.9014E+00	2.4943E+00	1.9223	.6476	.3431	3.3041E-01	1.0000	.54605	.00	6.8463E-02
70.0	.0340	.4610	3.9110E+00	2.5177E+00	1.9448	.6520	.3870	3.2859E-01	1.0000	.53360	.00	6.8463E-02
80.0	.0340	.4570	3.9220E+00	2.5491E+00	1.9916	.6779	.4233	3.2263E-01	1.0000	.52055	.00	6.8463E-02
90.0	.0340	.4532	3.9343E+00	2.5931E+00	2.0414	.6949	.4652	3.1858E-01	1.0000	.49489	.00	6.8463E-02
100.0	.0340	.4496	3.9481E+00	2.6497E+00	2.0937	.7124	.4643	3.1461E-01	1.0000	.48216	.00	6.8463E-02
110.0	.0340	.4462	3.9634E+00	2.7193E+00	2.1434	.7276	.4657	3.1078E-01	1.0000	.47375	.00	6.8463E-02
120.0	.0340	.4430	3.9801E+00	2.7997E+00	2.1907	.7400	.4673	3.0531E-01	1.0000	.46609	.00	6.8463E-02
130.0	.0340	.4400	3.9981E+00	2.8904E+00	2.2325	.7498	.4680	3.0349E-01	1.0000	.46034	.00	6.8463E-02
140.0	.0340	.4374	4.0174E+00	2.9914E+00	2.2672	.7568	.4680	3.0229E-01	1.0000	.45691	.00	6.8463E-02
150.0	.0340	.4351	4.0381E+00	3.1028E+00	2.2937	.7608	.4682	3.0229E-01	1.0000	.45477	.00	6.8463E-02
160.0	.0340	.4331	4.0601E+00	3.2254E+00	2.3116	.7669	.4677	3.0158E-01	1.0000	.45477	.00	6.8463E-02
170.0	.0340	.4314	4.0841E+00	3.3597E+00	2.3214	.7902	.4677	3.0124E-01	1.0000	.45368	.00	6.8463E-02
180.0	.0340	.4300	4.1101E+00	3.5156E+00	2.3247	.7913	0.0000	3.0109E-01	1.0000	.45328	.00	6.8463E-02

X/L = .022675 DZDT = .136026 ITER = 250

PHI	RB	CP	P/PINF	R/RINF	M-Z	M-R	M-PHI	A	COMP	H/HT	TEMP	(S-S.INF)/CV
0.0	.2485	.4409	3.5294E+00	2.3419E+00	1.8515	.5680	0.0000	3.3193E-01	1.0000	.57098	.00	6.8463E-02
10.0	.2485	.4363	3.4981E+00	2.3221E+00	1.8512	.5680	.0627	3.3151E-01	1.0000	.56975	.00	6.8463E-02
20.0	.2485	.4327	3.4701E+00	2.2921E+00	1.8482	.5714	.1247	3.3049E-01	1.0000	.56611	.00	6.8463E-02
30.0	.2485	.4290	3.4402E+00	2.2621E+00	1.8463	.5769	.1856	3.2941E-01	1.0000	.56015	.00	6.8463E-02
40.0	.2485	.4255	3.4095E+00	2.2321E+00	1.8418	.5847	.2447	3.2827E-01	1.0000	.55208	.00	6.8463E-02
50.0	.2485	.4220	3.3781E+00	2.2021E+00	1.8418	.5945	.3008	3.2712E-01	1.0000	.54217	.00	6.8463E-02
60.0	.2485	.4185	3.3468E+00	2.1721E+00	1.8422	.6042	.3537	3.2597E-01	1.0000	.53068	.00	6.8463E-02
70.0	.2485	.4150	3.3154E+00	2.1421E+00	1.8422	.6136	.4022	3.2482E-01	1.0000	.51809	.00	6.8463E-02
80.0	.2485	.4115	3.2841E+00	2.1121E+00	1.8422	.6225	.4410	3.2367E-01	1.0000	.50509	.00	6.8463E-02
90.0	.2485	.4080	3.2528E+00	2.0821E+00	1.8422	.6308	.4648	3.2252E-01	1.0000	.49215	.00	6.8463E-02
100.0	.2485	.4045	3.2215E+00	2.0521E+00	1.8422	.6388	.4829	3.2137E-01	1.0000	.47977	.00	6.8463E-02
110.0	.2485	.4010	3.1902E+00	2.0221E+00	1.8422	.6462	.4989	3.2022E-01	1.0000	.46861	.00	6.8463E-02
120.0	.2485	.3975	3.1589E+00	1.9921E+00	1.8422	.6532	.5122	3.1907E-01	1.0000	.45823	.00	6.8463E-02
130.0	.2485	.3940	3.1276E+00	1.9621E+00	1.8422	.6598	.5232	3.1792E-01	1.0000	.44923	.00	6.8463E-02
140.0	.2485	.3905	3.0963E+00	1.9321E+00	1.8422	.6659	.5322	3.1677E-01	1.0000	.44192	.00	6.8463E-02
150.0	.2485	.3870	3.0650E+00	1.9021E+00	1.8422	.6715	.5397	3.1562E-01	1.0000	.43512	.00	6.8463E-02
160.0	.2485	.3835	3.0337E+00	1.8721E+00	1.8422	.6765	.5457	3.1447E-01	1.0000	.42882	.00	6.8463E-02
170.0	.2485	.3800	3.0024E+00	1.8421E+00	1.8422	.6809	.5508	3.1332E-01	1.0000	.42302	.00	6.8463E-02
180.0	.2485	.3765	2.9711E+00	1.8121E+00	1.8422	.6848	.5550	3.1217E-01	1.0000	.41772	.00	6.8463E-02

J	R	P	RHO	U	Y	W	(S-SINF)/CY	A	T	H/HT
3	1.30000000	4.12295E-02	9.76394E-02	76008991	-0.0000000	0.00550000	0.00446347	29007696	0.0000	4223
4	1.49438474	4.19185E-02	1.00465E-01	76694577	-0.0000000	0.00000000	0.01715336	28706816	0.0476	4119
5	1.68876949	4.10254E-02	1.00519E-01	76833784	-0.0000000	0.00000000	0.02234005	28563556	0.0952	4079
6	1.88315423	4.02537E-02	1.00777E-01	76877256	-0.0000000	0.00000000	0.01211154	28495702	0.1429	4060
7	2.07753698	4.03814E-02	9.98657E-02	76911373	-0.0000000	0.00000000	0.01626859	28433441	0.1905	4043
8	2.27192372	4.01857E-02	9.97413E-02	76945490	-0.0000000	0.00000000	0.01403639	28371774	0.2381	4032
9	2.46630647	4.00337E-02	9.95151E-02	76979607	-0.0000000	0.00000000	0.01103725	28309998	0.2857	4023
10	2.66069321	3.99913E-02	9.92889E-02	76991235	-0.0000000	0.00000000	0.01003725	28248222	0.3333	4018
11	2.85507795	4.00615E-02	9.91257E-02	76993518	-0.0000000	0.00000000	0.00903725	28186446	0.3810	4016
12	3.04946270	4.02047E-02	9.91010E-02	76995801	-0.0000000	0.00000000	0.00803725	28124670	0.4286	4012
13	3.24384744	3.98347E-02	9.90763E-02	76998084	-0.0000000	0.00000000	0.00703725	28062894	0.4762	4005
14	3.43823219	3.95557E-02	9.90516E-02	76999367	-0.0000000	0.00000000	0.00603725	28001118	0.5238	4006
15	3.63261693	4.00337E-02	1.00000E-01	76999367	-0.0000000	0.00000000	0.00503725	27939342	0.5714	4021
16	3.82700168	4.15707E-02	1.00000E-01	76999367	-0.0000000	0.00000000	0.00403725	27877566	0.6190	4047
17	4.02138642	4.21281E-02	1.00000E-01	76999367	-0.0000000	0.00000000	0.00303725	27815790	0.6667	4079
18	4.21577116	4.46103E-02	1.00000E-01	76999367	-0.0000000	0.00000000	0.00203725	27754014	0.7143	4112
19	4.41015591	4.55112E-02	1.00000E-01	76999367	-0.0000000	0.00000000	0.00103725	27692238	0.7619	4145
20	4.60454065	4.65131E-02	1.11544E-01	76999367	-0.0000000	0.00000000	0.00003725	27630462	0.8095	4177
21	4.79892540	4.76774E-02	1.13747E-01	76999367	-0.0000000	0.00000000	0.00003725	27568686	0.8571	4208
22	4.99331014	4.90744E-02	1.15840E-01	76999367	-0.0000000	0.00000000	0.00003725	27506910	0.9048	4237
23	5.18769488	5.03428E-02	1.17266E-01	76999367	-0.0000000	0.00000000	0.00003725	27445134	0.9524	4267
24	5.38207963	5.13593E-02	1.17975E-01	76999367	-0.0000000	0.00000000	0.00003725	27383358	1.0000	4292

K=3 PHI = 0.0 Z = 15.592103

J	R	P	RHO	U	Y	W	(S-SINF)/CY	A	T	H/HT
3	1.30000000	4.10156E-02	9.67515E-02	76008991	-0.0000000	0.0475215	0.0646347	29007696	0.0000	4207
4	1.49331176	4.10125E-02	9.59511E-02	76694577	-0.0000000	0.0310047	0.03101807	28661229	0.0476	4107
5	1.69078152	4.05471E-02	9.59465E-02	76833784	-0.0000000	0.0290933	0.02286870	28531860	0.0952	4070
6	1.88017528	4.03857E-02	9.56403E-02	76877256	-0.0000000	0.0279715	0.01915456	28402491	0.1429	4052
7	2.00158704	4.01531E-02	9.54604E-02	76911373	-0.0000000	0.0268497	0.01609808	28273122	0.1905	4037
8	2.17032490	3.97263E-02	9.51094E-02	76945490	-0.0000000	0.0257279	0.01411791	28143753	0.2381	4026
9	2.34735536	3.95774E-02	9.50014E-02	76979607	-0.0000000	0.0246062	0.01230651	28014384	0.2857	4018
10	2.46774232	3.96145E-02	9.49034E-02	76991235	-0.0000000	0.0234845	0.0104057	27885015	0.3333	4013
11	2.66313408	3.95076E-02	9.48054E-02	76993518	-0.0000000	0.0223628	0.00848742	27755646	0.3810	4012
12	3.05852595	3.96578E-02	9.46478E-02	76995801	-0.0000000	0.0212411	0.00656912	27626277	0.4286	4003
13	3.25291761	3.97292E-02	9.42814E-02	76998084	-0.0000000	0.0201194	0.00465082	27496908	0.4762	4002
14	3.44730927	3.95463E-02	9.39054E-02	76999367	-0.0000000	0.0189977	0.00273254	27367539	0.5238	4003
15	3.64170113	4.04442E-02	1.00657E-01	76999367	-0.0000000	0.0178760	0.00081511	27238170	0.5714	4018
16	3.80000000	4.14421E-02	1.02467E-01	76999367	-0.0000000	0.0167543	0.00000000	27108801	0.6190	4045
17	4.03544655	4.24400E-02	1.04282E-01	76999367	-0.0000000	0.0156326	0.00000000	26979432	0.6667	4076
18	4.23083641	4.34379E-02	1.06097E-01	76999367	-0.0000000	0.0145109	0.00000000	26850063	0.7143	4110
19	4.42622627	4.53358E-02	1.07912E-01	76999367	-0.0000000	0.0133892	0.00000000	26720694	0.7619	4143
20	4.62161613	4.65137E-02	1.11421E-01	76999367	-0.0000000	0.0122675	0.00000000	26591325	0.8095	4175
21	4.81700599	4.77952E-02	1.13634E-01	76999367	-0.0000000	0.0111458	0.00000000	26461956	0.8571	4206
22	5.01239585	4.90003E-02	1.15692E-01	76999367	-0.0000000	0.0100241	0.00000000	26332587	0.9048	4235
23	5.20778571	5.02003E-02	1.17448E-01	76999367	-0.0000000	0.0089024	0.00000000	26203218	0.9524	4265
24	5.40317557	5.11163E-02	1.15003E-01	76999367	-0.0000000	0.0077807	0.00000000	26073849	1.0000	4290

K=4 PHI = 10.0 Z = 15.592103

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/Ht
3	1.30000000	3.91271E-02	9.41767E-02	7690166	-0.00030000	06942891	06846347	28551630	0.0000	4162
4	1.49640691	3.96241E-02	9.77825E-02	7667326	-0.02439755	06584222	03172962	28540213	0476	4073
5	1.69681382	3.9752E-02	9.82662E-02	7684883	-0.04027104	05990761	02373677	28434540	0952	4043
6	1.89522072	3.95894E-02	9.82662E-02	7689717	-0.05159592	05552251	01911395	28591938	1429	4029
7	2.09362763	3.94734E-02	9.82662E-02	7693719	-0.05991961	05274507	01605975	28545101	1905	4017
8	2.29203454	3.93510E-02	9.82662E-02	7697378	-0.06633777	05036193	01406654	28316481	2381	4009
9	2.49044145	3.92278E-02	9.82662E-02	7694119	-0.07185789	04900485	01233352	28252469	2857	4002
10	2.68884836	3.91048E-02	9.84191E-02	7694905	-0.07601107	04784753	01096769	282282161	3333	3999
11	2.88725527	3.89788E-02	9.86997E-02	7694714	-0.07879745	04687582	00978661	28218708	3810	3999
12	3.08566217	3.88543E-02	9.87367E-02	7693733	-0.07970913	04601933	00861143	28208888	4286	3996
13	3.28406908	3.87348E-02	9.88066E-02	7692958	-0.08275368	04532665	00794879	28205246	4762	3990
14	3.48247599	3.86143E-02	9.89551E-02	7692512	-0.08471514	04472053	00720534	28205246	5238	3993
15	3.68088290	4.01571E-02	1.00150E-01	7681721	-0.0817321	043409751	00656922	28318587	5714	4010
16	3.87928981	4.11828E-02	1.02000E-01	7676212	-0.07819947	043409751	00656922	28414851	6190	4037
17	4.07769672	4.24051E-02	1.04335E-01	7652387	-0.0467281	043409751	00656922	28528533	6667	4069
18	4.27610362	4.36274E-02	1.06936E-01	7631891	-0.03762158	04250923	00591120	28646320	7143	4103
19	4.47451053	4.50075E-02	1.08794E-01	7619108	-0.0853147	04160937	00528281	28762792	7619	4136
20	4.67291744	4.62346E-02	1.11030E-01	7606316	-0.05169139	04115958	00491319	28879433	8095	4169
21	4.87132435	4.75707E-02	1.13253E-01	7584204	-0.05764706	04036154	00459450	28994103	8571	4200
22	5.06973126	4.87710E-02	1.15311E-01	7560885	-0.0594744	04036154	00459450	29094125	9018	4229
23	5.26813817	4.99713E-02	1.17151E-01	7540292	-0.0497460	03983229	00432410	29190275	9524	4260
24	5.46654507	5.10873E-02	1.19246E-01	7535386	-0.04686622	03953827	004297066	29271773	1.0000	4284

K = 6 PHI = 30.0 Z = 15.592103

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/Ht
3	1.30000000	3.68224E-02	9.00651E-02	7619506	-0.00000000	10364429	06816347	28595186	0.0000	4088
4	1.50345872	3.79502E-02	9.45026E-02	7642254	-0.0250459	09781574	03152474	28340322	0476	4016
5	1.70691745	3.83102E-02	9.55875E-02	7689178	-0.0484921	0848921	02314485	28275088	0952	3997
6	1.91037617	3.8319E-02	9.60057E-02	7693364	-0.04721570	0841542	01888394	28259767	1429	3992
7	2.11383489	3.82662E-02	9.63495E-02	7697629	-0.0489345	07810999	01592047	28230555	1905	3985
8	2.31729262	3.84735E-02	9.6548E-02	7699306	-0.0634954	07521098	01491555	28215450	2381	3981
9	2.52075106	3.84735E-02	9.67421E-02	7699426	-0.0631333	0738681	01217298	28202101	2857	3977
10	2.72421106	3.85949E-02	9.70571E-02	7699624	-0.0620945	0726279	01168005	28201076	3333	3977
11	2.92766978	3.87616E-02	9.74345E-02	7699753	-0.0737176	06941116	00962135	282004573	3810	3978
12	3.13112851	3.8773E-02	9.75297E-02	7699355	-0.0736752	0678694	00842897	28197839	4286	3976
13	3.33458723	3.81155E-02	9.74902E-02	7698618	-0.09471530	0665366	00716913	28183426	4762	3972
14	3.53804595	3.82662E-02	9.75831E-02	7698581	-0.0766742	06481130	00702509	28201416	5238	3977
15	3.74150468	3.96797E-02	9.93104E-02	7687967	-0.046123	06185100	00639358	28268452	5714	3976
16	3.94496340	4.07478E-02	1.01024E-01	7671474	-0.0102171	06185100	00639358	28370176	6190	4024
17	4.14842212	4.19926E-02	1.03492E-01	76544781	-0.0415751	06185100	00639358	28487121	6667	4058
18	4.35188065	4.32648E-02	1.05810E-01	7638301	-0.0616552	06185100	00639358	28606051	7143	4092
19	4.55533557	4.47066E-02	1.08138E-01	7621524	-0.0513472	06113459	00440940	28725009	7619	4126
20	4.75879282	4.59263E-02	1.10376E-01	7604708	-0.0496314	06113459	00440940	28844059	8095	4153
21	4.96225702	4.71883E-02	1.12615E-01	7587996	-0.04900181	05926865	00367952	28963923	8571	4190
22	5.16571574	4.83904E-02	1.14884E-01	7564404	-0.0494100	05742610	00356118	29049998	9048	4219
23	5.36917446	4.96978E-02	1.16911E-01	7540890	-0.0494745	0563678	00350940	29157932	9524	4251
24	5.57263319	5.07121E-02	1.19333E-01	7535361	-0.04886598	05594253	003481671	29239358	1.0000	4275

K = 7 PHI = 40.0 Z = 15.592103

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/Ht
3	1.30000000	3.37690E-02	8.46632E-02	7630439	-0.00000000	1375072	06846347	28243634	0.0000	3989
4	1.51056585	3.55413E-02	9.01495E-02	7674303	-0.01947502	1282875	03076364	28072396	0476	3940
5	1.72113170	3.62544E-02	9.20302E-02	76924611	-0.0461347	11623347	02193357	28061596	0952	3937
6	1.93169755	3.66777E-02	9.30566E-02	76974569	-0.06067441	10801945	01974075	28076477	1429	3941
7	2.14226340	3.6665E-02	9.37605E-02	7701267	-0.04771539	10276589	01575509	28077457	1905	3942
8	2.35282925	3.71607E-02	9.43660E-02	7704762	-0.04648330	09798976	01372855	28080442	2381	3943
9	2.56333510	3.71535E-02	9.47394E-02	7707416	-0.0461792	09798976	01372855	28081482	2857	3943
10	2.77396095	3.76877E-02	9.52594E-02	7701560	-0.0444850	09401110	01058830	28092922	3333	3946
11	2.98450680	3.78235E-02	9.57613E-02	7701194	-0.0449571	09401110	01058830	28105711	3810	3950
12	3.19509265	3.79742E-02	9.62424E-02	7702596	-0.045125	09401110	01058830	28110571	4286	3948
13	3.40568850	3.78925E-02	9.60173E-02	7703267	-0.0467286	09401110	01058830	28109428	4762	3948
14	3.61628435	3.82436E-02	9.67626E-02	7699357	-0.0663133	0883606	00678365	28123942	5238	3955

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
15	3.02679020	3.90491E-02	9.01964E-02	7.6890641	-0.374132	0.0005943	0.0615391	2.29201361	0.5714	3.977
16	4.03735605	4.01693E-02	1.60349E-01	7.6737155	-0.376700	0.0004713	0.0595947	2.28309836	0.6190	4.007
17	4.24792190	4.14327E-02	1.0774E-01	7.6561170	-0.373765	0.0013176	0.0616615	2.26470737	0.667	4.042
18	4.45948175	4.27528E-02	1.04836E-01	7.6371960	-0.371113	0.0031710	0.0649003	2.24552978	0.7193	4.076
19	4.66903560	4.40739E-02	1.07817E-01	7.6182461	-0.368360	0.0050307	0.0681343	2.22635268	0.7859	4.111
20	4.87561945	4.53646E-02	1.09494E-01	7.6011192	-0.365610	0.0071912	0.0719313	2.20717619	0.8571	4.144
21	5.07918330	4.66468E-02	1.11173E-01	7.5857940	-0.362860	0.0095473	0.0761882	2.18799934	0.9284	4.176
22	5.28075115	4.79291E-02	1.12853E-01	7.5716193	-0.360110	0.0121147	0.0808436	2.16882261	0.9988	4.208
23	5.48131700	4.92114E-02	1.14534E-01	7.5574442	-0.357360	0.0147429	0.0859077	2.14964586	1.0684	4.240
24	5.68188285	5.04936E-02	1.17166E-01	7.5432691	-0.354610	0.0173759	0.0913102	2.13046911	1.1380	4.272
3	1.30000000	3.02229E-02	7.82146E-02	7.6452112	0.0000000	1.7057897	0.04840347	2.7799640	0.0000	3.664
4	1.51977340	3.27045E-02	8.50649E-02	7.6603960	-0.1530457	1.5850260	0.0519446	2.7339093	0.0476	3.947
5	1.73954680	3.51870E-02	9.19173E-02	7.6755808	-0.3074225	1.4262902	0.0574472	2.6797499	0.0952	3.664
6	1.95932020	3.74729E-02	9.85938E-02	7.6907656	-0.4723680	1.2215001	0.0648839	2.6185682	0.1429	3.680
7	2.17909360	3.97589E-02	1.07038E-02	7.7059504	-0.6473350	1.0167147	0.0738744	2.5573874	0.1905	3.889
8	2.39886701	4.20448E-02	1.15136E-02	7.7211352	-0.8223032	0.8120258	0.0838650	2.4962067	0.2381	3.896
9	2.61864041	4.43307E-02	1.23234E-02	7.7363200	-1.0072714	0.6072953	0.0948558	2.4350260	0.2857	3.901
10	2.83841381	4.66166E-02	1.31332E-02	7.7515048	-1.1922400	0.4027648	0.1058466	2.3738453	0.3333	3.908
11	3.05818721	4.89025E-02	1.39430E-02	7.7666896	-1.3772084	0.2076949	0.1168374	2.3126646	0.3810	3.914
12	3.27796061	5.11884E-02	1.47528E-02	7.7818744	-1.5621768	0.0234419	0.1278282	2.2514839	0.4286	3.914
13	3.49773401	5.34743E-02	1.55626E-02	7.7970592	-1.7471452	0.1668340	0.1388190	2.1903031	0.4762	3.915
14	3.71750741	5.57602E-02	1.63724E-02	7.8122440	-1.9321136	0.3062261	0.1498102	2.1291224	0.5238	3.920
15	3.93728081	5.80461E-02	1.71822E-02	7.8274288	-2.1170820	0.4456182	0.1608014	2.0679417	0.5714	3.933
16	4.15705421	6.03320E-02	1.79920E-02	7.8426136	-2.3020504	0.5850103	0.1717926	2.0067610	0.6190	3.926
17	4.37682761	6.26179E-02	1.88018E-02	7.8577984	-2.4870188	0.7244024	0.1827838	1.9455803	0.6667	4.021
18	4.59660102	6.49038E-02	1.96116E-02	7.8729832	-2.6719872	0.8637945	0.1937750	1.8844018	0.7143	4.057
19	4.81637442	6.71897E-02	2.04214E-02	7.8881680	-2.8569556	1.0031866	0.2047662	1.8232231	0.7619	4.092
20	5.03614782	6.94756E-02	2.12312E-02	7.9033528	-3.0419240	1.1425787	0.2157574	1.7620446	0.8095	4.125
21	5.25592122	7.17615E-02	2.20410E-02	7.9185376	-3.2268924	1.2819708	0.2267486	1.7008661	0.8571	4.158
22	5.47569462	7.40474E-02	2.28508E-02	7.9337224	-3.4118608	1.4211829	0.2377398	1.6396876	0.9048	4.188
23	5.69546802	7.63333E-02	2.36606E-02	7.9489072	-3.5968292	1.5603950	0.2487310	1.5785091	0.9524	4.221
24	5.91524142	7.86192E-02	2.44704E-02	7.9640920	-3.7817976	1.7006071	0.2597222	1.5173306	1.0000	4.254

K-0 PHI = 50.0 Z = 15.592103

K-9 PHI = 60.0 Z = 15.592103

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	2.63906E-02	7.09947E-02	7.6609539	0.0000000	2.0339922	0.04840347	2.7266339	0.0000	3.717
4	1.53039410	2.98699E-02	7.93324E-02	7.6811073	-0.0311115	1.8688811	0.0525680	2.7355129	0.0476	3.740
5	1.76226821	3.34375E-02	8.51125E-02	7.7012924	-0.1830445	1.6176041	0.0574472	2.7442417	0.0952	3.779
6	1.99413231	3.70061E-02	8.94949E-02	7.7214772	-0.3349314	1.3910649	0.0623905	2.7529705	0.1429	3.810
7	2.22600642	4.05747E-02	9.38774E-02	7.7416620	-0.4868183	1.1745323	0.0673262	2.7617000	0.1905	3.828
8	2.45788053	4.40433E-02	9.82607E-02	7.7618468	-0.6387052	0.9579711	0.0722618	2.7704287	0.2381	3.842
9	2.68975462	4.75120E-02	1.02644E-02	7.7820316	-0.7905920	0.7414593	0.0771972	2.7791574	0.2857	3.853
10	2.92162873	5.09807E-02	1.06816E-02	7.8022164	-0.9424788	0.5250266	0.0821328	2.7878861	0.3333	3.864
11	3.15350283	5.44494E-02	1.11000E-02	7.8224012	-1.0943656	0.3085941	0.0870684	2.7966148	0.3810	3.872
12	3.38537693	5.79181E-02	1.15184E-02	7.8425860	-1.2462524	0.0924833	0.0920040	2.8053435	0.4286	3.874
13	3.61725104	6.13868E-02	1.19368E-02	7.8627708	-1.3981392	0.1078983	0.0969396	2.8140722	0.4762	3.879
14	3.84912514	6.48555E-02	1.23552E-02	7.8829556	-1.5500260	0.2644743	0.1018841	2.8228009	0.5238	3.876
15	4.08100025	6.83242E-02	1.27736E-02	7.9031404	-1.7019128	0.4209592	0.1068694	2.8315296	0.5714	3.925
16	4.31287535	7.17929E-02	1.31920E-02	7.9233252	-1.8537996	0.5774440	0.1118548	2.8402583	0.6190	3.960
17	4.54475045	7.52616E-02	1.36104E-02	7.9435100	-2.0056860	0.7339288	0.1168402	2.8489870	0.6667	3.997
18	4.77662555	7.87303E-02	1.40288E-02	7.9636948	-2.1575724	0.8904136	0.1218256	2.8577157	0.7143	4.033
19	5.00850065	8.21990E-02	1.44472E-02	7.9838796	-2.3094588	1.0468984	0.1268110	2.8664444	0.7619	4.069
20	5.24037575	8.56677E-02	1.48656E-02	8.0040644	-2.4613452	1.2033832	0.1317964	2.8751731	0.8095	4.103
21	5.47225085	8.91364E-02	1.52840E-02	8.0242492	-2.6132316	1.3598680	0.1367818	2.8839018	0.8571	4.136
22	5.70412595	9.26051E-02	1.57024E-02	8.0444340	-2.7651180	1.5163528	0.1417672	2.8926305	0.9048	4.167
23	5.93600105	9.60738E-02	1.61208E-02	8.0646188	-2.9170044	1.6728376	0.1467526	2.9013592	0.9524	4.200
24	6.16787615	9.95425E-02	1.65392E-02	8.0848036	-3.0688908	1.8293224	0.1517380	2.9100879	1.0000	4.224

K-10 PHI = 70.0 Z = 15.592103

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	1.15431E-02	3.9333E-02	78142412	0.00000000	3.0642430	0.0646347	24222899	0.0000	2.935
4	1.63431013	1.7304E-02	5.3441E-02	77828231	0.4428132	2.6743263	0.0387917	25446303	0.476	3.226
5	1.96862028	2.12061E-02	6.2557E-02	76505870	0.4428132	2.7676531	0.0250976	26033141	0.952	3.369
6	2.30297038	2.3671E-02	7.0865E-02	74100443	0.4428132	2.8116225	0.0186553	26366443	1.429	3.476
7	2.6374091	2.5274E-02	7.3514E-02	71796794	0.4428132	2.8545374	0.0152056	26566889	1.905	3.529
8	2.97155054	2.6494E-02	7.4831E-02	70213271	0.4428132	2.8715993	0.0114066	26706607	2.281	3.566
9	3.30586076	2.7357E-02	7.5873E-02	70213271	0.4428132	2.8715993	0.0076497	26801046	2.857	3.592
10	3.64017089	2.7715E-02	7.6665E-02	70213271	0.4428132	2.8715993	0.0058608	26850247	3.333	3.605
11	3.97448102	2.8044E-02	7.7203E-02	70213271	0.4428132	2.8715993	0.0046131	26884180	3.510	3.614
12	4.30879115	2.8344E-02	7.7603E-02	70213271	0.4428132	2.8715993	0.0037603	26905058	4.286	3.62
13	4.64310127	2.8604E-02	7.7874E-02	70213271	0.4428132	2.8715993	0.0031400	27000077	4.762	3.661
14	4.97741140	2.8834E-02	7.8114E-02	70213271	0.4428132	2.8715993	0.0027231	27195139	5.238	3.698
15	5.31172153	2.9034E-02	7.8324E-02	77775945	0.4428132	2.8715993	0.0024977	27358117	5.714	3.737
16	5.64603166	2.9204E-02	7.8504E-02	77531197	0.4428132	2.8715993	0.0023307	27482147	6.190	3.776
17	5.98034179	2.9354E-02	7.8654E-02	77281317	0.4428132	2.8715993	0.0022146	27622338	6.667	3.815
18	6.31465191	2.9484E-02	7.8784E-02	77031437	0.4428132	2.8715993	0.0021285	27758100	7.143	3.853
19	6.64896204	2.9594E-02	7.8894E-02	76781557	0.4428132	2.8715993	0.0020624	27889563	7.619	3.891
20	6.98327217	2.9684E-02	7.8984E-02	76531677	0.4428132	2.8715993	0.0020163	28016026	8.095	3.929
21	7.31758229	2.9754E-02	7.9054E-02	76281797	0.4428132	2.8715993	0.0019802	28138172	8.571	3.959
22	7.65189242	2.9804E-02	7.9104E-02	76031917	0.4428132	2.8715993	0.0019541	28259917	9.048	3.991
23	7.98620255	2.9834E-02	7.9134E-02	75782037	0.4428132	2.8715993	0.0019380	28379376	9.524	4.024
24	8.32051268	2.9844E-02	7.9144E-02	75532157	0.4428132	2.8715993	0.0019329	28496033	1.0000	4.049

K-16 PHI =110.0 Z = 15.592103

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	1.60755E-02	4.9825E-02	78617182	0.00000000	2.3643060	0.0646347	25402224	0.0000	3.226
4	1.63431013	2.0127E-02	5.9162E-02	78367276	0.4428132	2.4393441	0.0522471	26081927	0.476	3.401
5	1.96862028	2.3494E-02	6.7104E-02	78127370	0.4428132	2.5143822	0.0412009	26463068	0.952	3.501
6	2.30297038	2.5957E-02	7.0793E-02	76735162	0.4428132	2.5894203	0.0306910	26603681	1.429	3.599
7	2.6374091	2.6163E-02	7.3354E-02	76494759	0.4428132	2.6644584	0.0216763	26708823	1.905	3.667
8	2.97155054	2.5525E-02	7.5166E-02	76254356	0.4428132	2.7394967	0.0151810	26781568	2.281	3.719
9	3.30586076	2.7442E-02	7.6288E-02	76013952	0.4428132	2.8145350	0.0098470	26824472	2.857	3.768
10	3.64017089	2.7605E-02	7.6711E-02	75773547	0.4428132	2.8895733	0.0051845	26882950	3.333	3.799
11	3.97448102	2.7780E-02	7.7134E-02	75533142	0.4428132	2.9646116	0.0039584	26942317	3.810	3.803
12	4.30879115	2.7964E-02	7.7557E-02	75292737	0.4428132	3.0396500	0.0031327	27002684	4.286	3.819
13	4.64310127	2.8158E-02	7.7980E-02	75052332	0.4428132	3.1146884	0.0025131	27064914	4.762	3.847
14	4.97741140	2.8362E-02	7.8403E-02	74811927	0.4428132	3.1897268	0.0020000	27129144	5.238	3.875
15	5.31172153	2.8576E-02	7.8826E-02	74571522	0.4428132	3.2647652	0.0015875	27195374	5.714	3.903
16	5.64603166	2.8790E-02	7.9249E-02	74331117	0.4428132	3.3398036	0.0012750	27263604	6.190	3.931
17	5.98034179	2.8914E-02	7.9672E-02	74090712	0.4428132	3.4148420	0.0010625	27333834	6.667	3.959
18	6.31465191	2.9038E-02	8.0095E-02	73850307	0.4428132	3.4898804	0.0009500	27405064	7.143	3.987
19	6.64896204	2.9172E-02	8.0518E-02	73609902	0.4428132	3.5649188	0.0009375	27477294	7.619	4.015
20	6.98327217	2.9316E-02	8.0941E-02	73369497	0.4428132	3.6399572	0.0009250	27551524	8.095	4.043
21	7.31758229	2.9460E-02	8.1364E-02	73129092	0.4428132	3.7149956	0.0009125	27627754	8.571	4.071
22	7.65189242	2.9614E-02	8.1787E-02	72888687	0.4428132	3.7900340	0.0009000	27705984	9.048	4.099
23	7.98620255	2.9778E-02	8.2210E-02	72648282	0.4428132	3.8650724	0.0008875	27786214	9.524	4.127
24	8.32051268	2.9952E-02	8.2633E-02	72407877	0.4428132	3.9401108	0.0008750	27868444	1.0000	4.155

K-17 PHI =110.0 Z = 15.592103

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	2.52335E-02	6.6752E-02	78417497	0.00000000	1.3467398	0.0646347	27092260	0.0000	3.670
4	1.67114915	2.5955E-02	7.0401E-02	77828231	0.3920210	1.6073743	0.0525915	27082214	0.476	3.669
5	2.04220230	2.6274E-02	7.5970E-02	77528231	0.3920210	1.8447330	0.0442819	27116090	0.952	3.695
6	2.41334345	2.6175E-02	7.6916E-02	76167544	0.3920210	1.9671200	0.0319478	27062854	1.429	3.663
7	2.78448460	2.6489E-02	7.8049E-02	74814541	0.3920210	2.0895061	0.0219411	27048975	1.905	3.633
8	3.15562576	2.6803E-02	7.9282E-02	73461538	0.3920210	2.2118914	0.0149408	26998726	2.281	3.644
9	3.52676691	2.7117E-02	8.0515E-02	72108535	0.3920210	2.3343417	0.0099368	26950167	2.857	3.644
10	3.89790806	2.7431E-02	8.1748E-02	70755532	0.3920210	2.4567916	0.0069316	26903650	3.333	3.632
11	4.26904921	2.7745E-02	8.2981E-02	70402529	0.3920210	2.5792415	0.0049264	26859174	3.810	3.615
12	4.64019036	2.8059E-02	8.4214E-02	70049526	0.3920210	2.7016914	0.0039212	26814700	4.286	3.608

3642
3673
3707
3742
3777
3811
3844
3877
3908
3938
3968
3989

4762
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5714
6190
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00141922
00115897
00093503
00078194
00064359
00052373
00043395
00036663
00028287
00021181

10585309
10191174
09796772
09403566
09011251
08619872
08229499
07839132
07448764
07058395
06668026
06277657

06404199
05917533
05430866
04944199
04457532
03970864
03484196
03000528
02513860
02027192
01540524
01053856

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77938022
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77501458
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77064894
76846612
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76410048
76191766

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8.96483E-02
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9.41351E-02
9.64725E-02
9.88729E-02
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1.04067E-01

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3.08285E-02
3.17716E-02
3.27307E-02
3.37058E-02
3.46969E-02
3.57040E-02
3.67271E-02
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8.72881E-02
9.29120E-02
9.92059E-02
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1.22087E-01
1.30976E-01
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1.50644E-01

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3.14106E-02
3.08401E-02
3.17716E-02
3.31305E-02
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4.72909E-02
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3.08285E-02
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K-18 PHI=150.0 Z=15.592103

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M
W
Y
U

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0.00000000
0.00000000

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77023743
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76707425
76549266
76391107
76232948
76074789

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8.23242E-02
8.72881E-02
9.29120E-02
9.92059E-02
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1.22087E-01
1.30976E-01
1.40495E-01
1.50644E-01

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3.08401E-02
3.17716E-02
3.31305E-02
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3.71584E-02
3.99399E-02
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4.72909E-02
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3.02624E-02
3.14106E-02
3.08401E-02
3.17716E-02
3.31305E-02
3.49259E-02
3.71584E-02
3.99399E-02
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4.72909E-02
5.20714E-02

7.93310E-02
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8.23242E-02
8.72881E-02
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9.92059E-02
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1.22087E-01
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3.02624E-02
3.14106E-02
3.08401E-02
3.17716E-02
3.31305E-02
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3.71584E-02
3.99399E-02
4.32804E-02
4.72909E-02
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3.14106E-02
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3.17716E-02
3.31305E-02
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K-19 PHI=160.0 Z=15.592103

H/HT
T
A
M
W
Y
U

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3.14701E-02
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3.26547E-02
3.20125E-02
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3.14701E-02
3.12067E-02
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3.06949E-02
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3.02031E-02
3.00000E-02

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9.88351E-02
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1.05347E-01

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3.24121E-02
3.26547E-02
3.20125E-02
3.17385E-02
3.14701E-02
3.12067E-02
3.09483E-02
3.06949E-02
3.04465E-02
3.02031E-02
3.00000E-02

3.27216E-02
3.24121E-02
3.26547E-02
3.20125E-02
3.17385E-02
3.14701E-02
3.12067E-02
3.09483E-02
3.06949E-02
3.04465E-02
3.02031E-02
3.00000E-02

K-20 PHI -170.0 Z - 15.592103

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	M/HT
3	1.3000000	3.3751604	0.46179E-02	77516604	-0.0000000	0.171187	0.0846347	28241913	0.0000	3988
4	1.7053168	3.40515E-02	0.46179E-02	7775259	0.03750118	0.325113	0.0476462	28042633	0.0476	3932
5	2.11062175	3.34027E-02	0.65341E-02	77974295	0.0713547	0.576016	0.0230215	27783317	0.952	3861
6	2.5159353	3.29443E-02	0.63378E-02	78196541	0.0848170	0.8251114	0.1640628	27625164	1.429	3816
7	2.9212451	3.26676E-02	0.61428E-02	78418787	0.0972390	0.111601	0.1995463	27533311	1.905	3762
8	3.32615455	3.25121E-02	0.59894E-02	78641033	0.1096591	0.315490	0.0749201	27442100	2.381	3717
9	3.73186526	3.13364E-02	0.57945E-02	78863279	0.1220795	0.511548	0.0514450	27351464	2.857	3673
10	4.13771614	3.02343E-02	0.56532E-02	79085525	0.1344912	0.707693	0.0427893	27261096	3.333	3629
11	4.54361701	2.91931E-02	0.55139E-02	79307771	0.1469029	0.903836	0.0331941	27171096	3.810	3585
12	4.94951789	2.82111E-02	0.53746E-02	79530017	0.1593146	0.109922	0.0240254	27081096	4.286	3541
13	5.35541877	2.72919E-02	0.52353E-02	79752263	0.1717263	0.306054	0.0153678	27004056	4.762	3500
14	5.76131965	3.05615E-02	0.17181E-02	79974509	0.1841380	0.502199	0.0076814	27124473	5.238	3479
15	6.16722053	3.07839E-02	0.11481E-02	80196755	0.1965497	0.698344	0.0044447	27244890	5.714	3458
16	6.57312141	3.15273E-02	0.47057E-02	80419001	0.2089614	0.894489	0.0017657	27365307	6.190	3437
17	6.97902229	3.24478E-02	0.63177E-02	80641247	0.2213731	0.109640	0.0005113	27485724	6.667	3416
18	7.38492317	3.33683E-02	0.89297E-02	80863493	0.2337848	0.305761	0.0001893	27606141	7.143	3395
19	7.79082405	3.42888E-02	0.57535E-02	81085739	0.2461965	0.501902	0.0000377	27726558	7.619	3374
20	8.19672493	3.52093E-02	0.13747E-02	81307985	0.2586082	0.698043	0.0000000	27846975	8.095	3353
21	8.60262581	3.53877E-02	0.33451E-02	81530231	0.2710199	0.894184	0.0000000	27967392	8.571	3332
22	9.00852669	3.62077E-02	0.45148E-02	81752477	0.2834316	0.109640	0.0000000	28087809	9.048	3311
23	9.41442757	3.70277E-02	0.60498E-02	81974723	0.2958433	0.300829	0.0001812	28208226	9.524	3290
24	9.82032845	3.78477E-02	0.80602E-02	82196969	0.3082550	0.496970	0.0000000	28328643	1.0000	3269

K-21 PHI -180.0 Z - 15.592103

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	M/HT
3	1.3000000	3.36357E-02	0.47544E-02	77519042	-0.0000000	0.0677800	0.0646347	28251718	0.0000	3991
4	1.7053168	3.44179E-02	0.76778E-02	7785437	0.03750118	0.325113	0.0518345	28017820	0.0476	3925
5	2.11062175	3.34640E-02	0.65543E-02	78112593	0.0713547	0.576016	0.0236450	27759285	0.952	3853
6	2.5159353	3.31407E-02	0.67405E-02	78368799	0.0848170	0.8251114	0.1579651	27643789	1.429	3821
7	2.9212451	3.27355E-02	0.63571E-02	78624925	0.0972390	0.111601	0.1150641	27559616	1.905	3789
8	3.32615455	3.23265E-02	0.56693E-02	78881051	0.1096591	0.315490	0.0840971	27475941	2.381	3757
9	3.73186526	3.15131E-02	0.42824E-02	79137177	0.1220795	0.511548	0.0668133	27392266	2.857	3725
10	4.13771614	3.04946E-02	0.41541E-02	79393303	0.1344912	0.707693	0.0490186	27308591	3.333	3700
11	4.54361701	2.95773E-02	0.40251E-02	79649429	0.1469029	0.903836	0.0445345	27224916	3.810	3668
12	4.94951789	2.86600E-02	0.38961E-02	79905555	0.1593146	0.109922	0.0344570	27141241	4.286	3637
13	5.35541877	2.77427E-02	0.37671E-02	80161681	0.1717263	0.306054	0.0250459	27057566	4.762	3605
14	5.76131965	3.05245E-02	0.15486E-02	80417807	0.1841380	0.502199	0.0167797	27123991	5.238	3579
15	6.16722053	3.05574E-02	0.28246E-02	80673933	0.1965497	0.698344	0.0095206	27200442	5.714	3547
16	6.57312141	3.14003E-02	0.42897E-02	80930059	0.2089614	0.894489	0.0046197	27276893	6.190	3525
17	6.97902229	3.22539E-02	0.58498E-02	81186185	0.2213731	0.109640	0.0016046	27353344	6.667	3503
18	7.38492317	3.30978E-02	0.74854E-02	81442311	0.2337848	0.305761	0.0004966	27429795	7.143	3481
19	7.79082405	3.39562E-02	0.91541E-02	81698437	0.2461965	0.501902	0.00049518	27506246	7.619	3460
20	8.19672493	3.48265E-02	0.69599E-02	81954563	0.2586082	0.698043	0.00074250	27582697	8.095	3439
21	8.60262581	3.57165E-02	0.25566E-02	82210689	0.2710199	0.894184	0.0000000	27659148	8.571	3418
22	9.00852669	3.57165E-02	0.41024E-02	82466815	0.2834316	0.109640	0.0000000	27735599	9.048	3397
23	9.41442757	3.74234E-02	0.56707E-02	82722941	0.2958433	0.300829	0.0000000	27812050	9.524	3376
24	9.82032845	3.79181E-02	0.80578E-02	82979067	0.3082550	0.496970	0.0000000	27888501	1.0000	3355

K= 3 PHI = 0.0 Z = 33.600000

Table with columns J, R, P, RHO, U, V, W, A, T, H/H/T. Contains 24 rows of numerical data.

K= 4 PHI = 10.0 Z = 33.600000

Table with columns J, R, P, RHO, U, V, W, A, T, H/H/T. Contains 24 rows of numerical data.

K= 5 PHI = 20.0 Z = 33.600000

Table with columns J, R, P, RHO, U, V, W, A, T, H/H/T. Contains 24 rows of numerical data.

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
12	5.0260178	3.575937E-02	9.25090E-02	77428256	-10819289	04721899	.00164493	.27809464	.4266	.3865
13	5.44001909	3.59037E-02	9.21879E-02	77401132	-10819459	04663867	.00184442	.27818680	.4762	.3869
14	5.89402100	3.60730E-02	9.31217E-02	77371629	-10863433	04611764	.00133376	.27836509	.5238	.3874
15	6.26802791	3.63037E-02	9.36597E-02	77350110	-10793771	04567190	.00119445	.27866602	.5714	.3883
16	6.68203482	3.66905E-02	9.42459E-02	77285330	-10710365	04518174	.00107703	.27899817	.6190	.3892
17	7.09603673	3.68928E-02	9.48474E-02	77259137	-10657479	04482739	.00096999	.27921762	.6667	.3898
18	7.51003764	3.71214E-02	9.50466E-02	77221365	-10597429	04450117	.00088000	.27945489	.7143	.3905
19	7.92403694	3.74033E-02	9.56404E-02	77186635	-10492369	04409420	.00080521	.27985974	.7619	.3919
20	8.32803743	3.83510E-02	9.73176E-02	77102442	-10044062	04363102	.00073981	.28074505	.8095	.3941
21	8.75203936	3.93240E-02	9.90777E-02	76937838	-98613049	04313184	.00068101	.28174622	.8571	.3969
22	9.16603987	4.01200E-02	1.00971E-01	76809746	-98218433	04258202	.00062825	.28275030	.9048	.3997
23	9.58003815	4.13307E-02	1.03075E-01	76657047	-98724114	04191536	.00058193	.28394179	.9534	.4031
24	9.99403009	4.24516E-02	1.04656E-01	76530013	-98342888	04115497	.00053513	.28482609	1.0000	.4056

K= 6 PHI = 30.0 Z = 33.800000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	3.35036E-02	8.41890E-02	76756579	-00000000	11351815	.06846347	.28211926	0.0000	.3980
4	1.72612138	3.60640E-02	9.30997E-02	77446207	-04632807	10357078	.00125755	.27834138	.0476	.3674
5	2.15022776	3.55700E-02	9.1819E-02	77518605	-04762397	08931779	.00153425	.27620106	.0952	.3970
6	2.59384814	3.54624E-02	9.1821E-02	77515213	-01873136	06357249	.00331303	.27934867	.1429	.3862
7	3.09446832	3.5257E-02	9.14645E-02	77528218	-01813073	07879356	.00346686	.27762676	.1905	.3854
8	3.43006691	3.51557E-02	9.13092E-02	77516172	-09119150	07507976	.00294137	.27749575	.2381	.3850
9	3.86672829	3.51259E-02	9.12844E-02	77507748	-09151814	07312112	.00249538	.27741901	.2857	.3848
10	4.28284967	3.51676E-02	9.13783E-02	77490110	-09122573	07181590	.00221284	.27743691	.3333	.3849
11	4.70897105	3.52531E-02	9.15069E-02	77471152	-09086884	07057471	.00191196	.27750348	.3810	.3850
12	5.13502743	3.54040E-02	9.18494E-02	77444482	-09051901	06925791	.00170956	.27765271	.4286	.3855
13	5.56121391	3.55738E-02	9.21803E-02	77417636	-10054572	06846269	.00150689	.27782426	.4762	.3859
14	5.98133519	3.57741E-02	9.25663E-02	77381648	-10021766	06781165	.00135442	.27803303	.5238	.3865
15	6.41347657	3.60976E-02	9.31948E-02	77344799	-09754776	06728111	.00121466	.27836312	.5714	.3874
16	6.85957795	3.64174E-02	9.37503E-02	77302300	-09487096	06675974	.00109350	.27870648	.6190	.3880
17	7.26567933	3.66228E-02	9.41594E-02	77262463	-09248109	06624584	.00098367	.27893376	.6667	.3884
18	7.69182070	3.68191E-02	9.46274E-02	77224847	-09012273	06571544	.00088907	.27919796	.7143	.3888
19	8.11794210	3.70015E-02	9.55737E-02	77187634	-09013500	06495746	.00081236	.27937428	.7619	.3913
20	8.54406348	3.71747E-02	9.68994E-02	77163263	-08772925	06432317	.00074212	.28056276	.8095	.3936
21	8.97018486	3.73171E-02	9.88033E-02	76934822	-08717865	06378781	.00068785	.28158958	.8571	.3965
22	9.39616624	4.01817E-02	1.06621E-01	76803789	-08348334	06326540	.00064342	.28260875	.9048	.3993
23	9.82292762	4.14034E-02	1.09811E-01	76691457	-07819358	06283695	.00060695	.28382173	.9524	.4028
24	10.24854900	4.23291E-02	1.04442E-01	76591179	-07433008	06248194	.00058200	.28470659	1.0000	.4053

K= 7 PHI = 40.0 Z = 33.800000

K=8 PHI = 50.0 Z = 33.805200

J	R	P	RHO	U	V	W	(S-S*MF)/CV	A	T	H/MT
3	1.30000000	2.59110E-02	7.0070E-02	77266192	.00720000	18970579	.06846347	.27194985	0.0000	3698
4	1.76567783	3.11350E-02	8.4013E-02	77267263	-.03127645	16781127	-.00223819	.27221953	.0076	3705
5	2.23115766	3.20370E-02	8.5918E-02	77268324	-.01678772	14394198	.00473200	.27248645	.0952	3736
6	2.69703709	3.28560E-02	8.6949E-02	77269385	-.02119577	13152459	.00753003	.27275124	1.429	3779
7	3.16271152	3.3574E-02	8.7474E-02	77270446	-.02533170	11910720	.00981107	.27301816	1.905	3787
8	3.62838515	3.42070E-02	8.8267E-02	77271507	-.02918753	10742289	.00114911	.27328634	.2381	3796
9	4.09405878	3.4765E-02	8.9291E-02	77272568	-.03284338	9717164	.00771649	.27355367	.2857	3802
10	4.55973241	3.5248E-02	8.9944E-02	77273629	-.03629000	8824260	.02432664	.27382119	3.333	3808
11	5.02540604	3.5670E-02	9.0762E-02	77274690	-.03953630	8047379	.00274168	.27408871	3.810	3814
12	5.49107967	3.6032E-02	9.1685E-02	77275751	-.04258355	7384426	.00186219	.27435623	4.286	3822
13	5.95675330	3.6345E-02	9.2712E-02	77276812	-.04543179	6831473	.00133056	.27462375	4.762	3829
14	6.42242693	3.6610E-02	9.3849E-02	77277873	-.04808000	6388520	.00093592	.27489127	5.238	3837
15	6.88810056	3.6837E-02	9.5096E-02	77278934	-.05052825	6055567	.00064128	.27515879	5.714	3845
16	7.35377419	3.7027E-02	9.6453E-02	77280000	-.05277650	5832614	.00042664	.27542631	6.190	3853
17	7.81944782	3.7181E-02	9.7920E-02	77281061	-.05482475	5719661	.00028200	.27569383	6.667	3861
18	8.28512145	3.7300E-02	9.9497E-02	77282122	-.05667300	5716708	.00018736	.27596135	7.143	3869
19	8.75079508	3.7385E-02	1.0138E-01	77283183	-.05832125	5823755	.00011271	.27622887	7.619	3877
20	9.21646871	3.7437E-02	1.0361E-01	77284244	-.05977950	6040802	.00006807	.27649639	8.095	3885
21	9.68214234	3.7467E-02	1.0614E-01	77285305	-.06104775	6367849	.00003342	.27676391	8.571	3893
22	10.14781597	3.7475E-02	1.0897E-01	77286366	-.06213600	6804896	.00001877	.27703143	9.048	3901
23	10.61348960	3.7461E-02	1.1210E-01	77287427	-.06305425	7351943	.00001412	.27729895	9.524	3909
24	11.07916323	3.7426E-02	1.1553E-01	77288488	-.06381250	8018990	.00001047	.27756647	1.0000	4042

K=9 PHI = 60.0 Z = 33.805500

J	R	P	RHO	U	V	W	(S-S*MF)/CV	A	T	H/MT
3	1.30000000	2.13830E-02	6.1048E-02	77274475	.00700000	27381853	.06846347	.26459010	0.0000	3500
4	1.76567783	2.81620E-02	7.2831E-02	77275536	-.02390716	25204841	-.00190077	.26485762	.0476	3597
5	2.23115766	3.05690E-02	8.1401E-02	77276597	-.03016400	23027830	.00164653	.26512514	.0952	3694
6	2.69703709	3.1273E-02	8.3570E-02	77277658	-.03536122	20850819	.00149331	.26539266	1.429	3724
7	3.16271152	3.1857E-02	8.4973E-02	77278719	-.03951845	18673808	.00134014	.26566018	1.905	3753
8	3.62838515	3.2295E-02	8.5578E-02	77279780	-.04256570	17506797	.00118700	.26592770	2.381	3782
9	4.09405878	3.2591E-02	8.6202E-02	77280841	-.04541395	16339786	.00103383	.26619522	2.857	3811
10	4.55973241	3.2754E-02	8.6946E-02	77281902	-.04806220	15172775	.00088066	.26646274	3.333	3840
11	5.02540604	3.2887E-02	8.7809E-02	77282963	-.05051045	14005764	.00072750	.26673026	3.810	3869
12	5.49107967	3.2990E-02	8.8792E-02	77284024	-.05275870	12838753	.00057433	.26700000	4.286	3898
13	5.95675330	3.3063E-02	8.9895E-02	77285085	-.05480695	11671742	.00042117	.26727000	4.762	3927
14	6.42242693	3.3107E-02	9.1118E-02	77286146	-.05665520	10504731	.00026800	.26754000	5.238	3956
15	6.88810056	3.3122E-02	9.2465E-02	77287207	-.05830345	9337720	.00016483	.26781000	5.714	3985
16	7.35377419	3.3108E-02	9.3938E-02	77288268	-.05975170	8170709	.00009166	.26808000	6.190	4014
17	7.81944782	3.3075E-02	9.5535E-02	77289329	-.06100000	7003698	.00004700	.26835000	6.667	4043
18	8.28512145	3.3023E-02	9.7258E-02	77290390	-.06205825	5836687	.00002235	.26862000	7.143	4072
19	8.75079508	3.2952E-02	9.9105E-02	77291451	-.06293650	4669676	.00001269	.26889000	7.619	4101
20	9.21646871	3.2854E-02	1.0108E-01	77292512	-.06364475	3502665	.00000804	.26916000	8.095	4130
21	9.68214234	3.2730E-02	1.0341E-01	77293573	-.06419300	2335654	.00000439	.26943000	8.571	4159
22	10.14781597	3.2581E-02	1.0604E-01	77294634	-.06459125	1168643	.00000274	.26970000	9.048	4188
23	10.61348960	3.2407E-02	1.0897E-01	77295695	-.06484950	51632	.00000169	.26997000	9.524	4217
24	11.07916323	3.2209E-02	1.1210E-01	77296756	-.06500775	0	.00000114	.27024000	1.0000	4350

K=10 PHI = 70.0 Z = 33.806000

J	R	P	RHO	U	V	W	(S-S*MF)/CV	A	T	H/MT
3	1.30000000	1.7042E-02	5.1947E-02	7717918	.00650000	2717918	.06846347	.25415020	0.0000	3281
4	1.76567783	2.5103E-02	7.2192E-02	77180249	-.02177763	25002176	-.00267855	.25441772	.0476	3377
5	2.23115766	2.77480E-02	8.1705E-02	77181312	-.02928107	22825165	.00149609	.25468524	.0952	3501
6	2.69703709	2.95870E-02	8.5077E-02	77182375	-.03578451	20648154	.00134392	.25495276	1.429	3567
7	3.16271152	3.0449E-02	8.6259E-02	77183438	-.03983795	18471143	.00119175	.25522028	1.905	3597
8	3.62838515	3.1153E-02	8.6776E-02	77184501	-.04278620	17304132	.00103958	.25548780	2.381	3627
9	4.09405878	3.1727E-02	8.7529E-02	77185564	-.04553445	16137121	.00088741	.25575532	2.857	3657
10	4.55973241	3.2170E-02	8.8422E-02	77186627	-.04808270	14970110	.00073524	.25602284	3.333	3687
11	5.02540604	3.2483E-02	8.9455E-02	77187690	-.05043100	13803100	.00058307	.25629036	3.810	3717
12	5.49107967	3.2667E-02	9.0628E-02	77188753	-.05257925	12636089	.00043090	.25655788	4.286	3747
13	5.95675330	3.2722E-02	9.1941E-02	77189816	-.05452750	11469078	.00027873	.25682540	4.762	3777
14	6.42242693	3.2749E-02	9.3394E-02	77190879	-.05627575	10302067	.00016456	.25709292	5.238	3807
15	6.88810056	3.2748E-02	9.4987E-02	77191942	-.05782400	9135056	.00009240	.25736044	5.714	3837
16	7.35377419	3.2719E-02	9.6720E-02	77193005	-.05917225	8068045	.00004775	.25762796	6.190	3867
17	7.81944782	3.2663E-02	9.8593E-02	77194068	-.06032050	7001034	.00002309	.25789548	6.667	3897
18	8.28512145	3.2582E-02	1.0062E-01	77195131	-.06127875	5934023	.00001244	.25816300	7.143	3927
19	8.75079508	3.2477E-02	1.0295E-01	77196194	-.06204700	4867012	.00000779	.25843052	7.619	3957
20	9.21646871	3.2349E-02	1.0558E-01	77197257	-.06262525	3800001	.00000414	.25869804	8.095	3987
21	9.68214234	3.2190E-02	1.0841E-01	77198320	-.06302350	2733000	.00000249	.25896556	8.571	4017
22	10.14781597	3.2002E-02	1.1144E-01	77199383	-.06325175	1666000	.00000144	.25923308	9.048	4047
23	10.61348960	3.1785E-02	1.1467E-01	77200446	-.06333000	600000	.00000089	.25950060	9.524	4077
24	11.07916323	3.1548E-02	1.1810E-01	77201509	-.06326825	0	.00000034	.25976812	1.0000	4310

J	R	P	RHO	U	V	W	X	Y	Z	A	T	H/H
11	5.51063726	3.24915E-02	8.6358E-02	77615784	-0.3269140	1.4021446				27431350	3810	3762
12	6.03396692	3.28785E-02	8.71635E-02	77552133	-0.3497187	1.3763733				27475073	4286	3774
13	6.56328619	3.32594E-02	8.77671E-02	77506683	-0.3716714	1.3516362				27513445	4762	3785
14	7.08652623	3.36393E-02	8.83497E-02	77451011	-0.3935870	1.3255262				27552608	5238	3797
15	7.61925589	3.40217E-02	8.89131E-02	77395311	-0.4154619	1.2997112				27607201	5714	3810
16	8.14288655	3.44041E-02	8.94771E-02	77339611	-0.4373469	1.2732767				27647263	6190	3821
17	8.66651521	3.47865E-02	9.00411E-02	77283911	-0.4592319	1.2468469				27687325	6667	3829
18	9.19014487	3.51689E-02	9.06051E-02	77228211	-0.4811169	1.2204169				27727387	7143	3843
19	9.71377453	3.55513E-02	9.11691E-02	77172511	-0.5030019	1.1944164				27767449	7619	3866
20	10.23740419	3.59337E-02	9.17331E-02	77116811	-0.5248869	1.1684164				27807511	8095	3889
21	10.76103385	3.63161E-02	9.22971E-02	77061111	-0.5467719	1.1424164				27847573	8571	3928
22	11.28466351	3.66985E-02	9.28611E-02	77005411	-0.5686569	1.1164164				27887635	9048	3966
23	11.80829317	3.70809E-02	9.34251E-02	76949711	-0.5905419	1.0904164				27927697	9524	3996
24	12.33192283	3.74633E-02	9.39891E-02	76894011	-0.6124269	1.0644164				27967759	10000	4023

K=11 PHI = 80.0 Z = 33.800000

J	R	P	RHO	U	V	W	X	Y	Z	A	T	H/H
3	1.30260000	1.46917E-02	4.67377E-02	77563719	0.0000000	2.8924544				25078207	0.0000	3145
4	1.84828118	2.22075E-02	6.6264E-02	77518119	0.0166244	2.5317183				25519429	0476	3539
5	2.42880616	3.1169E-02	7.3185E-02	77472519	0.0476692	2.2074310				26063504	0952	3818
6	2.99286503	4.2607E-02	7.7872E-02	77426919	-0.1071258	1.8715068				26609644	1429	3618
7	3.55126771	5.6362E-02	8.0313E-02	77381319	-0.1453100	1.7468215				27054709	1905	3598
8	4.12140839	7.0194E-02	8.1871E-02	77335719	-0.1748853	1.6269917				27518141	2381	3688
9	4.68569007	8.3784E-02	8.2594E-02	77290119	-0.1954766	1.5126432				27982561	2857	3707
10	5.24597175	9.7193E-02	8.2594E-02	77244519	-0.2092311	1.4024475				28447078	3333	3723
11	5.81425442	1.1117E-02	8.1871E-02	77198919	-0.2248514	1.2953178				28911508	3810	3737
12	6.37853510	1.2116E-02	8.1871E-02	77153319	-0.2425277	1.1929771				29375938	4286	3749
13	6.94281678	1.2978E-02	8.1871E-02	77107719	-0.2621076	1.0949194				29840368	4762	3760
14	7.50709846	1.3735E-02	8.1871E-02	77062119	-0.2836442	1.0018194				30304798	5238	3774
15	8.07138014	1.4397E-02	8.1871E-02	77016519	-0.3071813	0.9146251				30769228	5714	3787
16	8.63566181	1.4969E-02	8.1871E-02	76970919	-0.3327194	0.8324308				31233658	6190	3797
17	9.19994349	1.5441E-02	8.1871E-02	76925319	-0.3602575	0.7552365				31698088	6667	3806
18	9.76422517	1.5813E-02	8.1871E-02	76879719	-0.3897956	0.6820422				32162518	7143	3823
19	10.32850685	1.6085E-02	8.1871E-02	76834119	-0.4213337	0.6128479				32626948	7619	3840
20	10.89278853	1.6257E-02	8.1871E-02	76788519	-0.4548718	0.5476536				33091378	8095	3859
21	11.45707021	1.6329E-02	8.1871E-02	76742919	-0.4904099	0.4864593				33555808	8571	3879
22	12.02135189	1.6301E-02	8.1871E-02	76697319	-0.5279480	0.4292650				34020238	9048	3906
23	12.58563357	1.6173E-02	8.1871E-02	76651719	-0.5674861	0.3760707				34484668	9524	3933
24	13.14991524	1.6045E-02	8.1871E-02	76606119	-0.6090242	0.3268764				34949098	10000	4011

K=12 PHI = 90.0 Z = 33.800000

J	R	P	RHO	U	V	W	X	Y	Z	A	T	H/H
3	1.30000000	1.64137E-02	5.05727E-02	76185939	0.0000000	2.5324446				25477945	0.0000	3248
4	1.90711301	2.0478E-02	6.2267E-02	77045042	0.01115	2.1738461				25621259	0476	3282
5	2.51942632	2.5758E-02	7.2014E-02	77009117	0.0476711	2.0462670				26448280	0952	3507
6	3.12131244	3.2475E-02	7.6503E-02	77000415	0.1071258	1.9411576				26992687	1429	3591
7	3.72320205	4.0708E-02	7.9671E-02	76991714	0.1666404	1.8379944				27682736	1905	3600
8	4.32509266	5.0630E-02	8.076E-02	76983012	0.2261534	1.7392194				28472785	2381	3609
9	4.92698327	6.2267E-02	8.1954E-02	76974310	0.2856666	1.6459499				29262834	2857	3618
10	5.52887388	7.5707E-02	8.2667E-02	76965608	0.3451800	1.5586807				29952883	3333	3627
11	6.13076449	9.0946E-02	8.2667E-02	76956906	0.4046932	1.4764112				30642932	3810	3636
12	6.73265510	1.0785E-02	8.2667E-02	76948204	0.4642064	1.3981424				31332981	4286	3645
13	7.33454571	1.2524E-02	8.2667E-02	76939502	0.5237196	1.3238736				32023030	4762	3654
14	7.93643632	1.4263E-02	8.2667E-02	76930800	0.5832328	1.2526048				32713079	5238	3663
15	8.53832693	1.6002E-02	8.2667E-02	76922100	0.6427460	1.1843360				33403128	5714	3672
16	9.14021754	1.7741E-02	8.2667E-02	76913400	0.7022592	1.1190672				34093177	6190	3681
17	9.74210815	1.9480E-02	8.2667E-02	76904700	0.7617724	1.0567984				34783226	6667	3690
18	10.34399876	2.1219E-02	8.2667E-02	76896000	0.8212856	0.9975296				35473275	7143	3699
19	10.94588937	2.2958E-02	8.2667E-02	76887300	0.8807988	0.9412608				36163324	7619	3708
20	11.54777998	2.4697E-02	8.2667E-02	76878600	0.9403120	0.8879920				36853373	8095	3717
21	12.14967059	2.6436E-02	8.2667E-02	76870000	1.0008252	0.8377232				37543422	8571	3726
22	12.75156120	2.8175E-02	8.2667E-02	76861400	1.0613384	0.7904544				38233471	9048	3735
23	13.35345181	2.9914E-02	8.2667E-02	76852800	1.1218516	0.7461856				38923520	9524	3744
24	13.95534242	3.1653E-02	8.2667E-02	76844200	1.1823648	0.7049168				39613569	10000	3753

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
24	14.04937326	4.03397E-02	1.00935E-01	.764050820	.032652826	.124573310	.00024544	.28273008	1.0000	.3997
K=13 PHI=100.0 Z=33.800000										
3	1.30000000	2.46641E-02	6.76952E-02	.78249384	.00970000	.15093260	.06846347	.27004063	0.0000	.3646
4	1.85334029	1.91001E-02	5.51595E-02	.77578166	.0833788	.24647584	-.00303330	.25381511	.0476	.3221
5	2.60877536	2.68294E-02	7.51894E-02	.77582975	.0271794	.24647584	.00448212	.26712527	.0952	.3568
6	3.26000000	2.60414E-02	7.64731E-02	.77578166	.0271794	.13678150	.00462205	.26820520	.1429	.3599
7	3.91345876	2.60407E-02	7.94748E-02	.77578166	.0271794	.13678150	.00497109	.27025495	.1905	.3652
8	4.56683345	2.56775E-02	8.08311E-02	.77578166	.0271794	.13678150	.00497109	.27025495	.2381	.3681
9	5.22021814	3.01132E-02	8.18455E-02	.77578166	.0271794	.13678150	.00497109	.27025495	.2857	.3687
10	5.87355283	3.68353E-02	8.25531E-02	.77776352	.0271794	.13678150	.00497109	.27025495	.3333	.3697
11	6.52691752	3.83745E-02	8.31791E-02	.77786173	.0271794	.13678150	.00497109	.27025495	.3810	.3706
12	7.18028231	3.42747E-02	8.36419E-02	.77665397	.0271794	.13678150	.00497109	.27025495	.4286	.3714
13	7.83364069	3.18081E-02	8.41875E-02	.77578166	.0271794	.13678150	.00497109	.27025495	.4762	.3721
14	8.48701155	3.16081E-02	8.48841E-02	.77773310	.0271794	.13678150	.00497109	.27025495	.5238	.3733
15	9.14034627	3.23175E-02	8.56135E-02	.77448582	.0271794	.13678150	.00497109	.27025495	.5714	.3743
16	9.79372626	3.25147E-02	8.59788E-02	.77578166	.0271794	.13678150	.00497109	.27025495	.6190	.3750
17	10.44710625	3.25397E-02	8.66911E-02	.77766190	.0271794	.13678150	.00497109	.27025495	.6667	.3761
18	11.10049634	3.23285E-02	8.76335E-02	.77807271	.0271794	.13678150	.00497109	.27025495	.7143	.3782
19	11.75387503	3.41216E-02	8.92383E-02	.77456566	.0271794	.13678150	.00497109	.27025495	.7619	.3811
20	12.40714972	3.51545E-02	9.15158E-02	.77305942	.0271794	.13678150	.00497109	.27025495	.8095	.3844
21	13.06042441	3.61874E-02	9.36519E-02	.77926466	.0271794	.13678150	.00497109	.27025495	.8571	.3879
22	13.71370910	3.74784E-02	9.57659E-02	.76345000	.0271794	.13678150	.00497109	.27025495	.9048	.3914
23	14.36709379	3.87694E-02	9.81408E-02	.76345000	.0271794	.13678150	.00497109	.27025495	.9524	.3952
24	15.02047848	3.91562E-02	9.90893E-02	.76414459	.0271794	.13678150	.00497109	.27025495	.1.0000	.3980

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	3.14001E-02	8.04355E-02	.77492330	.00000000	.04732311	.06846347	.27963258	0.0000	.3910
4	2.00232324	3.19439E-02	8.04355E-02	.77181281	.1631180	.24647584	-.00440526	.25401809	.0476	.3228
5	2.70463627	3.11177E-02	8.38949E-02	.77582975	.0271794	.13678150	.00448212	.27261107	.0952	.3716
6	3.40694941	2.92917E-02	7.95131E-02	.77602522	.0271794	.13678150	.00448212	.27041084	.1429	.3656
7	4.10933624	3.03931E-02	8.28929E-02	.77578166	.0271794	.13678150	.00448212	.27259473	.1905	.3708
8	4.81172308	3.06692E-02	8.27174E-02	.77669356	.0271794	.13678150	.00448212	.27259473	.2381	.3708
9	5.51391462	3.04546E-02	8.33191E-02	.77711370	.0271794	.13678150	.00448212	.27259473	.2857	.3715
10	6.21631325	3.02399E-02	8.39204E-02	.77779000	.0271794	.13678150	.00448212	.27259473	.3333	.3712
11	6.91871188	3.16049E-02	8.35148E-02	.77414591	.0271794	.13678150	.00448212	.27249374	.3810	.3713
12	7.62111051	3.10779E-02	8.34890E-02	.77845281	.0271794	.13678150	.00448212	.27259473	.4286	.3714
13	8.32350914	3.12194E-02	8.39612E-02	.77855111	.0271794	.13678150	.00448212	.27266204	.4762	.3717
14	9.02590777	3.14623E-02	8.47155E-02	.77815248	.0271794	.13678150	.00448212	.27281567	.5238	.3723
15	9.72830640	3.17177E-02	8.46943E-02	.77855111	.0271794	.13678150	.00448212	.27301284	.5714	.3727
16	10.43070503	3.16582E-02	8.48841E-02	.77865397	.0271794	.13678150	.00448212	.27316381	.6190	.3731
17	11.13310366	3.19231E-02	8.50749E-02	.77875682	.0271794	.13678150	.00448212	.27331478	.6667	.3734
18	11.83550229	3.16501E-02	8.52657E-02	.77885967	.0271794	.13678150	.00448212	.27346575	.7143	.3738
19	12.53790092	3.14850E-02	8.54565E-02	.77896252	.0271794	.13678150	.00448212	.27361672	.7619	.3742
20	13.24029955	3.17299E-02	8.56473E-02	.77906537	.0271794	.13678150	.00448212	.27376769	.8095	.3746
21	13.94269818	3.19748E-02	8.58381E-02	.77916822	.0271794	.13678150	.00448212	.27391866	.8571	.3750
22	14.64509681	3.69135E-02	9.47297E-02	.78086543	.0271794	.13678150	.00448212	.27406963	.9048	.3754
23	15.34749544	3.82144E-02	9.71051E-02	.76624744	.0271794	.13678150	.00448212	.28054805	.9524	.3935
24	16.04989407	3.91632E-02	9.80823E-02	.76345000	.0271794	.13678150	.00448212	.28152691	1.0000	.3963

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	3.13467E-02	8.04355E-02	.78013310	.00000000	.04732311	.06846347	.27945013	0.0000	.3905
4	2.02131000	3.28609E-02	8.73041E-02	.77919310	.13678150	.13678150	-.00440526	.26051589	.0476	.3395
5	2.70463627	3.47635E-02	9.06549E-02	.76914612	.0271794	.13678150	.00448212	.27661129	.0952	.3828
6	3.38795210	3.09743E-02	8.31743E-02	.77578166	.0271794	.13678150	.00448212	.27290267	.1429	.3729
7	4.07126793	3.23302E-02	8.60891E-02	.77315944	.0271794	.13678150	.00448212	.27521220	.1905	.3787
8	4.75458376	3.20812E-02	8.53791E-02	.77456566	.0271794	.13678150	.00448212	.27444539	.2381	.3758
9	5.43790959	3.27761E-02	8.50749E-02	.77335531	.0271794	.13678150	.00448212	.27482629	.2857	.3763

K=15 PHI=110.0 Z=33.800000

J	R	P	RHO	U	V	W	(S-SINF)/CY	A	T	H/HT
10	6.56476528	3.20514E-02	9.546504E-02	7.77915	0.6465725	1.1133697	0.0333157	2.7399320	3.333	3.751
11	7.311710358	3.19191E-02	8.511761E-02	7.773059	0.5333027	1.1133697	0.0258613	2.7365875	3.810	3.744
12	8.06294158	3.16512E-02	8.47674E-02	7.768144	0.4171017	1.1133697	0.0159446	2.7327153	4.266	3.734
13	8.82157597	3.14652E-02	8.44945E-02	7.764610	0.3045059	1.1133697	0.0101172	2.7299474	4.762	3.724
14	9.57331791	3.12755E-02	8.42815E-02	7.762736	0.2111153	1.1133697	0.0071429	2.7290559	5.238	3.720
15	10.32565591	3.11357E-02	8.41353E-02	7.761730	0.1433449	1.1133697	0.0051036	2.7277092	5.714	3.717
16	11.07779396	3.10155E-02	8.40514E-02	7.761488	0.0918776	1.1133697	0.0036787	2.7265425	6.190	3.715
17	11.83291196	3.11549E-02	8.40375E-02	7.761563	0.0519737	1.1133697	0.0024105	2.7254535	6.667	3.715
18	12.58526926	3.23447E-02	8.40435E-02	7.761458	0.0335294	1.1133697	0.0014759	2.7244288	7.143	3.716
19	13.33740758	3.43157E-02	8.40671E-02	7.761362	0.0219164	1.1133697	0.0008700	2.7234619	7.619	3.716
20	14.08949595	3.69118E-02	8.41115E-02	7.761298	0.0131157	1.1133697	0.0005164	2.7225457	8.095	3.710
21	14.83815928	3.92431E-02	8.41647E-02	7.761256	0.0081624	1.1133697	0.0003278	2.7216863	8.571	3.645
22	15.59262193	3.63879E-02	9.37572E-02	7.7611559	0.0052152	1.1133697	0.0002328	2.7208843	9.048	3.881
23	16.34275935	3.76388E-02	9.61046E-02	7.7610697	0.0036033	1.1133697	0.0001603	2.7199824	9.524	3.919
24	17.09489794	3.85943E-02	9.78064E-02	7.7610222	0.0025407	1.1133697	0.0001043	2.7190323	1.0000	3.946

K=16 PHI =130.0 Z = 33.800000

J	R	P	RHO	U	V	W	(S-SINF)/CY	A	T	H/HT
3	1.30000000	3.02104E-02	7.81915E-02	7.8534738	-0.0000000	0.0156320	0.0446347	2.7197999	0.0000	3.864
4	2.10009459	2.77824E-02	7.67667E-02	7.7831771	1.2217925	1.1133697	0.0105734	2.6907151	0.478	3.620
5	2.90210118	3.49253E-02	9.10511E-02	7.6833688	1.4931194	1.1133697	0.0155416	2.7171338	0.952	3.841
6	3.70038376	3.18235E-02	8.47271E-02	7.7481494	0.7000606	1.2631104	0.0260116	2.7407725	1.429	3.756
7	4.50037085	3.34827E-02	8.78514E-02	7.7341343	0.7848070	1.2242526	0.0310055	2.7610483	1.905	3.812
8	5.30047894	3.26547E-02	8.69184E-02	7.7337714	0.8145460	1.1714756	0.0335893	2.7491999	2.381	3.779
9	6.10056753	3.20397E-02	8.73315E-02	7.7545643	0.8153225	1.1145213	0.0412946	2.7522960	2.857	3.788
10	6.90065611	3.28837E-02	8.65517E-02	7.7605944	0.8134127	1.1344713	0.0331683	2.7488263	3.333	3.778
11	7.70074570	3.26415E-02	8.60818E-02	7.7631986	0.8136351	1.1133697	0.0379139	2.7476420	3.810	3.776
12	8.50083427	3.25317E-02	8.64737E-02	7.7726935	1.1279151	1.1133697	0.0119414	2.7440353	4.286	3.765
13	9.30092284	3.24595E-02	8.65444E-02	7.7733578	0.8273724	1.1133697	0.0110922	2.7404812	4.762	3.755
14	10.10101141	3.19725E-02	8.53353E-02	7.7854004	0.6833873	1.1142261	0.0133176	2.7354576	5.238	3.741
15	10.90110005	3.14955E-02	8.44567E-02	7.7984523	0.7134923	1.1145853	0.0156953	2.7293266	5.714	3.725
16	11.70118864	3.11260E-02	8.39357E-02	7.8115500	0.7314514	1.1145853	0.0174514	2.7249153	6.190	3.713
17	12.50127723	3.12167E-02	8.40217E-02	7.7987635	0.7176385	1.1141819	0.0158808	2.7205030	6.667	3.715
18	13.30136582	3.17665E-02	8.36834E-02	7.7967635	0.6946564	1.1141819	0.0146537	2.7160917	7.143	3.719
19	14.10145440	3.26137E-02	8.66951E-02	7.7797315	0.8161939	1.1141819	0.0169552	2.7429719	7.619	3.762
20	14.90154298	3.47033E-02	9.46278E-02	7.7534817	0.9613132	1.1141819	0.0232155	2.7546938	8.095	3.794
21	15.70163156	3.47033E-02	9.36444E-02	7.7254585	0.9616138	1.0912650	0.0232154	2.7671695	8.571	3.799
22	16.50172014	3.54094E-02	9.20046E-02	7.7027021	0.9766336	1.0012130	0.0015086	2.7795388	9.048	3.863
23	17.30180872	3.70849E-02	9.49949E-02	7.6740078	1.0199732	0.9431275	0.0013534	2.7930932	9.524	3.901
24	18.10189730	3.79489E-02	9.66316E-02	7.6537833	1.0656123	0.8845596	0.0001192	2.8003558	1.0000	3.927

K=17 PHI =140.0 Z = 33.800000

J	R	P	RHO	U	V	W	(S-SINF)/CY	A	T	H/HT
3	1.30000000	2.85349E-02	7.50689E-02	7.8733860	-0.0000000	-0.1210317	0.0446347	2.7572336	0.0000	3.801
4	2.10009459	3.04711E-02	8.08241E-02	7.7755232	1.6411791	0.0469311	0.0241780	2.7446345	0.478	3.767
5	2.90210118	3.34211E-02	8.76634E-02	7.6834848	0.8233444	1.1133697	0.0191584	2.7613087	0.952	3.812
6	3.70038376	3.35915E-02	8.36677E-02	7.7444989	1.6334741	1.0643854	0.0110029	2.7523871	1.429	3.788
7	4.50037085	3.35915E-02	8.79570E-02	7.7352600	1.6334741	1.0643854	0.0110029	2.7638186	1.905	3.819
8	5.30047894	3.29752E-02	8.69017E-02	7.7553723	0.8445092	1.0942194	0.0214499	2.7538902	2.381	3.792
9	6.10056753	3.32793E-02	8.76697E-02	7.7660151	0.9716092	0.9835825	0.0214499	2.7557640	2.857	3.796
10	7.00065611	3.30730E-02	8.73715E-02	7.7624729	0.9533961	0.9424462	0.0214499	2.7514447	3.333	3.785
11	8.00074570	3.31997E-02	8.74533E-02	7.7649727	0.9435457	0.9435457	0.0214499	2.7508041	3.810	3.783
12	9.00083427	3.28635E-02	8.72645E-02	7.7639082	0.9435457	0.9435457	0.0214499	2.7486749	4.286	3.778
13	9.90092284	3.26372E-02	8.73341E-02	7.7636351	1.0333493	0.9117482	0.0164565	2.74866120	4.762	3.777
14	10.90101141	3.27373E-02	8.76947E-02	7.7749703	0.9647170	0.9131139	0.0135567	2.7452577	5.238	3.768
15	11.90110005	3.20933E-02	8.65064E-02	7.7781719	0.6644892	0.9131139	0.0108486	2.7462215	5.714	3.743
16	12.90118864	3.11505E-02	8.41070E-02	7.7813523	0.716853	0.9131139	0.0077217	2.7271755	6.190	3.719
17	13.90127723	3.11505E-02	8.36705E-02	7.7813523	0.9370732	0.9131139	0.0051521	2.7251521	6.667	3.713
18	14.90136582	3.11505E-02	8.36705E-02	7.7813523	0.9370732	0.9131139	0.0051521	2.7251521	7.143	3.713
19	15.90145440	3.11505E-02	8.47335E-02	7.7813523	0.9370732	0.9131139	0.0051521	2.7251521	7.619	3.728
20	16.90154298	3.23034E-02	8.42094E-02	7.7834502	0.9424462	0.9131139	0.0051521	2.7251521	8.095	3.784
21	17.90163156	3.33034E-02	8.58114E-02	7.7626018	1.0463131	0.8847614	0.0025380	2.7629209	8.571	3.817
22	18.90172014	3.43334E-02	8.98539E-02	7.7388498	1.0584104	0.8847614	0.0025380	2.7629209	9.048	3.817
23	19.90180872	3.53946E-02	9.19319E-02	7.7101528	1.1443564	0.8847614	0.0025380	2.7629209	9.524	3.880
24	20.90189730	3.53946E-02	9.19319E-02	7.7101528	1.1443564	0.8847614	0.0025380	2.7629209	1.0000	3.946

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
23	18.19196455	3.65728E-02	9.41131E-02	.78808516	.11959466	.08444337	.00011125	.27674483	.9524	.3866
24	19.03656278	3.73909E-02	9.56164E-02	.78611264	.12285181	.08426616	.00004658	.27966105	1.0000	.3911
K-18 PHI =150.0 Z = 33.800000										
3	1.30000000	2.76699E-02	7.34343E-02	.78992913	-.00000000	-.02487043	.04946347	.27451354	0.0000	.3768
4	2.18207304	3.25415E-02	8.31134E-02	.77912606	.07434617	.04402269	.05732715	.27943231	.0476	.3915
5	3.04414769	3.14048E-02	8.36179E-02	.77476062	.10942377	.04402269	.05732715	.27506681	.1429	.3774
6	3.54622153	3.35507E-02	8.74697E-02	.77177837	.13181173	.04402269	.05732715	.27630343	.1905	.3823
7	4.82827538	3.34773E-02	8.75154E-02	.77419226	.10550128	.04402269	.05732715	.27603614	.1905	.3823
8	5.71036692	3.34541E-02	8.77514E-02	.77552783	.10844763	.04402269	.05732715	.27603614	.2857	.3805
9	6.59244306	3.35178E-02	8.82974E-02	.77574621	.10970412	.04402269	.05732715	.27585024	.2857	.3805
10	7.47451691	3.34172E-02	8.85041E-02	.77613495	.11170599	.04402269	.05732715	.27557325	.3333	.3797
11	8.35659035	3.33892E-02	8.85041E-02	.77631192	.11249932	.04402269	.05732715	.27545350	.3810	.3794
12	9.23866400	3.31811E-02	8.76614E-02	.77631192	.11259945	.04402269	.05732715	.27515195	.4286	.3785
13	10.12072744	3.31907E-02	8.76614E-02	.77612559	.11259945	.04402269	.05732715	.27510158	.4762	.3784
14	11.00279128	3.31637E-02	8.76614E-02	.77643279	.11404174	.04402269	.05732715	.27495356	.5238	.3783
15	11.88482613	3.32353E-02	8.66724E-02	.77817206	.11177818	.04402269	.05732715	.27459567	.5714	.3765
16	12.76695997	3.17453E-02	8.56071E-02	.78067095	.10674352	.04402269	.05732715	.27439751	.6190	.3735
17	13.64903592	3.12864E-02	8.41574E-02	.78194011	.10674352	.04402269	.05732715	.27270807	.6667	.3718
18	14.53110766	3.14823E-02	8.45371E-02	.78194011	.10792066	.04402269	.05732715	.27293543	.7143	.3725
19	15.41318150	3.21706E-02	8.51524E-02	.77961918	.11167619	.04402269	.05732715	.27170551	.7619	.3746
20	16.29525535	3.29778E-02	8.73904E-02	.77726350	.11628112	.04402269	.05732715	.27472508	.8095	.3774
21	17.17732919	3.35944E-02	8.93376E-02	.77456527	.12115894	.04402269	.05732715	.27586034	.8571	.3805
22	18.05940334	3.45877E-02	9.11754E-02	.77189760	.12602184	.04402269	.05732715	.27703398	.9048	.3837
23	18.94147638	3.61323E-02	9.33018E-02	.76887597	.13113543	.04402269	.05732715	.27830260	.9524	.3873
24	19.82355072	3.68899E-02	9.47004E-02	.76624164	.13417594	.04402269	.05732715	.27912099	1.0000	.3935

K-19 PHI =160.0 Z = 33.800000

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	2.72945E-02	7.27232E-02	.78970509	-.00000000	-.03332822	.06846347	.27397837	0.0000	.3753
4	2.11144410	3.34570E-02	8.31791E-02	.77230219	.03332822	.01815181	.08395843	.28362645	.0476	.4022
5	3.12246681	3.01739E-02	7.99521E-02	.77636042	.10000000	.09000000	.07604688	.27473269	.0952	.3774
6	4.03743321	3.40261E-02	8.81751E-02	.77294406	.09000000	.09000000	.07604688	.27974850	.1429	.3903
7	4.94457762	3.25411E-02	8.65371E-02	.77581185	.11249476	.08116695	.07604688	.27631908	.1905	.3818
8	5.85322202	3.37173E-02	8.82104E-02	.77922219	.11382895	.08116695	.07604688	.27849208	.2381	.3822
9	6.76686643	3.34765E-02	8.79304E-02	.77645653	.11993368	.08116695	.07604688	.27822258	.2857	.3804
10	7.67801083	3.35023E-02	8.82051E-02	.77651475	.11984660	.08116695	.07604688	.27570249	.3333	.3801
11	8.58916554	3.35409E-02	8.81964E-02	.77636049	.12147099	.08116695	.07604688	.27556226	.3810	.3797
12	9.50029284	3.35609E-02	8.80051E-02	.77608651	.12242747	.08116695	.07604688	.27535461	.4286	.3791
13	10.41144405	3.35609E-02	8.80311E-02	.77608651	.12333339	.08116695	.07604688	.27531256	.4762	.3790
14	11.32256895	3.35799E-02	8.80311E-02	.77666517	.12411985	.08116695	.07604688	.27530180	.5238	.3790
15	12.23373256	3.29791E-02	8.73423E-02	.77778491	.12210942	.08116695	.07604688	.27480391	.5714	.3776
16	13.14487726	3.21032E-02	8.51828E-02	.78004676	.11919849	.08116695	.07604688	.27378873	.6190	.3748
17	14.05602167	3.15027E-02	8.46671E-02	.78169737	.11678784	.08116695	.07604688	.27304178	.6667	.3728
18	14.96716607	3.15027E-02	8.47331E-02	.78154100	.11764367	.08116695	.07604688	.27306194	.7143	.3728
19	15.87831048	3.21032E-02	8.57311E-02	.77929852	.12019340	.08116695	.07604688	.27369026	.7619	.3745
20	16.78945488	3.21032E-02	8.57311E-02	.77715643	.12539341	.08116695	.07604688	.27460570	.8095	.3770
21	17.70059929	3.37204E-02	8.89004E-02	.77520793	.12922819	.08116695	.07604688	.27584893	.8571	.3799
22	18.61174369	3.47263E-02	9.06366E-02	.77282172	.13457845	.08116695	.07604688	.27674015	.9048	.3829
23	19.52288810	3.57936E-02	9.26758E-02	.76987507	.13947637	.08116695	.07604688	.27792943	.9524	.3862
24	20.43403250	3.64716E-02	9.33933E-02	.76776793	.14222262	.08116695	.07604688	.27866652	1.0000	.3935

K-20 PHI =170.0 Z = 33.800000

J	R	P	RHO	U	Y	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	2.74537E-02	7.30569E-02	.78965604	-.00000000	-.02323360	.06846347	.27420611	0.0000	.3759
4	2.25929678	3.40098E-02	8.35089E-02	.77912606	.07434617	.04402269	.08312645	.28471676	.0476	.4053
5	3.15937355	3.08348E-02	8.11867E-02	.78012850	.10834779	.04402269	.08312645	.27560930	.0952	.3798
6	4.06900033	3.54156E-02	8.98558E-02	.77706337	.08500000	.08500000	.07604688	.28077555	.1429	.3942
7	5.01874711	3.30555E-02	8.65761E-02	.77706337	.11445710	.08500000	.07604688	.27640049	.1905	.3820
8	5.94443389	3.40346E-02	8.87686E-02	.77624659	.11522276	.08500000	.07604688	.27691448	.2381	.3834

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
9	6.67812066	3.32200E-02	8.60673E-02	77692233	.12253761	.07719819	.00550400	.27590525	.2857	.3006
10	7.80780144	3.36340E-02	8.63994E-02	77671128	.12416375	.07713874	.00494530	.27588653	.3333	.3805
11	8.73749422	3.35147E-02	8.62411E-02	77678707	.12470370	.07708679	.00470647	.27580864	.3810	.3798
12	9.66718100	3.33862E-02	8.60754E-02	77702316	.12527877	.07703493	.00445352	.275738839	.4266	.3792
13	10.59686777	3.32610E-02	8.60104E-02	77633337	.12587817	.07698308	.004217909	.275654330	.4762	.3791
14	11.52665405	3.31496E-02	8.63067E-02	77654027	.13712678	.07693123	.00398369	.275543590	.5238	.3793
15	12.45624133	3.31784E-02	8.77167E-02	77739732	.12626200	.07687938	.00374927	.275403640	.5714	.3782
16	13.38592811	3.22572E-02	8.61914E-02	77620287	.12671897	.07682753	.00351485	.27403381	.6150	.3755
17	14.31561489	3.16952E-02	8.49292E-02	78160483	.12717593	.07677568	.00328044	.27321724	.6667	.3732
18	15.24530166	3.12772E-02	8.48092E-02	78172942	.12763289	.07672383	.00304602	.27311790	.7143	.3730
19	16.17498844	3.20785E-02	8.56714E-02	78031597	.12678257	.07667198	.00281160	.27352604	.7619	.3744
20	17.10467521	3.28798E-02	8.70707E-02	77810294	.12603217	.07662013	.00257718	.27425265	.8095	.3768
21	18.03436199	3.36714E-02	8.87114E-02	77535353	.13551695	.07656828	.00234276	.27553979	.8571	.3796
22	18.96404877	3.46109E-02	9.04121E-02	77292527	.14010999	.07651643	.00210834	.27680732	.9048	.3826
23	19.89373555	3.56340E-02	9.23815E-02	76940558	.14485693	.07646458	.00187392	.27751519	.9524	.3857
24	20.82342232	3.62509E-02	9.35269E-02	76820058	.147422510	.07641273	.00163950	.27842356	1.0000	.3876

K=21 PH1=180.0 Z=33.800000

J	R	P	RHO	U	V	W	(S-SINF)/CV	A	T	H/HT
3	1.30000000	2.77404E-02	7.35691E-02	78929413	-.00040000	0.00000000	.06846347	.27461323	0.0000	.3771
4	2.23266657	3.41139E-02	8.50151E-02	77115158	-.02639398	0.00000000	.07867261	.28412018	.0476	.4036
5	3.17053313	3.15155E-02	8.28975E-02	78322184	.07846433	0.00000000	.02977961	.27522740	.0952	.3804
6	4.10579970	3.56104E-02	9.02549E-02	77371937	.08246910	0.00000000	.03205978	.28071179	.1429	.3946
7	5.04108627	3.30287E-02	8.65916E-02	77787593	.11440659	0.00000000	.01601316	.27636759	.1905	.3819
8	5.97632253	3.41048E-02	8.82614E-02	77653394	.11566699	0.00000000	.01057162	.27704686	.2381	.3838
9	6.91159940	3.34924E-02	8.76424E-02	77717377	.12769208	0.00000000	.00845324	.27593485	.2857	.3807
10	7.84686536	3.30659E-02	8.84944E-02	77672267	.12672894	0.00000000	.00477813	.27596136	.3333	.3808
11	8.78213213	3.16741E-02	8.87267E-02	77663151	.12611483	0.00000000	.00351662	.27572809	.3810	.3801
12	9.71739910	3.34497E-02	8.81471E-02	77687272	.13100913	0.00000000	.002809590	.27531938	.4266	.3796
13	10.65466566	3.34006E-02	8.86659E-02	77694755	.13130671	0.00000000	.002535556	.27541544	.4762	.3793
14	11.58793223	3.31942E-02	8.82701E-02	77647566	.13169507	0.00000000	.001981884	.27549140	.5238	.3795
15	12.52319880	3.32191E-02	8.77635E-02	77721561	.13198990	0.00000000	.00153890	.27513946	.5714	.3785
16	13.45846536	3.24247E-02	8.62703E-02	77949437	.12860670	0.00000000	.00132765	.27417106	.6190	.3758
17	14.39373193	3.16843E-02	8.48117E-02	78162677	.12945601	0.00000000	.00113835	.27324728	.6667	.3732
18	15.32899849	3.15162E-02	8.45413E-02	78376845	.12911595	0.00000000	.00113835	.27322126	.7143	.3727
19	16.26426506	3.19346E-02	8.53173E-02	78143286	.12763793	0.00000000	.00092571	.27352126	.7619	.3740
20	17.19953163	3.26211E-02	8.66758E-02	77866589	.13194016	0.00000000	.000665495	.27432507	.8095	.3763
21	18.13479819	3.34944E-02	8.83613E-02	77606725	.13654267	0.00000000	.00048058	.27534153	.8571	.3791
22	19.07026476	3.44444E-02	9.01574E-02	77350729	.14131410	0.00000000	.00039606	.27642633	.9048	.3821
23	20.00533133	3.54872E-02	9.21076E-02	77020154	.14628475	0.00000000	.000314360	.27759058	.9524	.3853
24	20.94059789	3.61138E-02	9.32743E-02	76854582	.14885824	0.00000000	.00001475	.27827272	1.0000	.3872

X/L = 1.000000 DZDI = 3.350363 ITER = 626
 SURFACE FLOW VARIABLES AT Z = 33.800000

PHI	RB	CP	P/PINF	R/RINF	M-Z	M-R	M-PHI	A	COMP	H/HT	TEMP	CS-S.INF)/CV
0.0	1.3000	.0259	1.1485E+00	1.0512E+00	2.6578	-.0000	0.0000	2.8791E-01	1.0000	.41946	.00	6.8463E-02
10.0	1.3000	-.0227	1.1300E+00	1.0393E+00	2.6650	-.0000	.1321	2.8791E-01	1.0000	.41255	.00	6.8463E-02
20.0	1.3000	-.0136	1.0783E+00	1.0247E+00	2.6858	-.0000	.2853	2.8532E-01	1.0000	.40703	.00	6.8463E-02
30.0	1.3000	-.0007	9.9024E-01	9.4776E-01	2.7207	-.0000	.4024	2.8212E-01	1.0000	.39796	.00	6.8463E-02
40.0	1.3000	-.0192	8.9025E-01	8.7639E-01	2.7705	-.0000	.5465	2.7762E-01	1.0000	.38537	.00	6.8463E-02
50.0	1.3000	-.0401	7.7045E-01	7.5044E-01	2.8346	.0000	.6776	2.7195E-01	1.0000	.36978	.00	6.8463E-02
60.0	1.3000	-.0636	6.3583E-01	6.8911E-01	2.9205	.0000	.8487	2.6459E-01	1.0000	.35004	.00	6.8463E-02
70.0	1.3000	-.0861	5.0674E-01	5.8608E-01	3.0192	.0000	1.0608	2.5615E-01	1.0000	.32806	.00	6.8463E-02
80.0	1.3000	-.0585	4.3697E-01	5.2711E-01	3.0930	.0000	1.3448	2.5072E-01	1.0000	.31446	.00	6.8463E-02
90.0	1.3000	-.0994	4.8826E-01	5.7278E-01	3.6888	.0000	1.9440	2.5478E-01	1.0000	.32456	.00	6.8463E-02
100.0	1.3000	-.0746	4.3338E-01	5.7634E-01	2.8984	.0000	.5589	2.7004E-01	1.0000	.36461	.00	6.8463E-02
110.0	1.3000	-.0119	9.3635E-01	9.0748E-01	2.7604	.0000	.2400	2.7943E-01	1.0000	.39697	.00	6.8463E-02
120.0	1.3000	-.0119	9.3635E-01	9.0748E-01	2.7916	.0000	.1100	2.7945E-01	1.0000	.39046	.00	6.8463E-02
130.0	1.3000	-.0178	8.9845E-01	8.8304E-01	2.8180	-.0000	-.0624	2.7782E-01	1.0000	.38636	.00	6.8463E-02
140.0	1.3000	-.0285	8.4848E-01	8.4687E-01	2.8548	-.0000	-.1052	2.7451E-01	1.0000	.38012	.00	6.8463E-02
150.0	1.3000	-.0310	8.2276E-01	8.2036E-01	2.8738	-.0000	-.1052	2.7398E-01	1.0000	.37879	.00	6.8463E-02
160.0	1.3000	-.0329	8.1159E-01	8.2036E-01	2.8824	-.0000	-.1180	2.7398E-01	1.0000	.37552	.00	6.8463E-02
170.0	1.3000	-.0321	8.1631E-01	8.2377E-01	2.8798	-.0000	-.0812	2.7421E-01	1.0000	.37594	.00	6.8463E-02
180.0	1.3000	-.0306	8.2485E-01	8.2991E-01	2.8741	-.0000	0.0000	2.7461E-01	1.0000	.37706	.00	6.8463E-02

BODY AND SHOCK GEOMETRY AT Z = 33.800

PHI	RB	DB/DZ	DRR/DPHI	RS	DRS/DZ	DRS/DPHI
0.0	1.3000	0.0000	0.0000	9.7928	.2270	0.0000
10.0	1.3000	0.0000	0.0000	9.8430	.2286	.5765
20.0	1.3000	0.0000	0.0000	9.9940	.2334	1.1618
30.0	1.3000	0.0000	0.0000	10.2495	.2414	1.7620
40.0	1.3000	0.0000	0.0000	10.6091	.2530	2.3757
50.0	1.3000	0.0000	0.0000	11.0792	.2682	3.0097
60.0	1.3000	0.0000	0.0000	11.6587	.2873	3.6488
70.0	1.3000	0.0000	0.0000	12.3529	.3103	4.2892
80.0	1.3000	0.0000	0.0000	13.1499	.3371	4.9600
90.0	1.3000	0.0000	0.0000	14.0494	.3675	5.3593
100.0	1.3000	0.0000	0.0000	15.0207	.4007	5.7283
110.0	1.3000	0.0000	0.0000	16.0459	.4358	5.9423
120.0	1.3000	0.0000	0.0000	17.0949	.4720	5.8816
130.0	1.3000	0.0000	0.0000	18.1040	.5066	5.5625
140.0	1.3000	0.0000	0.0000	19.0386	.5387	4.9319
150.0	1.3000	0.0000	0.0000	19.8236	.5660	4.0035
160.0	1.3000	0.0000	0.0000	20.4340	.5866	2.8644
170.0	1.3000	0.0000	0.0000	20.8274	.5992	1.4512
180.0	1.3000	0.0000	0.0000	20.9406	.6040	0.0000

REFERENCE

1. Chaussee, D. S.; and McMillan, O. J.: A Supersonic, Three-Dimensional Code for Flow Over Blunt Bodies - User's Manual. NASA CR-3223, 1980.

APPENDIX

SOURCE CODE


```

60      IF (NREAL.NE.0) CALL INITIL
        CALL INITA
        C.....CALCULATES COEFFICIENTS FOR STARTUP(FIRST CARD BEFORE ZALTER CARD
        IF(NCONE.EQ.2.AND.IFANDM.EQ.0)CALL RECCOC1)
        IEND=0
        DDZZ=(ZEND-ZTINT)/500.0
        ZZZ=ZINT
65      C.....READ RESPACING PARAMETERS
        C
        C      ZALTER = ZSTATION WHERE ALTERING OCCURS
        C      NJUNK = NUMBER OF POINTS IN RADIAL AND MERIDIONAL DIRECTIONS
        C      RJA,RKA = AMOUNT OF CLUSTERING IN RADIAL AND MERIDIONAL DIRECTIONS
        C      PHFDA = MERIDIONAL ANGLE ARCUT WHICH CLUSTERING OCCURS
        C      STPSZE = 0,AUTOMATIC STEPSIZE >0, CONSTANT STEPSIZE
        C      CCONST(4AND5) = THE AMOUNT OF DISSIPATION IN RADIAL AND MERIDIONAL DIREC
        C      I.E. .69
        C      NSMCHI=0,NEW AVERAGING SCHEME,=1,REGULAR SCHEME
        C      NSMCH5=0,NO ENTROPY RELAXATION,=1,RELAXATION
        C
        C      READ(5,100)ZALTER,NITR,NIPHIA,RJA,RKA,PHFDA,STP,DISS1,DISS2,
        C      NSMCHI,NSMCH5
        C
        C      STPSZE=0.0
        C      CALL BICRY(2)
        C      CALL EIGEN(1)
        C      OUTPUT INITIAL FLOW VARIABLES
        C.....ICONST(5)=0
        IF(NCONE.EQ.1) GO TO 15
        CALL OUTPUT(2)
        CALL OUTPUT(5)
        CALL OUTPUT(6)
        C
        C      15 CONTINUE
        C.....COME AT ZERO ALPHA BYPASS
        IF(NCONE.EQ.1.AND.ALPHA.EQ.0.G.OR.NITER.EQ.0) GO TO 16
        DO 4 JUDDI=1,NITER
        ICGNST(5)=JUDDI
        IF(STPSZE.EQ.0)GO TO 10227
        DZ=STPSZE
        DZDT=DZ/DT
        DZDPH=DZ/DELTA
        GO TO 5
10227 CONTINUE
        C.....COMPUTE AUTOMATIC STEPSIZE
        IF (MOD(JUDDI,ICNST(49)).NE.0) GO TO 5
        IF (MOD(JUDDI,ICNST(49)).NE.0) GO TO 5
        CALL EIGEN(1)
        C.....GENERATES DATA TAPE
        GO TO (34,35,35), TAPE1
35      CONTINUE
        IF(Z.LT.ZZZ) GO TO 34
        ZZZ=Z+DZZ
        CALL OUTPUT(3)
        C.....CONTINUE
        IF(Z>ZL.ZT.ZEND)GO TO 30
        IF(IEND.EQ.1)GO TO 19
        DZ=ZEND-Z
        DZDT=DZ/DT
    
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115      DZDPH=DZ/DETA
      ZEND=1
      CONTINUE
      IF(ZALTER.GE.Z.AND.ZALTER.LT.(Z+DZ)) GO TO 10
      GO TO 8
120      C.....CLUSTER POINTS IN RADIAL OR MERIDIONAL DIRECTIONS
      10      CONTINUE
      CALL OUTPUT(5)
      CALL SETSPC(NITR,RJA,NIPHIA,AKA,PHIFDA)
      STP5ZE=STP
      CONST(4)=DISS1
      CONST(5)=DISS2
      NSUCH(S)=RZSUCHS
      NSUCH(11)=NSUCH1
      READ(5,100)ZALTER,NITR,NIPHIA,RJA,AKA,PHIFDA,STP,DISS1,DISS2,
      *
      IF(STP5ZE.EQ.0)CALL EIGEN(1)
      CALL OUTPUT(5)
      8      CONTINUE
      CALL DIFFR
      IF(NCORE.EQ.2.AND.IFANDM.EQ.0)CALL AERCO(2)
      C.....OUTPUT INTERMEDIATE DATA
      C....OUTPUT BASED ON ITERATIONS
      IF(MOD(JUDI,IIPRTF).NE.0) GO TO 21
      CALL OUTPUT(2)
140      21 IF(MOD(JUDI,IIPRTB).NE.0) GO TO 20
      CALL OUTPUT(5)
      CALL OUTPUT(6)
      20 CONTINUE
      C....OUTPUT BASED ON Z STATIONS
      IF(AMOD(Z.FLOD).LE.DZ) CALL OUTPUT(2)
      IF(AMOD(Z.ZBSS).LE.DZ) GO TO 12
      GO TO 4
150      12 CONTINUE
      CALL OUTPUT(5)
      CALL OUTPUT(6)
      4 CONTINUE
      19 CONTINUE
      C.....RESET CONE SOLUTION TO Z-ZINT
      IF(NCORE.EQ.2) GO TO 16
      ZR=ZTINT-ZSHIFT)/Z-ZSHIFT)
      DO 14 K=1,NPHI2
      RB(K)=ZR*RB(K)
      RS(K)=ZR*RS(K)
      RBP(K)=ZR*RBPH(K)
      RSPH(K)=ZR*RSPH(K)
      Z-ZTINT
160      14 RSPH(K)=ZR*RSPH(K)
      Z-ZTINT
      CALL GEOMI(2)
      WRITE(6,102) Z
165      16 CONTINUE
      C.....OUTPUT FINAL DATA
      CALL OUTPUT(2)
      CALL OUTPUT(5)
      CALL OUTPUT(6)
      ZSAVE=ZEND
      ZEND=ZTINT
170

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MAIN 153

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175 IF(NCONE.EQ.1.AND.IFANDM.EQ.0)CALL RERCO(1)
    IF(IFANDM.EQ.0)CALL RERCO(2)
    ZEND=ZSAVE
    C.....STORE SOLUTION ON PUNCHED CARDS
    IF(TAPE2.EQ.3) CALL OUTPUT(8)
    C.....STORE SOLUTION ON DISK1 FOR RESTART
    IF(DISK1.NE.2) GO TO 17
    CALL OUTPUT(4)
180 17 CONTINUE
    C.....STORE SOLUTION ON DISK2 FOR RESTART
    IF(DISK2.NE.2) GO TO 18
    CALL OUTPUT(7)
    18 CONTINUE
185 100 FORMAT(F10.5,I2,I3,6F10.5,I2,I3)
    102 FORMAT(* CONE SOLUTION RESET TO Z-INITIAL=*,F10.5)
    112 FORMAT('I15,6)
    113 FORMAT(3I5,4E15,6)
    6 ZZZ=ZZZ
190 IF (TAPE1.EQ.1) GO TO 13
    END FILE 9
    REWIND 9
    CONTINUE
    13 IF(NCASE.GT.0) GO TO 11
    C.....PUNCH DATA CARDS FOR 3-0 S-0-S CODE
    IF(HTDSOS.GT.0) CALL OUTPUT(9)
    STOP
    END

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 MAIN 180


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7 CONTINUE
C.....COMPUTE AERODYNAMIC COEFFICIENTS
REF1=2./58
FTX1=FTX2*REF1
FTY1=FTY2*REF1
FTZ1=FTZ2*REF1
FIX=FTX+FTX1
FIY=FTY+FTY1
FITZ=FTZ+FTZ1
C.....COMPUTE AERODYNAMIC MOMENT COEFFICIENTS
REF2=2./(SB*LENGTH)
RMTX1=RMTX2*REF2
RMTY1=RMTY2*REF2
RMTZ1=RMTZ2*REF2
RMTX=RMTX+RMTX1
RMTY=RMTY+RMTY1
RMTZ=RMTZ+RMTZ1
WRITE(6,101)Z,FTX1,FTY1,FTZ1,FTX,FTY,FTZ,RMTX1,RMTY1,RMTZ1,RMTX,
<RMTY,RMTZ
20 CONTINUE
IF(ZZ(3).LT. ZEND)RETURN
C.....PRINT OUT FINAL AERODYNAMIC FORCE AND MOMENT COEFFICIENTS
C.....CALCULATE LIFT, DRAG, AND YAW FORCES(WIND AXES, AND STATIC MARGIN
A1=ALPH
A2=BETA
A3=ROLL
CD=FTZ*CD*(A1)*COS(A2)-FTX*CD*(A1)*SIN(A2)+FTY*CD*(A1)
CY=FTZ*(SIN(A2)*COS(A3)-SIN(A1)*COS(A2)*SIN(A3))+FTX*(COS(A2)*
<COS(A3)+SIN(A1)*SIN(A2)*SIN(A3))+FTY*SIN(A3)*COS(A1)
CL=-FTZ*(SIN(A2)*SIN(A3)+SIN(A1)*COS(A2)*COS(A3))+FTX*(COS(A1)*
<COS(A2)+FTX*(SIN(A3)-SIN(A1)*COS(A2)*SIN(A1)*SIN(A2)*COS(A3))
WRITE(6,102)SB,LENGTH
WRITE(6,102)FTX,CL,FTX,CY,FTZ,CD
RMTY=-RMTY
RMTZ=-RMTZ
WRITE(6,101)RMTX,RMTY,RMTZ
ZCP=RMTX/ITY
SM=ZCP*ZCG/LENGTH
WRITE(6,106)ZCP,LENGTH,ZREF
WRITE(6,107)SM,LENGTH,ZCG
6 CONTINUE
101 FORMAT(1X,2H2=,F10.6/1X,21HDCY,DCN,DCR,CY,CN,CA=,6E15.6 /1X,21HDMX
<SDAY,DMZ,CMX,CMY,CMZ=,6E15.6)
102 FORMAT(1H0,5X,21HAXIAL FORCE COEFFICIENT = ,E15.6,10X,19HIFT COE
<FFICIENT = ,E15.6/76X,21H SIDE FORCE COEFFICIENT = ,E15.6,10X,19H
<YAW COEFFICIENT = ,E15.6/6X,21H AXIAL FORCE COEFFICIENT = ,E15.6
<,10X,19HDRAG COEFFICIENT = ,E15.6)
104 FORMAT(1H0,7X,20HROLLING MOMENT COEFFICIENT = ,E15.6//
<6X,30H SIDE MOMENT COEFFICIENT = ,E15.6//
<6X,30H ROLLING MOMENT COEFFICIENT = ,E15.6)
105 FORMAT(1H1,5X,12HREF. AREA = ,F10.6,1X,34HREF. LENGTH = ,F10.6)
106 FORMAT(1H0,6X,19HCENTER OF PRESSURE = ,E15.6,1X,21HBASED ON REF. LE
<NGTH = ,E15.6,1X,23HRAID MOMENT REF. CENTER = ,E15.6)
107 FORMAT(1H0,6X,26HSTATIC STABILITY MARGIN = ,E15.6,1X,29HBASED ON R
<EF. LENGTH = ,E15.6,1X,20HNO C.G. LOCATION = ,E15.6)
108 FORMAT(1H1,7HTHE END)

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115 SUBROUTINE PERCO 76/76 OPT=1 FTN 4.6-460 06/15/79 18.58.36 PAGE 3

RETURN
END

PERCO 101
PERCO 102

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1 SUBROUTINE COMPUT (NSTART)
COMMON /PVARB/RHO(24,41) , P(24,41) , U(24,41) , V(24,41) , W(24,4
*1) ,
* ROBC(41) , ROBZ(41) , VINP(41) , WINP(41) ,
* ROBP(41) , RB(41) , RBZ(41) , RBP(41) ,
* DTPH(24,41) , BCT(41) , DDI(24,41) , DTDP(41) , ACI(41) ,
* ICONST(50) , GAM(20) , CONST(50) , MARGON , RS(41) ,
* ASZ(41) , RSPHI(41) , AST(41) , ASZI(41) , RSPHI(41) ,
COMMON /IDY/IB/RK,ETA(41),PHIP(41),DTIL(41),DTIL(41),DELTA,TP(24)
COMMON/SYARB/Z , PHI , DT , DZ , GPHI , ZINI ,
* ZEND , PI , ALPHA , GAMMA , SIGMA , YRACH , TAP1 ,
* TAP2 , DISK1 , DISK2 , SIGM , NP/MT , DZDT ,
* DZDFH , ZH , T/MD , T/ML , T/PL , T/TH ,
* T/TL , RZ , BZ , NPHI , NIT , KPHI , MTER ,
* NP/MI , NP/II , NP/II2 , NP/II3 , NP/MI1 , NP/MI2 , NP/MI3 ,
* NT , NT1 , NT2 , NT3 , PHIEF , NCG/IE , RAC1 ,
* PHIF , RETHOO , LAG , N/C , P/INF , RHO/IN , U/INF ,
* Q/INF , D/INF , ALENGT , ZREF , ZCS , ZSHIFT , IFANCH
INTEGER DISK1,DISK2,TAP1,TP2
COMMON/FORCL5/ZI(3) , CP(41) , ARI(41) , ARI(41) , ARI(41) , ARI(41)
COMMON/FANCH/FTX,FTY,FTZ,AMTX,AMTY,AMTZ,FTX2,FTY2,FTZ2,AMT/2,AMTY/2
*,AMTZ/2
REAL MTEMPX,MTEMPY,MTEMPZ
DZ1=(ZZ(3)-ZZ(2))/0.5
DZ2=(ZZ(2)-ZZ(1))/0.5
FTEPX=0.0
FTEPY=0.0
FTEPZ=0.0
MTEMPX=0.0
MTEMPY=0.0
MTEMPZ=0.0
DO 4 K=3,NPHI
SPHI=SIGN(PHIP(K))
CPHI=CGS(PHIP(K))
GO TO (1,2),NSTART
1 CONTINUE
C..... FORCE AND MOMENT FROM STARTING SOLUTION
ALANG(5,20)/IX,FTY,FTZ,AMTX,AMTY,AMTZ
M=ZINT-ZSHIFT
RC=RTAN(SIGN)
FORNAT(6F12.8)
RETURN
2 CONTINUE
C..... APT BODY CALCULATIONS
DPHI=PHIP(K-1)-PHIP(K-1)
IF(K .EQ. NPHI)CPHI=2.*PHIP(K)-PHIP(K-1)
PA=(DZ1+DZ2)*AR(CK)*0.5*CPHI5
IF(ACOS .EQ. 1)AR=0.5*PHI5*0.5*PHI5*0.5*PHI5*0.5*PHI5*0.5*PHI5
IF(K .EQ. 3)GR .K .EQ. NPHI)AR=0.5*AA
FORCE=CP(CK)*AA
ZARM=Z(2)-ZREF
IF(IGONE .EQ. 1)ZARM=2.*(ZINT-ZSHIFT)/(1.+TRN(SIGN)**2)/3.+ZSHIFT
<-ZREF
FTEPX=FTEPX+FORCE*(ARBP(CK)/AR(CK))*CPHI-SPHI
FTEPY=FTEPY+FORCE*(ARBP(CK)/AR(CK))*PHI-CPHI
FTEPZ=FTEPZ+FORCE*PAR(CK)
C..... MOMENT CENTER LOCATED AT Z=ZREF

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COMPUT 2
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PVARB 42
PVARB 43

SUBROUTINE	COMPUT	76/76	OPT=1	FTN 4.6+460	06/15/79	18.58.36	PAGE
							2
60				<pre> MTEMPX=MTEMPX-FORCE*(ZARM #ARBPH(K)*SPHI/ARB(K))*((ZARM #ARB(K)* <ARBZ(K))*CPHI) MTEMPY=MTEMPY+FORCE*(ZARM #ARBPH(K)*CPHI/ARB(K))-((ZARM #ARB(K)* <ARBZ(K))*SPHI) MTEMPZ=MTEMPZ+FORCE#ARBPH(K) </pre>			44 45 46 47 48 49 50 51 52 53 54 55 56 57
65	4			<pre> CONTINUE FTZ2=FTMPX FTY2=FTMPY FTZ2=FTMPZ RMTX2=MTEMPX RMTY2=MTEMPY RMTZ2=MTEMPZ RETURN END </pre>			
70							

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1 SUBROUTINE BNDRY(K1)
  LEVEL 2,ETE=*,EO,FO,GO,HO
  COMMON/LARGE/ETLPH(4,24,41),EOC(4,24,41)
5 COMMON /PVARB/RHO(24,41),P(24,41),Y(24,41),W(24,4
  *1)
  * R0B(41),R0Z(41),VIN(41),WINF(41)
  * R0PH(41),RU(41),R0Z(41),R0Z(41),R0PH(41)
  * DIOPH(24,41),BCI(41),DIOZ(24,41),DIO(41),ACI(41)
  * ICOSI(SO),GAK(20),CONST(SO),NBLGON,RS(41)
  * RSZ(41),ASPHI(41),RST(41),ASZT(41),ASPHI(41)
  * COMMON /IDVAF/RK,ETRA(41),PHIP(41),DTIL(41),DTIL(41),ETA,TP(24)
  * COMMON/SVARE/1,Z,PHI,DT,DZ,DP,DI,ZINT
  * ZEND,PI,ALPHA,GAPPA,SICMA,XMACH,TAVE1
  * TAPE2,DISK1,ALPH,DISK2,SIGM,NFRNT,DZGT
  * DZOPH,ZH,THAO,THO,TPW,TPA,TITW
  * TITL,RZ,DZ,NIPHI,NIT,KPHI,MITER
  * NPHI,NPHI1,NPHI2,NPHI3,NPHI4,NPHI5
  * NT,NT1,NT2,NT3,PHIF,HCONE,RAOI
  * PHIF,METHCO,LRG,NBC,PINF,RHOIN,UMF
  * QINF,DIAM,ELENG,ZREF,ZCG,ZSHIFT,IFPAUM
  * INTEGER DISK1,DISK2,TAPE1,TAPE2
  * COMMON /ALBOS/HE(SI(1)),NENRA,ROZ(4),NEATB(3),NS4CH(32),INC(32)
  * COMMON /XYZ/XYZ(3),YI(160),XZ(160),YI(160),YZ(160),Y3C160
  * )Z(160),Z2(160),Z3(160)
  * COMMON /CGNS/MPPO,MPRO,WRTO,WRCON,GASCON,WRHO,WRASO,WRARTO,WRGX
  * CONPRN/REK,G/REAL,NURPRT,BOOYH,BODY5,PSONIC,RSONIC,P1INF,R1INF
  * V1IRP,NITPG,WROUT
  * COMMON/ENTRO/SC(41),ZBS,7FLD,ITPRTB,ITPRTF,MCASE,NTDSOS
  * DIMENSION PK13(41),PK14(41),PK21(41),PK22(41),PK23(41)
  * LOGICAL ITNS
  * ARSIN(A)*ARSIN(A)
  * GO TO (10,16,11),K1
10 CONTINUE
  * IF(CONE.EQ.2) GO TO 32
  * ...DETERMINE SURFACE ENTROPY FOR CONICAL BODIES
  * IF(C...4) 16,16,15
15 DO 13 K=5,NPHI1
  * IF(C(3,K)) 17,17,13
13 CONTINUE
  * KENT=NPHI
  * GO TO 19
17 CONTINUE
  * KENT=K-1
  * GO TO 19
16 DO 7 K=5,NPHI1
  * IF(C(3,K)) 7,8,8
  * 7 CONTINUE
  * KENT=NPHI
  * GO TO 20
  * 8 CONTINUE
  * KENT=K-1
  * GO TO 20
19 CONTINUE
  * DO 24 K=3,NPHI
  * IF(K.LE.KENT) S(K)=P(4,3)/RHO(4,3)**GAPPA
  * IF(K.GT.KENT) S(K)=P(4,NPHI)/RHO(4,NPHI)**GAPPA
  *
  * BNDRY 2
  * CVARB 3
  * CVARB 4
  * PVARB 2
  * PVARB 3
  * PVARB 4
  * PVARB 4
  * PVARB 5
  * PVARB 6
  * PVARB 7
  * PVARB 8
  * IDVAFB 2
  * SVARB 2
  * SVARB 3
  * SVARB 4
  * SVARB 5
  * SVARB 6
  * SVARB 7
  * SVARB 8
  * SVARB 9
  * SVARB 10
  * SVARB 11
  * L1800 2
  * XYZ 2
  * CONRG 2
  * REALG 3
  * ENTRO 2
  * BNDRY 12
  * BNDRY 13
  * BNDRY 14
  * BNDRY 15
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  * BNDRY 34
  * BNDRY 35
  * BNDRY 36
  * BNDRY 37
  * BNDRY 38
  * BNDRY 39
  
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24 CONTINUE
60 GO TO 32
20 CONTINUE
DO 31 K=3,NPHI
31 S(K)=P(4,KENT)/RHO(4,KENT)**GRWFA
32 CONTINUE
C...WEAK GR SMALL ANGLE CORRECTIONS: (USES PRANDTL-MEYER RELATIONS)
65 DO 9 K=3,NPHI
PK4=1.0/SART(PBZ(K)**2+1.0*(RPH(K)/RB(K))**2)
PK1=.RBZ(K)*PK4
PK2=PK4
PK3=-RPH(K)/RB(K)*PK4
IT2=.FALSE.
25 CONTINUE
Q5Q=U(3,K)**2+V(3,K)**2+M(3,K)**2
IF(P(3,K).GE.0.0) GO TO 4
C...NEGATIVE SURFACE PRESSURE
ICHECK=1
WRITE(6,100)K,Z,P(3,K),RHO(3,K),U(3,K),V(3,K),M(3,K),ICHECK
P(3,K)=P5(P(3,K))
PPP=0.5*(P(3,K)+1)*P(3,K-1)
IF(P(3,K).GT.PPP)P(3,K)=PPP
RHO(3,K)=(P(3,K)/S(K))**C1/OGRWFA
Q3K=SART(1.0-P(3,K)/RHO(3,K))
U(3,K)=U(3,K)*Q3K/S(3,K)*S
V(3,K)=V(3,K)*Q3K/S(3,K)*S
M(3,K)=M(3,K)*Q3K/S(3,K)*S
WRITE(6,105) P(3,K),RHO(3,K),U(3,K),V(3,K),M(3,K)
Q5Q=Q3K**2
4 CONTINUE
IF(RHO(3,K).GE.0.0)GO TO 5
ICHECK=2
WRITE(6,100)K,Z,P(3,K),RHO(3,K),U(3,K),V(3,K),M(3,K),ICHECK
RHO(3,K)=R5(P(3,K))
RHR=0.5*(RHO(3,K)+1)*RHO(3,K-1)
IF(RHO(3,K).GT.RHR)RHO(3,K)=RHR
P(3,K)=S(K)*RHO(3,K)**C1/OGRWFA
U(3,K)=U(3,K)*Q3K/S(3,K)*S
V(3,K)=V(3,K)*Q3K/S(3,K)*S
M(3,K)=M(3,K)*Q3K/S(3,K)*S
WRITE(6,105)P(3,K),RHO(3,K),U(3,K),V(3,K),M(3,K)
C...IT=1
5 PK5=SART(Q5Q)
PK6=(PK1*U(3,K)+PK2*V(3,K)+PK3*M(3,K))/PK5
PK6D=PK6/RODI
PK7=R5SIN(PK6)
PK7D=PK7*RAOI
IF(PK7D.GT.5.0)WRITE(6,102)K,PK7D
IF (NFEAL.EQ.-1) GO TO 22
PK8=COS(PK1)*P(3,K)/RHO(3,K)
PK9=PK8**2/FR8
PK10=PK9-1.0
IF(PK10.GT.0.0)GO TO 6
ICHECK=3
WRITE(6,100)K,Z,P(3,K),RHO(3,K),U(3,K),V(3,K),M(3,K),ICHECK
PK10=0.5

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BNDRY 96


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115 PK9=1.5
    PR8=PY5**2/PK9
    RHOC(3,K)=GM(1)*RP(3,K)/PK8
    GK=SQRT(1.0-P(3,K)/RHO(3,K))
    U(3,K)=U(3,K)*GK/0.5**0.5
    V(3,K)=V(3,K)*GK/0.5**0.5
    W(3,K)=W(3,K)*GK/0.5**0.5
    WRITE(6,103)P(3,K),RHO(3,K),U(3,K),V(3,K),W(3,K)
6 CONTINUE
    PK11=GM*APK9/SQRT(PK10)
    PA12=GM*APK9*((GAP*0+1.0)*PK9**2-4.0*PK10)/(4.0*PK10**2)
    C..NEXT TWO TERMS COMPUTE COEFFICIENTS FOR DENSITY EXPANSION
    IF(RS*GH(9).EQ.0) GO TO 2
    PR25=PK11/GAPPA
    PK26=PK9*(3.0-GAPPA)*PK9*(PK9-2.0)+4.0)/(4.0*PK10**2)
2 CONTINUE
    PA13(K)=P(3,K)*(1.0-PK11*PK7+PK12*PK7**2)
    FACTOR=0.5**0.5*PK9/(PK10**0.5)
    TERM1=(GAP*0+1.0)*PK9**0.5/6.0
    TERM2=(5.0+7.0*APPA**2.0*GAPPA**2)*PK9**3/6.0
    TERM3=5.0*GAPPA**1.0*PK9**2/3.0
    TERM4=4.0/3.0-2.0*PK9
    COEFF3=FACTOR*(TERM1+TERM2+TERM3+TERM4)
    PTEST=PK13(K)-P(3,K)*COEFF3*PK7**3
    IF(COEF(PK7).LT.FUS(0.1))GO TO 123
    WRITE(6,122) PK7,P(3,K),PK13(K),PTEST,K
    XH1 = SQRT(PK9)
    CALL PHYTUR(XH1,PK7,P2P1,NITS,GAPPA)
    PTEST = P(3,K)*XH1
    WRITE(6,124) PTEST,NITS
145 FORMAT(1HF,BOX,F15.9,' NITS=',I3)
    PTEST = PIF E
122 CONTINUE
123 CONTINUE
    PA13(K)=(PTEST-P(3,K))/0.5*0.60**2008/P(3,K+1)+P(3,K-1))
    PA13(K)=(PTEST+P(3,K))/0.5*0.70**1508/P(3,K+1)+P(3,K-1))
    PA13(K)=(PTEST+P(3,K))/0.5*0.99**0658*(P(3,K+1)+P(3,K-1))
    PA13(K)=PTEST
    PA14(K)=(PK13(K)/5(K))**0.10/GAPPA
    IF(NS*CH(S).EQ.0) GO TO 3
    PA14(K)=RHO(3,K)*G(1.0-PY25*PK7+PK26*PK7**2)
    S(K)=P(3,K)/RHO(3,K)*GAPPA
3 CONTINUE
    PK15=SQRT(1.0-PK13(K)/PK14(K))
    GO TO 23
22 CONTINUE
    IF (GAPPA*EQ.2) WRITE (6,101) PK7,BODYH,BODY5
    IF (NS*CH(2).EQ.0) GO TO 26
    C FOLLOWING STATEMENTS TO 23 ARE FOR RELAXING CONSTANT ENTROPY.
    CALL P2PANG(PK7,P(3,K),PK13(K),PK14(K),PK15)
    GO TO 23
165 CONTINUE
26 CALL RGRAS(P(3,K),RHO(3,K),HRAS,WRAP,WRTX,WR5X,GASCON,WRGX,-1,1,2)
    WRMACH=(PK5/WRPX)**2
    L* STA=5*RT(WRMACH-1.)
    LF P=PK7*RHO(3,K)*ASW/WRMETHA
    PA13(K)=P(3,K)-DELP

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BNDRY 151
BNDRY 152

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175      CALL RGAS(PK13(K), PK14(K), WRAK, WRHX, WRTX, S(K), GASCOM, WPIA, .1, 5.2)
      PK15=SBRT(2.0*(BCOYH-LR(HX)))
23      CONTINUE
      PK16=PK6+PK5*PK4
      PK17=U(3,K)+PK16*HRZ(K)
      PK18=V(3,K)-PK16
      PK19=W(3,K)+PK16*WRPH(K)/WR(K)
      PK20=SIGN(PK17**2+PK18**2+PK19**2)
      PK24=PK15/PK20
      PK21(K)=PK24*PK17
      PK22(K)=PK24*PK18
      PK23(K)=PK24*PK19
      IF (NSUCH(2).LE.C) GO TO 9
      IF (NBEAL(EJ,-1)) GO TO 9
      IF (ITZ=ND) GO TO 9
      ITND=.TRUE.
      IF (ABS(P(3,K)-PK13(K)).LT.P(3,K)*1.0E-3) GO TO 9
      P(3,K)=PK13(K)
      RHO(3,K)=PK14(K)
      U(3,K)=PK21(K)
      V(3,K)=PK22(K)
      W(3,K)=PK23(K)
      GO TO 25
195      CONTINUE
11      CONTINUE
      C..RESET BODY VARIABLES TO THOSE CALCULATED BY ABETTS SCHEME
      DO 12 K=3,NPHI
      P(3,K)=PK13(K)
      RHO(3,K)=PK14(K)
      U(3,K)=PK21(K)
      V(3,K)=PK22(K)
      W(3,K)=PK23(K)
      CONTINUE
12      GO TO 21
18      CONTINUE
      C
      C..APPLY REFLECTION PRINCIPLE AT PLANES OF SYMMETRY
      DO 1 K=1,2
      M=6-K
      L=NPHI-K
      N=NPHI-K
      DO 1 J=3,NTZ
      RHO(J,K)=RHO(J,M)
      P(J,L)=RHO(J,N)
      P(J,K)=P(J,M)
      U(J,K)=U(J,M)
      U(J,L)=U(J,N)
      V(J,K)=V(J,M)
      V(J,L)=V(J,N)
      W(J,K)=W(J,M)
      W(J,L)=W(J,N)
      U(J,3)=0.0
      W(J,NPHI)=0.0
      CONTINUE
1      IF(ICONST(5).LT.100.OR.NCONE.EQ.2) GO TO 21
153      BNDRY
154      BNDRY
155      BNDRY
156      BNDRY
157      BNDRY
158      BNDRY
159      BNDRY
160      BNDRY
161      BNDRY
162      BNDRY
163      BNDRY
164      BNDRY
165      BNDRY
166      BNDRY
167      BNDRY
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169      BNDRY
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171      BNDRY
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203      BNDRY
204      BNDRY
205      BNDRY
206      BNDRY
207      BNDRY
208      BNDRY
209      BNDRY

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230      C...SET ENERGY CONSTANT IN WINDWARD PLANE FOR CONICAL FLOWS
        IF(ALPHA) 27,28,28
27      SSH=P(NT2,NPHI)/RHO(NT2,NPHI)**GAMMA
        DO 29 J=4,NT1
          RHO(J,NPHI)=(P(J,NPHI)/SSH)**(1.0/GAMMA)
          QM2=1.0-P(C,NPHI)/RHO(J,NPHI)
          YOU=V(J,NPHI)/U(J,NPHI)
          U(J,NPHI)=SQRT(QM2/(1.0*YOU**2))
          V(J,NPHI)=U(J,NPHI)*YOU
29      CONTINUE
        GO TO 21
240      28      SSH=P(NT2,3)/RHO(NT2,3)**GAMMA
          DO 30 J=4,NT1
            RHO(J,3)=(P(J,3)/SSH)**(1.0/GAMMA)
            QM2=1.0-P(J,3)/RHO(J,3)
            YOU=V(J,3)/U(J,3)
            U(J,3)=SQRT(QM2/(1.0*YOU**2))
            V(J,3)=U(J,3)*YOU
30      CONTINUE
21      CONTINUE
100      FORMAT(1H0,3HERROR CHECK NEGATIVE PRESSURE IN BNDRY /1H
          *2RZ=-.13,3X,2HZ=-.10,3/1H *2HP=-.E13.6,3X,4HPHO=-.E13.6,3X,2HJ=-.E13.6
          *3X,
          *2HV=-.E13.6,3X,2HW=-.E13.6,3X,7HICHECK=-12)
101      FORMAT(1H ,10H*BOUNDARY - ANG(PK7)-.1PE12.5,1X,3HHB-.1PE12.5,1X,
          *3HSD-.1PE12.5)
102      FORMAT(1H0,3HDEFLECTION ANGLE IN BNDRY AT K=.13,1X,
          *2HIS,F7.3)
103      FORMAT(1H ,23HMODIFICATION INSTITUTED /1H *2HP=-.E13.6,3X,
          *4HHC=-.E13.6,3X,
          *2HJ=-.E13.6,3X,2HV=-.E13.6,3X,2HW=-.E13.6)
          RETURN
          END
210      BNDRY
211      BNDRY
212      BNDRY
213      BNDRY
214      BNDRY
215      BNDRY
216      BNDRY
217      BNDRY
218      BNDRY
219      BNDRY
220      BNDRY
221      BNDRY
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223      BNDRY
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225      BNDRY
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236      BNDRY
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238      BNDRY
239      BNDRY
240      BNDRY
241      BNDRY
242      BNDRY

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SUBROUTINE PHYTURN 76/76 OPT=1          FTN 4,6+460          06/15/79 10.50.36          PAGE 1
1      SUBROUTINE PHYTURN(HI,DMU,P2P1,NITS,GM)
C      A THOMAS R. SMOKE'S PRODUCTION.
REAL M1,M2,M
5      XNU(CH) = ATAN(SQRT(C*(M*M-1.)))/SQRTC-ATAN(SQRT(M*M-1.))
        XNU(MH) = SQRT(M*M-1.)/(1.+(GM-1.)/2.*M*M)/M
        C = (GM-1.)/(GM+1.)
        SQRTC = SQRT(C)
        EPS = 0.1E-6
        XNU1 = XNU(M1)
        XNU2 = XNU1+DMU
        XM = M1
        DO 10 I=1,20
        NITS = I
        M2 = XM - (XNU(XM)-XNU2)/XNUP(XM)
        IF (M2.GT. 100.0) GO TO 20
        IF (ABS((M2-XM)/XM) .LT. EPS) GO TO 30
        10 XM = M2
        20 CONTINUE
        M2 = 100.0
        WRITE(6,1)
        1 FORNAT(1H,15X,8- - - BODY TURN STOPPED AT M2 = 100.0 - - -*)
        30 CONTINUE
        P2P1 = ((1.+(GM-1.)/2.*M1*M1)/(1.+(GM-1.)/2.*M2*M2))*((GM/(GM-1.))
        RETURN
        END
25
2      PHYTURN
3      PHYTURN
4      PHYTURN
5      PHYTURN
6      PHYTURN
7      PHYTURN
8      PHYTURN
9      PHYTURN
10     PHYTURN
11     PHYTURN
12     PHYTURN
13     PHYTURN
14     PHYTURN
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16     PHYTURN
17     PHYTURN
18     PHYTURN
19     PHYTURN
20     PHYTURN
21     PHYTURN
22     PHYTURN
23     PHYTURN
24     PHYTURN
25     PHYTURN
26     PHYTURN

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SUBROUTINE BOCENT 76/76 OPT=1          FTH 4.6+460          O6/15/79 18.58.36          PAGE 2
60      1 CONTINUE
          ST(2)=ST(4)
          ST(NPHI1)=ST(NPHI1)
          GO TO(3,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4),I
          DO 5 K=2,NPHI1
            SK)=ST(K)
            GO TO 6
          4 CONTINUE
            DO 2 K=3,NPHI
              S(K)=0.25*(ST(K+1)+2.0*ST(K)+ST(K-1))
              S(2)=S(4)
              S(NPHI1)=S(NPHI1)
          70 CONTINUE
          100 FORMAT(1H ,21HSURFACE ENTROPY AT Z=.F10.5,15H WAS REDUCED BY,F10.5
                * )
          RETURN
          END
38 BOCENT
39 BOCENT
40 BOCENT
41 BOCENT
42 BOCENT
43 BOCENT
44 BOCENT
45 BOCENT
46 BOCENT
47 BOCENT
48 BOCENT
49 BOCENT
50 BOCENT
51 BOCENT
52 BOCENT
53 BOCENT
54 BOCENT

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PAGE 1

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FTN 4.6-160

76/76 OPT-1

FUNCTION COSH

2
3
4
5

FUNCTION COSH(A)
COSH+.S*(EXP(A).EXP(-A))
RETURN
END

1

SINH 2
SINH 3
SINH 4
SINH 5

FUNCTION SINH(A)
SINH=.5*(EXP(A)-EXP(-A))
RETURN
END

1


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1      BLOCK DATA
      LEVEL 2,ETEMP,EO,FO,GO,HO
      COMMON/LARGE/ETEMP(4,24,41),EO(4,24,41),FO(4,24,41),GO(4,24,41),HO(4,24,41)
5      COMMON /PVARB/RHO(24,41),P(24,41),U(24,41),V(24,41),W(24,41)
      *
      *   RCB(41) , ROBZ(41) , VINFC(41) , VINFC(41) ,
      *   ROBPH(41) , RBZ(41) , RBZ(41) , RBPBK(41) ,
      *   OTDPHC(24,41) , BCT(41) , OTDZ(24,41) , OTDZ(41) , ACT(41) ,
      *   ICONST(SO) , GR*(20) , CONST(SO) , MRESCH , RS(41) ,
      *   RSZ(41) , RSPHI(41) , RST(41) , RSZT(41) , RSPHIT(41)
      COMMON /IDVARB/RK,ETA(41),PHIP(41),DTIL(41),DTILE(41),GETA,TP(24)
      COMMON/SVARB/T,Z , PHI , DT , DZ , DPHI , ZINT ,
      *   ZEND , PI , ALPHA , GAMMA , SIUHA , XHACH , TAPF1 ,
      *   TAPF2 , DISK1 , ALPHA , DISK2 , SIGM , WPRRT , CZDT ,
      *   DZGPH , ZH , TIRAO , TIRAO , TIRAO , TIRAO ,
      *   TIRAO , AZ , BZ , NIPHI , NIT , KPHI , MITFH ,
      *   NPHI , NPHI1 , NPHI2 , NPHI3 , NPHI4 , NPHI5 ,
      *   NT , NT1 , NT2 , NT3 , PHIFD , NCOVE , KAOI ,
      *   PHIF , METHOO , LAG , ABC , PINF , RHOIN , UINF ,
      *   QINF , DIAM , ALINGT , ZTRFF , ZCG , ZSHIFT , IPRMOM
      INTEGER DISK1,DISK2,TAPF1,TAPF2
      COMMON /L1900/HIEST(11) , NCRJA , NCSXY(4) , NCRTR(3) , NSHCH(32) , IH(32)
      COMMON /XYZ/XYZ(3) , XI(160) , Y(160) , Z(160) , X3(160) , Y3(160) , Z3(160)
25      * , Z4(160) , Z5(160) , Z6(160)
      COMMON /JUL/ JULI , C11 , C12 , ALF , ZINNR , DZIRMM
      COMMON /EPSL/ EPSL1 , EPSL2
      COMMON /PI/ ALG/NREAL , NHRPRT , BCOYH , BOOYS , PSONIC , RSONIC , P1INF , R1INF
      * , V1INF , NITAVG , NHRROUT
      COMMON /CCNRG/WRPO , WRRO , WRTO , WRCON , GASCON , WPHO , WRSD , WRAC , WPRIO , WRGX
      COMMON /ENTRO/S(41) , ZBS , ZFLD , ITPATB , ITPRTF , NCASE , NTSOS
      COMMON /CFS/NGFS
      COMMON /CLUSTR/RJ , XI(24) , TXI(24) , TXIT(24)
      END

```

```

      DATA
      CVARB 2
      CVARB 2
      CVARB 3
      CVARB 4
      PVARB 2
      PVARB 3
      PVARB 4
      PVARB 5
      PVARB 6
      PVARB 7
      PVARB 8
      ICVARB 2
      SVARB 2
      SVARB 3
      SVARB 4
      SVARB 5
      SVARB 6
      SVARB 7
      SVARB 8
      SVARB 9
      SVARB 10
      SVARB 11
      L1900 2
      XYZ 2
      XYZ 3
      XYZ 2
      XYZ 2
      REALG 2
      REALG 3
      CONRG 2
      ENTRO 2
      CFS 2
      CLUSTR 2
      DATA 16

```



```

1      SUBROUTINE DERIV
      SUBROUTINE TO COMPUTE DERIVATIVES
      COMMON T(27)
      COMMON/COM1/PER,GAMMA
      COMMON /ERINT/IER
      COTAN(A)=COS(A)/SIN(A)
      IER=0
      THET=T(2)
      A2=0.5*(GAMMA-1.0)*(1.0-T(4)**2-T(5)**2)
      QUAN=T(4)**2-A2
      IF(ABS(QUAN)-0.0000000) 1.1.2
      IER=2
      PER=1
      RETURN
10     T(6)=-A2*(T(5)+T(4)*COTAN(THET))/(T(4)**2-A2)-T(5)
      T(7)=T(4)
      RETURN
15     END
      DERIV 2
      DERIV 3
      BLANK 2
      COM2 2
      ERINT 2
      DERIV 7
      DERIV 8
      DERIV 9
      DERIV 10
      DERIV 11
      DFIRV 12
      DERIV 13
      GERIV 14
      DERIV 15
      DERIV 16
      DERIV 17
      DERIV 18
      DERIV 19

```



```

      K=KPHI
      C..DISSIPATION FUNCTION
      DISS=0.0
      IF(CONST(4) .NE. 0.0 .OR. CONST(5) .NE. 0.0)CALL DISSIP(N,J,K,DIS
      15)
      IF(J.EQ.3) GO TO 9
      IF(J.EQ.NT2) GO TO 5
      C..CORRECTOR IN FIELD
      ETEMP(N,J,K)=0.5*(ECON(J,K)+TEMP(N,J,K)-(DZDT*(FO(N,J,K)
      *FO(N,J-1,K))+DZDPH*(GO(N,J,K)-GO(N,J,K-1))+DZPHO(N,J,K))+DISS)
      GO TO 3
      5 CONTINUE
      C..CORRECTOR AT SHOCK
      ETEMP(N,J,K)=0.5*(ECON(J,K)+EON(J,K)-(DZDT*(FO(N,J,K)
      *FO(N,J-1,K))+DZDPH*(GO(N,J,K)-GO(N,J,K-1))+DZPHO(N,J,K))+DISS)
      GO TO 3
      9 CONTINUE
      C..CORRECTOR AT BODY
      ETEMP(N,J,K)=0.5*(ETEMP(N,J,K)+EON(J,K)-(DZDT*(FO(N,4,K)-FC(N,3,K)
      *))+DZDPH*(GO(N,3,K)-GO(N,3,K-1))+DZPHO(N,3,K))+DISS)
      CONTINUE
      3 DECODE CONSERVATIVE VARIABLES
      CALL IOCON(2)
      C..CALCULATE CORRECTED SHOCK VALUES
      CALL SHOCK(2)
      C..CALCULATES GEOMETRIC FACTORS BASED ON OLD BODY AND NEW SHOCK GEOMETRY
      CALL GEOM(2)
      C..RESETS BODY VARIABLES
      CALL BODY(1)
      C..APPLIES PLANE OF SYMMEYRY BOUNDARY CONDITIONS
      CALL BODY(2)
      RETURN
      END
DIFFR 41
DIFFR 42
DIFFR 43
DIFFR 44
DIFFR 45
DIFFR 46
DIFFR 47
DIFFR 48
DIFFR 49
DIFFR 50
DIFFR 51
DIFFR 52
DIFFR 53
DIFFR 54
DIFFR 55
DIFFR 56
DIFFR 57
DIFFR 58
DIFFR 59
DIFFR 60
DIFFR 61
DIFFR 62
DIFFR 63
DIFFR 64
DIFFR 65
DIFFR 66
DIFFR 67
DIFFR 68
DIFFR 69
DIFFR 70
DIFFR 71
DIFFR 72
DIFFR 73
DIFFR 74

```

```

1  SUBROUTINE DISSIP(N,J,K,OISS)
   LEVEL 2,ETEMP,EO,FO,GO,HO
   COMMON/LARGE/ETEMP(4,24,41),EO(4,24,41),
   * FOC(4,24,41),GOC(4,24,41),HOC(4,24,41)
5  COMMON/PVARB/RHO(24,41),P(24,41),U(24,41),V(24,41),W(24,41),
   * ROB(41),ROBZ(41),VINF(41),WINF(41),
   * ROBP(41),ROBZ(41),RBC(41),RBP(41),RBPZ(41),
   * DTOPH(24,41),BCT(41),DTOZ(24,41),OTOR(41),ACT(41),
10  * ICONST(50),GAM(20),CONST(50),NREGON,RS(41),
   * ASZ(41),RSPHI(41),RST(41),ASZT(41),RSPALI(41)
   COMMON/IDVARB/ETA(41),PHIP(41),DTILE(41),DETA,IP(24)
   COMMON/SVARB/T,Z,PHI,DT,DZ,DPHI,ZINT
   * ZEMO,PI,ALPHA,GAMMA,SIGMA,XMACH,TAPE1
15  * TAPE2,DISK1,ALFH,DISK2,SIGM,NPRHT,DZDT,
   * DZOPH,ZM,IMGD,TM,D,TM,TM,TM,TM,TM
   * TTM,RZ,BZ,NPHI,NIT,KPHI,NITER,
20  * NPHI,NPHI1,NPHI2,NPHI3,NPHI4,NPHI5,
   * NT,NT1,NT2,NT3,PHIF,NCOE,RAOI,
   * PHIF,METHOD,LAG,NBC,PINF,RHOIN,UINF,
   * OINF
   INTEGER DISK1,DISK2,TAPE1,TAPE2
   C
   C
   C..... CONST(4)<0, LAX DAMPING
   C..... CONST(4)=0, NO DAMPING
25  C..... CONST(4)>0, 4TH ORDER DAMPING
   C
   C
30  IF(CONST(4))21,1,20
   C...DISSIPATION TERM IN THE RADIAL DIRECTION
20  IF(J.GE.5.AND.J.LE.NT)GO TO 5
   IF(J.LT.5)GO TO 7
   JD=NT
   GO TO 6
7  JD=5
   GO TO 6
5  JD=J
6  DISSR=-CONST(4)*O.O1*(EO(N,JD+2,K)+EO(N,JD-2,K))-4.O*(EO(N,JD+1,K)
   * +EO(N,JD-1,K))+6.O*(EO(N,JD,K))
   GO TO 2
21  CONTINUE
   IF(J.GE.4.AND.J.LE.NT1)GO TO 50
   IF(J.LT.4)GO TO 70
   JD=NT
   GO TO 60
70  JD=4
50  JD=J
60  DISSR=-CONST(4)*(C.125*(EO(N,JD+1,K)+EO(N,JD-1,K))-O.25*(EO(N,JD,K)))
   GO TO 2
1  DISSR=O.O
   C
   C
   C..... CONST(5)<0, LAX DAMPING
   C..... CONST(5)=0, NO DAMPING
55  C..... CONST(5)>0, 4TH ORDER DAMPING
   C

```

DISSIP 2
DISSIP 3
DISSIP 4
DISSIP 5
DISSIP 6
DISSIP 7
DISSIP 8
DISSIP 9
DISSIP 10
DISSIP 11
DISSIP 12
DISSIP 13
DISSIP 14
DISSIP 15
DISSIP 16
DISSIP 17
DISSIP 18
DISSIP 19
DISSIP 20
DISSIP 21
DISSIP 22
DISSIP 23
DISSIP 24
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DISSIP 29
DISSIP 30
DISSIP 31
DISSIP 32
DISSIP 33
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DISSIP 36
DISSIP 37
DISSIP 38
DISSIP 39
DISSIP 40
DISSIP 41
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DISSIP 45
DISSIP 46
DISSIP 47
DISSIP 48
DISSIP 49
DISSIP 50
DISSIP 51
DISSIP 52
DISSIP 53
DISSIP 54
DISSIP 55
DISSIP 56
DISSIP 57
DISSIP 58

60	SUBROUTINE DISSIP	76/76	OPT=1	FTN 4.6+460	06/15/79	18.58.36	PAGE	2
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```

C
2  IF(CONST(S))31.3.11
C...DISSIPATION TERM IN THE MERIDIANOL DIRECTION
31  CONTINUE
    IF(K .GE. 4 .AND. K .LE. NPHM1)GO TO 80
    IF(K .LT. 4)GO TO 100
    KD=NPHM1
    GO TO 90
100  KD=4
    GO TO 90
80  KD=K
90  DISSP=--CONST(S)*( .125*(EO(N,J,KD=1)+EO(N,J,KD=1))-0.25*EO(N,J,KD))
    GO TO 4
11  CONTINUE
    IF(K.EQ.3) P(J,1)=P(J,S)
    IF(K.EQ.NPH1) P(J,NPH12)=P(J,NPH12)
    PF1=ABS(P(J,K+2)-2.0*P(J,K+1)+P(J,K))/(P(J,K+2)+2.0*P(J,K+1)+P(J,K
    *))
    PF2=ABS(P(J,K+1)-2.0*P(J,K)+P(J,K-1))/(P(J,K+1)+2.0*P(J,K)+P(J,K-1
    *))
    PF3=ABS(P(J,K)-2.0*P(J,K-1)+P(J,K-2))/(P(J,K)+2.0*P(J,K-1)+P(J,K-2
    *))
    DISSP=0.5/DETR*(PF1+PF2)*(EO(N,J,K+1)-EO(N,J,K))-
    * (PF2+PF3)*(EO(N,J,K)-EO(N,J,K-1))*CONST(S)
    GO TO 4
3  DISSP=0.0
4  DISS=DISSR+DISSP
    RETURN
    END
59  DISSIP
60  DISSIP
61  DISSIP
62  DISSIP
63  DISSIP
64  DISSIP
65  DISSIP
66  DISSIP
67  DISSIP
68  DISSIP
69  DISSIP
70  DISSIP
71  DISSIP
72  DISSIP
73  DISSIP
74  DISSIP
75  DISSIP
76  DISSIP
77  DISSIP
78  DISSIP
79  DISSIP
80  DISSIP
81  DISSIP
82  DISSIP
83  DISSIP
84  DISSIP
85  DISSIP
86  DISSIP
87  DISSIP

```



```

1 SUBROUTINE EIGEN(K4)
  LEVEL=2,ETEMP=EO,FO,GO,HO
  COMMON/LARGE/ETEMP(4,24,41),EO(4,24,41),
  * FO(4,24,41),GO(4,24,41),MO(4,24,41)
  * COMMON /PVARB/RHO(24,41),P(24,41),U(24,41),V(24,41),W(24,4
  * 1)
  * ROZ(41),ROZ(41),VIN(41),WIN(41),
  * ROPH(41),ROZ(41),ROZ(41),ROPH(41),
  * OTDPH(24,41),BCT(41),DTDZ(24,41),DIDR(41),ACT(41),
  * ICONST(50),GAK(20),CONST(50),MREGON,RS(41),
  * ASZ(41),RSPHI(41),PST(41),RZT(41),RSPHIT(41),
  * COMMON /IDVARB/RK,ETAC(41),PHIP(41),DTIL(41),DTILE(41),DETA,TP(24)
  * COMMON/SVARB/1,Z,PHI,DT,DZ,DPHI,ZINT
  * ZERO,PI,ALPHA,GRAMA,SICMA,XMACM,TAPE1,
  * TAPE2,DISK1,ALPH,DISK2,SIG4,MHNT,DEDT,
  * DZOPH,ZH,THEO,THD,THM,TIL,TPM,
  * TTHL,RZ,BZ,NIPHI,NIT,KPHI,MITER,
  * NPHI,NPHI1,NPHI2,NPHI3,NPHM1,NPHM2,NPHM3,
  * NT,NT1,NT2,NT3,PHIFD,NCONE,RADI,
  * PHIF,METHOD,LAG,NBC,PINF,RHOIM,UINF,
  * GIRF,DIAM,ALENG,ZREF,ZCG,ZSHIFT,IFRNDH
  * INTEGER DISK1,DISK2,TAPE1,TAPE2
  * COMMON/REALG/AREAL,MWRPT,BOOTH,BODYS,PSONIC,RSONIC,PLINE,RLINE
  * VLINE,NITAVG,NRROUT
  * COMMON/CONRG/WRPO,WRRO,WRIO,WRCON,GASCON,WRHO,WRSO,WRAO,WRHO,WRIO,WRGX
  * COMMON/CLUSTR/RJ,IXI(24,41),IXI(24,41),IXI(24,41)
  * DIMENSION SG12(24,41),SG24(24,41)
  C.....K4=1 IMPLYS EIGENVALUES AND STEP SIZE
  IPANT=ICONST(4)
  SIG12M=0.0
  SIG34M=0.0
  DO 1 K=3,NPHI
  T=XI(J)
  R=T*(RQB(K)-RB(K))+RB(K)
  IF (NREAL EQ -1) GO TO 50
  C2=GAK(1)*P(J,K)/RHO(J,K)
  IF(C2) 17,17,18
  CALL RCAS(P(J,K),RHO(J,K),C,WRH,WRT,WRG,GASCON,WRGX,-1,2,2)
  C2=C*C
  GO TO 51
  17 CONTINUE
  C2=-C2
  GO TO (23,24),IPANT
  24 WRITE(6,102) J,K
  23 CONTINUE
  18 CONTINUE
  C=SIGN(C2)
  50 CONTINUE
  BP=DTDPH(J,K)*(HOR(K)-RB(K))/R
  O1=(V(J,K)+W(J,K))*BP*(J,K)
  GC=U(J,K)*W(J,K)*BP*(1,0+BP**2)+(V(J,K)+W(J,K))*BP**2-C2*(1,0+BP**2)
  IF(GOOL) 19,19,20
  CONTINUE
  55 GOOL=GOOL
  WRITE(6,103) J,K

```

```

EIGEN 2
CVARB 2
CVARB 3
CVARB 4
CVARB 5
PVARB 6
PVARB 7
PVARB 8
IDVARB 9
SVARB 10
SVARB 11
REALG 12
REALG 13
CONRG 14
CLUSTR 15
EIGEN 16
EIGEN 17
EIGEN 18
EIGEN 19
EIGEN 20
EIGEN 21
EIGEN 22
EIGEN 23
EIGEN 24
EIGEN 25
EIGEN 26
EIGEN 27
EIGEN 28
EIGEN 29
EIGEN 30
EIGEN 31
EIGEN 32
EIGEN 33
EIGEN 34
EIGEN 35
EIGEN 36
EIGEN 37
EIGEN 38
EIGEN 39
EIGEN 40

```

```

20 CONTINUE
60 02-C=SQRT(G001)
    03=UC(J,K)**2-C2
    SIGB1=(01-02)/03
    SIGB2=(01-02)/03
    G002=UC(J,K)**2+U(J,K)**2-C2
    IF(G002) 21,21,22
21 CONTINUE
    G002=-G002
    WRITE(6,104) J,K
22 CONTINUE
    04= U(J,K)*U(J,K)
    05=C*SQRT(G002)
    SIGB3=(04+05)/03/R*DTAIL(K)
    SIGB4=(04-05)/03/R*DTAIL(K)
C..... COMPUTE LOCAL T AND PHI EIGENVALUES
    SIG1=ABS(DTDC(J,K)*SI(B1)*OTDR(K))*TAXI(J)
    SIG2=ABS(UJ02(J,K)*SIGB2*OTDR(K))*TAXI(J)
    SIG12=ABS(UJ01(SIG1,SIG2))
    SIG3=ABS(SIGB3)
    SIG4=ABS(SIGB4)
    SIG34=ABS(SIG3,SIG4)
    S012(J,K)=SIG12
    S034(J,K)=SIG34
    IF(SIG12.LE.SIG12M) GO TO 2
C..... LOCATE MAXIMUM U-Y EIGENVALUE
    JMAX1=J
    KMAX1=K
    SIG12M=SIG12
    ICONST(11)=JMAX1
    ICONST(12)=KMAX1
2 CONTINUE
90 IF(SIG34.LE.SIG34M) GO TO 3
C..... LOCATE MAXIMUM U-W EIGENVALUE
    JMAX2=J
    KMAX2=K
    ICONST(13)=JMAX2
    ICONST(14)=KMAX2
    SIG34M=SIG34
3 CONTINUE
    GO TO (13,14),IPRNT
14 CONTINUE
100 WRITE(6,100)Z,J,K,SIGB1,SIGB2,SIG1,SIG2,SIG12,SIGB3,SIGB4,SIG3,
    *SIG4,SIG34
13 CONTINUE
1 CONTINUE
C..... COMPUTE STEP SIZE BASED ON MAXIMUM EIGENVALUE
    DZ12=DT*CONST(9)/SIG12M
    DZ34=DETA*CONST(9)/SIG34M
    IF(DZ12.GT.DZ34) GO TO 4
    DZ1=CONST(9)/SIG12M
    DZ=DT*DT
    DZDPH=DZ/DETA
    ICONST(13)=100*ICONST(13)
    ICONST(14)=100*ICONST(14)
    GO TO 6
4 CONTINUE

```

EIGEN 41
EIGEN 42
EIGEN 43
EIGEN 44
EIGEN 45
EIGEN 46
EIGEN 47
EIGEN 48
EIGEN 49
EIGEN 50
EIGEN 51
EIGEN 52
EIGEN 53
EIGEN 54
EIGEN 55
EIGEN 56
EIGEN 57
EIGEN 58
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EIGEN 87
EIGEN 88
EIGEN 89
EIGEN 90
EIGEN 91
EIGEN 92
EIGEN 93
EIGEN 94
EIGEN 95
EIGEN 96
EIGEN 97

```

115      DZDPH=CONST(9)/SIG34H
      DZ-DZDPH*DETA
      DZDI=DZ/DT
      ICONST(11)=100*ICONST(11)
      ICONST(12)=100*ICONST(12)
120      CONTINUE
      GO TO (15,16),IPRINT
      16      CONTINUE
      WRITE(6,101) JMAX1,KMAX1,SIG12M,JMAX2,KMAX2,SIG34H,DZ
      15      CONTINUE
125      FORMAT(1X,F6.4,2I3,10F11.5)
      101      FORMAT(2I5,E12.4,5X,2I5,2E12.4)
      102      FORMAT(1H,42#ERROR CHECK - SPEED OF SOUND IN EIGEN. J=,12.4H K=
      *12)
      *1)
130      FORMAT(1H,39#ERROR CHECK - SIGMA-BAR-1 IN EIGEN. J=,12.4H K=,12
      *2)
      104      FORMAT(1H,39#ERROR CHECK - SIGMA-BAR-2 IN EIGEN. J=,12.4H K=,12
      *3)
      RETURN
135      ENO

```

EIGEN 98
EIGEN 99
EIGEN 100
EIGEN 101
EIGEN 102
EIGEN 103
EIGEN 104
EIGEN 105
EIGEN 106
EIGEN 107
EIGEN 108
EIGEN 109
EIGEN 110
EIGEN 111
EIGEN 112
EIGEN 113
EIGEN 114
EIGEN 115
EIGEN 116
EIGEN 117
EIGEN 118


```

6      KK=0
      DO 8 NN=1,MAX
      IF(NN-NC) 9,8,9
      IF(KK) 10,11,10
      KK=7
      DO 7 N=1,3
      N=J-3*N
      J1=XTRUN(NC,N1)
      J2=XTRUN(NN,N1)
      F(N)=F(J1)
      F(N+3)=F(J2)
      B1M2=F(1)-F(2)
      B1M3=F(1)-F(3)
      B2M3=F(2)-F(3)
      B1M1=X-F(1)
      B2M1=X-F(2)
      B3M1=X-F(3)
      F(9)=BM1+BM2+BM3/(B1M2+BM3)
      F(10)=BM1+BM3/(B1M2+BM3)
      F(11)=BM1+BM2/(B1M3+BM3)
      J1=XTRUN(NN,M)
      J2=XTRUN(NC,M)
      Q(2)=X
      GO TO 19
      DO 16 N=1,3
      N1=J-3*N
      J2=XTRUN(NN,N1)
      F(N+3)=F(J2)
      J1=XTRUN(NN,M)
      Q(J1)=F(4)+F(9)+F(5)+F(10)+F(6)+F(11)
      CONTINUE
      1      RETURN
      ENO
60     ESPACE
61     ESPACE
62     ESPACE
63     ESPACE
64     ESPACE
65     ESPACE
66     ESPACE
67     ESPACE
68     ESPACE
69     ESPACE
70     ESPACE
71     ESPACE
72     ESPACE
73     ESPACE
74     ESPACE
75     ESPACE
76     ESPACE
77     ESPACE
78     ESPACE
79     ESPACE
80     ESPACE
81     ESPACE
82     ESPACE
83     ESPACE
84     ESPACE
85     ESPACE
86     ESPACE
87     ESPACE
88     ESPACE
89     ESPACE
90     ESPACE
91     ESPACE
92     ESPACE

```

```

1 SUBROUTINE GEOMI(KS)
  LEVEL=2,ITEM=EO,FO,GO,MO
  COMMON/LARGE/ITEM(4,24,41),E0(4,24,41),
  * F0(4,24,41),G0(4,24,41),H0(4,24,41),
  * COMMON/PVARB/RHO(24,41),P(24,41),U(24,41),V(24,41),W(24,41),
  * R0B(41),R0BZ(41),VINF(41),WINF(41),
  * RBP(41),R0BZ(41),RBZ(41),
  * DTPH(24,41),BCT(41),DIBZ(24,41),DIDP(41),
  * ICONST(50),GAM(20),CONST(50),MREC0N,R3(41),
  * ASZ(41),ASPHI(41),RST(41),RSTZ(41),RSPHIT(41),
  * COMMON/IDVARB/RK,ETA(41),PHIP(41),OTIL(41),DITILE(41),OKETA,TP(24)
  * COMMON/SVARB/T,Z,PHI,DI,
  * ZENO,PI,ALPHA,GAMMA,SIGMA,XPACH,TAPEL,
  * TAPE2,DISK1,ALPH,DISK2,SIG,MPANT,DZDI,
  * DZDPH,ZH,THAO,THD,THW,THL,
  * TTML,RZ,BZ,NIPHI,NIT,KPHI,NITER,
  * NPHI,NPHI1,NPHI2,NPHI3,NPHI4,NPHI5,
  * NT,NII,NT2,NI3,PHIFD,MCGME,RAOI,
  * PHIF,METHOD,LAG,NAC,PINF,RHOIN,UINF,
  * QINF,DIAM,ALENGT,ZREF,ZCG,ZSHIFT,IFACOM
  * INTEGER DISK1,DISK2,TAPE1,TAPE2
  * COMMON/CLUSTR/RI,XI(24),TXI(24),TXIT(24)
  * IPRINT=ICONST(4)
  IF(K5 EQ 2) GO TO 12
  CALL GEOM3(1,PHIP,NPHI,Z,RO,ROBZ,RBP,IPRANT,NCOIN)
  CONTINUE
  CALL GEOM2(KS)
  IF(NPANT) 3,3,4
  CONTINUE
  GO TO (3,10),IPRANT
  CONTINUE
  WRITE(6,103)
  WRITE(6,100) Z
  CONTINUE
  DO 1 J=3,NT2
  T=XI(J)
  IF(NPANT) 5,5,6
  CONTINUE
  GO TO (5,11),IPRANT
  CONTINUE
  WRITE(6,101) T
  CONTINUE
  DO 2 K=2,NPHI1
  PHI=PHIP(K)
  A=-ROBZ(K)-T*(ROBZ(K)-ROBZ(K))
  B=-RBP(K)-T*(RBP(K)-RBP(K))
  C=-ROB(K)-ROB(K)
  D=-R0BZ(K)-ROBZ(K))
  E=-RBP(K)-RBP(K))
  DTDZ(J,K)=B/C
  DTDZ(J,K)=A/C
  DTDZ(K)=1.0/C
  ACT(K)=D/C
  BCT(K)=E/C
  R=CRT*ROB(K)
  X=R*SIGN(PHI)
  
```

GEOMI 2
 CVARB 2
 CVARB 3
 CVARB 4
 CVARB 2
 CVARB 3
 CVARB 4
 CVARB 5
 CVARB 6
 CVARB 7
 CVARB 8
 IDVARB 2
 SVARB 2
 SVARB 3
 SVARB 4
 SVARB 5
 SVARB 6
 SVARB 7
 SVARB 8
 SVARB 9
 SVARB 10
 SVARB 11
 SVARB 11
 CLUSTR 2
 GEOMI 8
 GEOMI 9
 GEOMI 10
 GEOMI 11
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 GEOMI 39
 GEOMI 40
 GEOMI 41

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42      Y=RCOS(PHI)
43      IF(NPRT) 7,7,8
44      CONTINUE
45      GO TO (7,9),IPRT
46      CONTINUE
47      PHIO=PHI*RAOT
48      WRITE(6,102) PHIO,R,X,Y,D7DZ(J,K),D7DZ(K,K),ACT(K),BCT(K)
49      CONTINUE
50      CONTINUE
51      CONTINUE
52      FORMAT(1H0,4X,4HZ = ,F8.5)
53      FORMAT(1H0,4X,4HT = ,F8.5)
54      FORMAT(1H0,7X,6PHI = ,F10.5,3X,4HA = ,F8.5,3X,4HA = ,F8.5,
55      # 3X,4HY = ,F8.5/6X,BHOT/DZ = ,F10.5,3X,10HOT/LPHI = ,F8.5,
56      # 3X,BHOT/DR = ,F10.5,3X,BH(A/C)T = ,F10.5,3X,BH(B/C)T = ,F8.5)
57      FORMAT(1H1,41X,25H+ESH GEOMETRY DESCRIPTION //)
58      RETURN
59      END

```



```

1      C      GEOM3
SUBROUTINE GEOM3(K7,PHIP,NPHI,Z,PB,PSZ,RBPH,IPANT,NCONE)
COMMON /JSE/ZL1,CFL1,CFL2,ZLF,ZTRAH,OZTRAH
COMMON /ACNT/NPEAC(S1)
COMMON /BPRM/S1,PRFAC(10),PHIPAK(10),RBPEDK(10),ZSLG(7),LONG,BKK
1      KIND(7),RSEG(7),DSEG(7),ASEG(7),NSEG,KSEG,KROSS,UTZINY
2      MEL,LOZ(14),ZTRAH(14),YTOP(14),XSIDE(14),YBOT(14)
COMMON /DIMEN/DIMEN(14),RBPCH(41),RHZ(41),RHP(41)
10     DIMENSION BPA(15,14),TOPH(15),PHIDP(15),DRATPH(15),COORD(15)
COMMON /DIMEN/ ZCEN(7),RCENT(7),RADIUS(7)
13     DATA DSEG/0/57.26518/
15     C CODING FOR SIMPLE CIRCULAR CONES WITH CUTS.
C NSEG=9 OF SEGMENTS, ZSEG,RIEG = Z AND CONE N AT START OF SEGMENT.
C DSEG,ASEG = NORMAL DISTANCE FROM CENTER TO CUT AND R/CLE THROUGH.
C KIND = KIND OF CONTOUR.
C 0 = CIRCULAR CROSS-SECTION AND LONGITUDINAL AXISYMETRIC CIRCLE ARC
C 1 = CIRCULAR CROSS-SECTION AND LONGITUDINAL CONE.
C 2 = CIRCULAR CROSS-SECTION WITH CHOP CUT, LONGITUDINALLY FLAT.
C 3 = ELLIPTIC CROSS-SECTION ON BOTTOM, POSSIBLY ON TOP.
C 4 = ELLIPTIC CROSS-SECTIONS WITH DELTA R DIVISIONS FACED.
C JOE DATA ARE USED IN DECIDE AND INITA.
C REGION 1 REPS IN DATA ONCE. REGION 2 FINDS DATA AT Z,PHI REPEATEDLY.
IF (K7.NE.0) GO TO 2
25     1 CONTINUE
WRITE(6,977)
999    FORMAT(1H)
READ (5,3) NSEG,(KIND(N), N=1,7)
3      FORMAT (B5)
READ (5,4) (ZSEG(N), N=1,NSEG)
READ (5,4) (RLO(N), N=1,NSEG)
READ (5,4) (DSEG(N), N=1,NSEG)
READ (5,4) (ASEG(N), N=1,NSEG)
4      FORMAT (7F10.5)
ZL1=ZSEG(1)
ZLF=ZSEG(NSEG)
CFL=HSLG(1)
CFL2=CFLG(2)-RSEG(1)/(ZSEG(2)-ZSEG(1))
WRITE (6,5) NSEG,KIND,ZSEG,FSEG,DSEG,ASEG
5      FORMAT (1X#5SG,KIND#15/2#10.5/1#10.5/1#10.5/
1      1#10.5/1#10.5)
C LOCATE CIRCULAR ARC CENTERS, IF ANY.
C SPECIFY ELLIPTIC CONTOURS, IF ANY.
GO 7 N=1,NSEG
IF (NLEQ,NSEG) GO TO 7
IF (KIND(N).NE.3.AND.KIND(N).NE.4) GO TO 107
C KIND 3 AND 4 CODING OMITTED.
107    CONTINUE
IF (KIND(N).NE.0) GO TO 7
READ (5,4) ZCENT(H),RCENT(H),RADIUS(N)
WRITE (6,6) N,ZCENT(H),RCENT(H),RADIUS(N)
6      FORMAT (1X#5SG#15,*,ZCENT,RCENT,RADIUS,.,.,)
7      CONTINUE
DO 110 N=1,10
PHIPAK(N)=0.0
RBPEDK(N)=0.0
110    CONTINUE

```

```

        RETURN
    2 CONTINUE
    C COMPUTE SHOCK RADII AND DERIVATIVES.
    C FIRST, LOCATE WHICH SEGMENT Z IS IN.
    C NOTE THAT LAST SEGMENT IS SIMPLY A CONTINUATION OF THE SECOND-TO-LAST.
    NSEGMI=NSEG-1
    NSEGPI=NSEG+1
    DO 10 N=1,NSEGMI
        KSEG=N
        IF (Z.LE.ZSEG(N).AND.Z.LT.ZSEG(N+1)) GO TO 11
    10 CONTINUE
    11 CONTINUE
    LSEG=KSEG+1
    C COMPUTE LOCAL CROSS-SECTION GEOMETRIC CONSTANTS.
    ZF=(Z-ZSEG(KSEG))/(ZMIG(LSEG)-ZSEG(KSEG))
    R=RSUG(KSEG)+ZF*(RSEG(LSEG)-RSEG(KSEG))
    IF (KIND(KSEG).NE.3.AND.KIND(KSEG).NE.4) GO TO 130
    C KIND 3 AND 4 CODING OMITTED.
    130 CONTINUE
    IF (KIND(KSEG).NE.0) GO TO 14
    C FIND R ON CIRCULAR ARC FROM (R-RC)SQ = RASQ - (Z-ZC)SQ
    R=RSQ-RADIUS(KSEG)**2-(Z-ZCENT(KSEG))**2
    R=SQRT(EMHC50)+RCENT(KSEG)
    14 CONTINUE
    D=DSEG(KSEG)+ZF*(DSEG(LSEG)-DSEG(KSEG))
    A=ASEG(KSEG)+ZF*(ASEG(LSEG)-ASEG(KSEG))
    IF (KIND(KSEG).NE.2) GO TO 34
    DOR=D/R
    DCR =PHIM(DOR,1.0)
    DELPHI=ACOS(DOR)
    PHINCR=R/SEC(DOR)
    PHIMIN=PHINOM DELPHI
    PHIMAX=PHINOM+DELPHI
    WFLAT=R*ZIN(ULLPHI)
    WRITE (6,16) WFLAT
    16 FORMAT (1X,F12.6)
    PHIBK(1)=PHIMAX
    REGRK(1)=R
    IF (PHIMIN.LE.0.0) GO TO 142
    PHIPK(1)=PHIMIN
    PHIBK(2)=PHIMAX
    ABREK(1)=HIREAL(2)-R
    142 CONTINUE
    C..DETERMINE RB, DRB/DPHI, AND DRB/DZ FOR EACH MERIDIAN
    DO 8 K=3,NPHI
        PHIPK(K)
        SP=SIN(PHI)
        CP=COS(PHI)
        SP=SP*SP
        CZP=CP*CP
        IF (KIND(KSEG).NE.2) GO TO 15
        C TEST WHETHER PHIPK CROSSSES FLAT OR CIRCLE.
        C IF (PHI.LT.PHIMIN.OR.PHI.GT.PHIMAX) GO TO 15
        C CODING FOR FLAT CUT CENTERED AT ANGLE PHINOM.
        C CURRENT CODING IS FOR FLAT CUT PARALLEL TO AXIS OF SYMMETRY.
        RBZ(K)=0.0

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 GEOM3 113

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115 DPHI=PHI-PHINOM
    CO=OP1-COS(LPHI)
    SINDP1=SIN(LPHI)
    COSO50=COSOP1**2
    RB(K)=D/COSOP1
    DEMD = D*SGN(LSEG)
    RBL = DEMD/CGSOFI
    RBZ(K) = (RBL-RB(K))/(ZSEG(LSEG)-Z)
    IF (ABS(DPHI).LT.C.0X01) RBPH(K)=0.0
    IF (ABS(DPHI).LT.0.00X01) GO TO 20
125 C SECANT(DPHI) DIFFERENTIATED * D.
    RBPH(K)=D*SINC(FI/COSOP1)
    GO TO 20
130 RBZ(K)=R
    RBZ(K)=(RSEG(LSEG)-RSEG(KSEG))/(ZSEG(LSEG)-ZSEG(KSEG))
    IF (XINS(FSEG).EG.0) RBZ(K)=(ZCENT(KSEG)-Z)/(R-RCENT(KSEG))
    RBPH(K)=0.0
135 20 CONTINUE
    IF (K(RD(KSEG).LT.2) GO TO B
    IF (PHI.LT.PHIMIN.OR.PHI.GT.PHIMAX) GO TO B
    XFLAT=RB(K)*SP
    YFLAT=-RB(K)*CP
140 WRITE (6,12) Z,K,PHI,FB(K),FBZ(K),RBPH(K),XFLAT,YFLAT
    B FORMAT (1X,Z,K,PHI,FB(K),RBZ(K),RBPH(K),*,F10.5,F12.5)
    B CONTINUE
    B0 CONTINUE
    DO 36 K=1,2
    M=6-K
    I=NPHI+K
    N=NPHI-K
    RB(K)=RB(M)
    RBZ(K)=RBZ(M)
    RBPH(K)=RBPH(M)
    RBZ(I)=RBZ(N)
    RBPH(K)=-RBPH(N)
    RBPH(I)=-RBPH(N)
150 36 CONTINUE
    RETURN
    ENO
155

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GEOMS 114
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1      SUBROUTINE HMACH(S,THETAS,GAMMA,MMACH,THETAU,PER)
C      SUBROUTINE TO COMPUTE MACH NUMBER AND SHOCK ANGLE GIVEN CONE
C      SEMIVERTEX ANGLE AND SURFACE VELOCITY
      COMMON T(27)
      COMMON /CONI/PIRI,GAMMAI
      COMMON /ERINT/ER
      EXTERNAL DERIV
      GAMMAI=GAMMA
      PER=0
      T(2)=THETAS
      T(3)=0.002
      T(4)=0.0
      T(5)=US
      T2=T(2)
      T4=T(4)
      T5=T(5)
      T1=1.0
      CALL INTS(T,2.0,5.0E-8,0.0,0.0,0.10,0.0,0.0,0.0,DERIV)
      IF (IER.NE.0) GO TO 998
      CALL INTH(T,2.0,5.0E-8,0.0,0.0,0.10,0.0,0.0,0.0,DERIV)
      IF (IER.NE.0) GO TO 998
      IF (ABS(T(4))-1.0) > .2, 120, 103
      IF (ABS(T(5))-1.0) > .2, 101, 101
      IF (T(2)-1.68) > .102, 101, 101
      PER=2
      GO TO 999
102    IF (ABS(T(4))-2.0E-7) > .120, 120, 103
103    IF (ABS(T(5))-2.0E-7) > .120, 120, 104
104    O=1+(T(2))*((1.0-T(5))**2)*((GAMMA-1.0))/(T(5))*((GAMMA+1.0))
105    IF (ABS(O)-2.0E-7) > .400, 100, 105
106    IF (O) > .400, 106, 109
107    M=3L#9
108    IF (ABS(1.0*M/T(2))-2.0E-6) > .400, 100, 112
      T(3)=M
      CALL INTS(T,2.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,DERIV)
      IF (IER.NE.0) GO TO 998
      CALL INTH(T,2.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,DERIV)
      IF (IER.NE.0) GO TO 998
      O=1+(T(2))*((1.0-T(5))**2)*((GAMMA-1.0))/(T(5))*((GAMMA+1.0))
      IF (ABS(O)-2.0E-7) > .400, 100, 110
      T2=T(2)
      T4=T(4)
      T5=T(5)
      O1=0
      GO TO 100
400    MMACH=5.98*((2.0*T(5))**2)/((GAMMA-1.0)*((COS(T(2))))**2-T(5)**2))
      THETAU=T(2)
      GO TO 999
998    PER=PER+1
999    RETURN
      END

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2 HMACH
 3 HMACH
 4 HMACH
 5 BLANK
 6 COMI
 7 ERINT
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C...PERIODIC CLUSTERING
IF (R.EG.O.O) GO TO 15
YO=O.5/RA*AL*G*(1.0-(F*P*(R*))-1.0)*PHIFD/100.0)
* (1.0-(1.0-E*F(-R*E))PHIFD/100.0))
YO1=SIGN(R*E*YO)
YO2=YO1/(R*P*PHIFD/RAO1)
CONTINUE
15 DO 35 I1=2,NPH11
   ETAC(I1)=I1*30*ETA
   IF (R.GI.O.O) GO TO 40
   PHIP(I1)=R*PH11
   DIIL(I1)=1.0
   DIILE(I1)=O.O
   GO TO 35
40 CONTINUE
   YO3=KE*(YAC(I1)/P1-YO)
   S*ETA=52.4*(Y3)
   CHE3A=C*50*(Y3)
   PHIP(I1)=PHIP*PH11*(1.0-S*ETA/YO1)
   DIIL(I1)=Y*Y*PH11/CHETA
   DIILE(I1)=Y*Y*PH11*CHETA*2
CONTINUE
35 PHIP(2)=PHIP(4)
   PHIP(NPH11)=PHIP(NPH11)
   DIIL(2)=DIIL(4)
   DIIL(NPH11)=DIIL(NPH11)
   DIILE(2)=DIILE(4)
   DIILE(NPH11)=DIILE(NPH11)
   DIILE(3)=O.O
   DIILE(NPH11)=O.O
C...RANDOM CLUSTERING
S*PH=2*52*(R*J)
DO 36 I1=1,N12
   IP(I1)=(I1-1)*N01
   IF (R.J.EI.C.O) GO TO 41
   OI=PHIP(IP11)
   S*P=SIGN(OI)
   XI(I1)=O*7*S*PH*J
   YI(I1)=SIGN(XI(I1),R*ECOT)
   YI(I1)=SIGN(XI(I1),R*ECOT)
   GO TO 42
41 XI(I1)=IP(I1)
   YI(I1)=1.0
   YI(I1)=O.O
CONTINUE
42 CONTINUE
36 IF (R*ERL.EG.-1) GAM(2)=1.0
   IF (C1*2*1) 8.8.9
9   OI5(I1)=1
10  IF (C1*2) 10,10,11
11  OI5(I1)=3
12  IF (C*OME) 12,12,13
13  N*GRE=1
14  CONTINUE
15  IF (IC*NS1(4)) 16,16,17
16  IC*NS1(4)=1
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INITA 97

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115 17 CONTINUE
    IF(TAPE1) 1,1.20
1 1 TAPE1=1
    IF(TAPE2) 4,4.26
4 4 TAPE2=1
26 26 CONTINUE
20 20 CONTINUE
C...CALCULATE FREE STREAM QUANTITIES
C
125 GAM(3)=GAMPA/GAMPA-1.0)
    GAM(4)=1.0/(CAREA 1.0)
    AA=1.0/GAM(1)*MACH**2
    HB=AA-1.0
    PINE=1.0/AA**GAM(3)
    RPSIN=1.0/AA**GAM(4)
    QINF=STRT(CR,RA)
    CONST(1)=DIM*ALPH)
    CONST(2)=COS(ALPH)
    UINF=QINF*CONST(2)
    IF (MACH EQ -1) UINF=CONST(2)*VINF
    DO 3 K=2,PM11
    PHI=PHIP(K)
    VINF(K)=QINF*CONST(1)*COS(PHI)
    WINF(K)=QINF*CONST(1)*SIN(PHI)
    IF (MACH EQ 0) GO TO 14
    VINF(K)=VINF(K)*VINF/2INF
    WINF(K)=WINF(K)*VINF/2INF
14 CONTINUE
3 3 CONTINUE
2 2 CONTINUE
    CALL OUTPUT(1)
    WRITE(6,103)
150 WRITE(6,101)
    WRITE(6,100) (II,ETAC(II),PHIP(II),DTIL(II),DTHE(II),II=2,PM11)
    IF (IC N1(98,1(4,1)) GO TO 2)
    IUTD(2,1(4,1,1),RWD,DIJ(1,1),RWD,DIJ(2,1))=0 TO 30
    GO TO 31
30 CONTINUE
C...GUESS CORL STARTING SOLUTION IF ALPHA IS DIFFERENT FROM ZERO
    ZSTA=ZINT-ZSHIFT
    TMETA=SIGN
    CALL START(THETA,KRACH,GAMPA,ZSTA,O.O,NT,TA,CA,VA,RHOR,PA,PER,
    *THA)
160 DO 32 K=3,PM11
    DO 33 J=3,MT2
    P(C,J,K)=P(C,J=2)
    RHC(J,K)=RHC(J=2)
    UC(J,K)=UC(J=2)
    VC(J,K)=VC(J=2)
    WC(J,K)=0.0
33 CONTINUE
    RSC(E)=YAC(NT)+ZSTA*TRK(SIGH)
    RSC(F)=RSC(K)/ZSTA
170 32 CONTINUE
    ASPMI(3)=0.0
    INITA 98
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    INITA 154

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175      ASPHI(NPHI)=0.0
180      DO 34 K=4,NPHI
34      RSPHI(K)=(RS(K+1)-RS(K-1))/(2.0*DELTA)*NOTIL(P)
      GO TO 27
31      CONTINUE
      IF(TAPE2.EQ.2) GO TO 19
C      C..READ INITIAL DATA FROM DISK1
C      GO TO(6,7),DISK1
6      CONTINUE
      REF0(12) Z,((P(J,K),RHO(J,K),UC(J,K),V(J,K),W(J,K),K=3,NPHI),J=3,N
185      *I2),(RS(K),RSS(K),RSPHI(K),K=3,NPHI)
      ZINI=Z
      WRITE(6,102)
      REWIND 12
7      CONTINUE
C      C..READ INITIAL DATA FROM DISK2
C      GO TO(18,19,19),DISK2
18      CONTINUE
      REMO(11) Z,((P(J,K),RHO(J,K),UC(J,K),V(J,K),W(J,K),K=3,NPHI),J=3,N
195      *I2),(RS(K),RSS(K),RSPHI(K),K=3,NPHI)
      ZINI=Z
      WRITE(6,109)
      REWIND 11
19      CONTINUE
5      CONTINUE
C      C..READ INITIAL DATA FROM PUNCHED CARDS
C      IF(TAPE2.EQ.1.OR.TAPE2.EQ.3) GO TO 27
205      REMO(S,111) Z
      REMO(S,112) ((P(J,K),RHO(J,K),UC(J,K),V(J,K),W(J,K),K=3,NPHI),J=3,
      *N12)
      REMO(S,113) (RS(K),RSS(K),RSPHI(K),K=3,NPHI)
      ZINI=Z
      WRITE(6,110)
210      CONTINUE
      DO 25 K=1,2
      M=6-K
      I=NPHI*K
      N=NPHI-K
215      RS(K)=RS(M)
      RS(I)=RS(N)
      RSS(K)=RSS(N)
      RSS(I)=RSS(N)
      RSPHI(K)=RSPHI(N)
      RSPHI(I)=RSPHI(N)
220      CONTINUE
      C.....WRITE TAPE - INITIAL DATA AND BODY SHMWE
      GO TO(21,22,21),TAPE1
225      CONTINUE
      DOZZ=(ZEND-ZTINT)/100.0
      Z=ZTINT
23      CONTINUE
155      INITA
156      INITA
157      INITA
158      INITA
159      INITA
160      INITA
161      INITA
162      INITA
163      INITA
164      INITA
165      INITA
166      INITA
167      INITA
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169      INITA
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192      INITA
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194      INITA
195      INITA
196      INITA
197      INITA
198      INITA
199      INITA
200      INITA
201      INITA
202      INITA
203      INITA
204      INITA
205      INITA
206      INITA
207      INITA
208      INITA
209      INITA
210      INITA
211      INITA

```



```

230      CALL GEOM(C1,PHIP,NPHI,Z,PR,ABZ,IBPH,IPFNT,MCONE)
      Z=Z*ODZE
      IF(Z-ZEND) 23,24,24
      CONTINUE
      24      Z=Z*INT
      21      ICONST(1)=1
      CONTINUE
      24-R(3,3)/RHS(RHO(3,3))=RCAYPA
      24-RHS(24)
      DO 38 K=3,NPHI
      IF (NPEAK.LQ.-1) GO TO 39
      SK(K)=P(3,K)/RHS(RHO(3,K))=RCAYPA
      SK(K)=RHS(5(K))
      GO TO 38
      39      CONTINUE
      CALL FMSXP(3,K),PHO(3,K),SOUND,ENTH,TEM,S(K),GFSCON,WGRX,-1.4,2)
      245      CONTINUE
      SK(2)=SK(4)
      SK(2)=SK(13)-50*(NPHI)
      IF (NPEAK.LQ.-1) GO TO 29
      37      CONTINUE
      CALL RGRS(P(3,3),RHO(3,3),SOUND,ENTH,TEM,BOOYS,GASCON,WGRX,-1.4,2)
      BOOY2=UC(1,3)*P(3,3)+V(3,3)*R(3,3)+W(3,3)*R(3,3)
      BOOY=ENTH*BOOY2*0.5
      29      CONTINUE
      IF (NPEAK.EQ.0) WRITE(6,114) BOOY,BOOYS,BOOY2
      CALL GEOM(C1,PHIP,NPHI,Z,PR,ABZ,IBPH,IPFNT,MCONE)
      CALL GFC(2)
      FORMAT(1H,5Y,2HF,-12,3Y,4HE,TA,E11.4,3X,4PHI=-E11.4,3X,
      * SGRILL=E11.4,3Y,6MC,ILL=-E11.4)
      101      FORMAT(1H,2Y,3MC,CIRKX,HE,54(1,DESCRIPTION,/)
      102      FORMAT(1H,3Y,104,FIELD DATA WAS READ FROM DISK1)
      103      FORMAT(1H,2Y,6Y,6S,RESIDUE DESCRIPTION,/)
      104      FORMAT(1H,2Y,104,GEOMETRY INPUT)
      105      * E11.4,3Y,6MC,ILL=-E11.4)
      109      FORMAT(1H,2Y,104,FIELD DATA WAS READ FROM DISK2)
      110      FORMAT(1H,4Y,104,FIELD DATA WAS READ FROM P. 6, NED CARDS)
      111      FORMAT(15,6)
      112      FORMAT(15,6)
      113      FORMAT(15,6)
      114      FORMAT(1H,13Y,BOOY STREAMLINE CONSTANTS. HT=,1PE13.6,1X,245-
      1PE13.6,1X,5HY#2-1PE13.6)
      RETURN
      END
213      INITA
214      INITA
215      INITA
216      INITA
217      INITA
218      INITA
219      INITA
220      INITA
221      INITA
222      INITA
223      INITA
224      INITA
225      INITA
226      INITA
227      INITA
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240      INITA
241      INITA
242      INITA
243      INITA
244      INITA
245      INITA
246      INITA
247      INITA
248      INITA
249      INITA
250      INITA
251      INITA
252      INITA
253      INITA
254      INITA
255      INITA
256      INITA

```

SUBROUTINE	INITIAL	76/76	OPT-1	FTN 4.6+460	06/15/79	10.50.36	PAGE 1
1							
5							
10							
15							
20							
25							
30							

```

SUBROUTINE INITIL
COMMON/CONRG/PD,RO,TO,CONC,GASCON,MO,SO,AO,RTO,GX
COMMON/REALG/REAL,NM,PR,TD,BO,YS,P,SONIC,R,SONIC,P,IN,FI,RI,NI
*,VIIHF,INITAVG,NM,ROUT
DATA I123/C/
IF (I123.EQ.123) RETURN
GX=1.4
I123=123
PO=ATH PRES IN UNITS LBS PER FT**2
PO=2110.
CONC=0.996291
RO=STD DENSITY IN SLUGS PER FT**3
RO=0.002498*CONC
TO=STD TEMP
TO=493.635
ARM=SPECIFIC GAS CONSTANT
ARR=1716.0/CONC
GASCON=ARR
CALL RGASC(PO,RO,AO,HO,TO,SO,ARR,GX,-1.4,2)
RTO=GASCON*TO
CONTINUE
IF (NM,PR,TD,GE.1) GO TO B7
RETURN
WRITE (6,80) PD,RO,TD,CONC,GASCON,MO,SO, AO,RTO,GX
FOR=AT(1HO,26HF)FROM INITIL - PRI /CONRG/ /1H ,3HO-1PE13.6.1X,
13HO-1PE13.6.1X,3HO-1PE13.6.1X,3HO-1PE13.6.1X,3HO-1PE13.6.1X,
23HO-1PE13.6.1X,3HO-1PE13.6.1X,3HO-1PE13.6.1X,4HO-1PE13.6.1X,
33HOX-1PE13.6)
RETURN
END

```

INITIL 2
CONRG 2
REALG 2
REALG 3
INITIL 5
INITIL 6
INITIL 7
INITIL 8
INITIL 9
INITIL 10
INITIL 11
INITIL 12
INITIL 13
INITIL 14
INITIL 15
INITIL 16
INITIL 17
INITIL 18
INITIL 19
INITIL 20
INITIL 21
INITIL 22
INITIL 23
INITIL 24
INITIL 25
INITIL 26
INITIL 27
INITIL 28
INITIL 29
INITIL 30


```

60      C...DISK1=1 TO READ DISK1; 2 TO WRITE DISK1; 3 TO DO NOTHING
      C...DISK2=1 TO READ DISK2; 2 TO WRITE DISK2; 3 TO DO NOTHING
      C...TAPE1=1 TO DO NOTHING; 2 STORES BODY SHAPE AND WHITES DATA ON TAPE;
      C...TAPE2=1 TO DO NOTHING; 2 TO READ STARTING SOLN FROM DATA CARDS
65      C...NTDSOS=0-DO NOTHING; 1-PUNCH; 2-WRITE TAPE FOR 3-D S-O-S STARTING SOL
      C...IF NTDSOS>0, LAST DATA CARD SHOULD CONTAIN MACHI AND LAMBDA
      C...TO BE USED IN SUBROUTINE OUTPUT
70      C...READ(S,104) ZBS,ZFLD,ITPRIB,ITPRIF,NCASE
      C...ZBS=INCREMENT IN Z FOR PRINTING BODY AND SHOCK VARIABLES
      C...ZFLD=INCREMENT IN Z FOR PRINTING FIELD VARIABLES
      C...ITPRIB=NO. OF ITERATION FOR PRINTING BODY AND SHOCK VARIABLES
75      C...ITPRIF=NO. OF ITERATIONS FOR PRINTING FIELD VARIABLES
      C...NCASE=IF NCASE>0, THEN NEW CASE FOLLOWS
      C...READ(S,105)DIAM,ALENGT,ZREF,ZCG,ZSHIFT,IFANOM
80      C...VALUES USED IN FORCE AND MOMENT CALCULATIONS OR IN SHIFTING ORIGIN OF
      C...SHARP CONE SOLUTION
      C...DZEM= LENGTH USED IN CALCULATING REFERENCE AREA, USUALLY MAX DIAMETER
      C...ALENGT= REFERENCE LENGTH USED IN CALCULATING MOMENTS
      C...ZREF= MOMENT REFERENCE CENTER
85      C...ZCG = CENTER OF GRAVITY LOCATION FOR STATIC MARGIN CALCULATION
      C...ZSHIFT= THE VALUE OF Z WHICH CORRESPONDS TO THE STARTING CONE ORIGIN,
      C...IF NO SHIFT SET=0
      C...IFANOM= 0 IF FORCE AND MOMENTS ARE DESIRED, = 1 IF NOT DESIRED
90      100 FORMAT(3F10.5,)
      101 FORMAT(S15)
      102 FORMAT(S15)
      103 FORMAT(3E15.6,5X.15)
      104 FORMAT(3F10.5,3I5)
      105 FORMAT(SF10.5,15)
95      999 RETURN
      END
      INPUT 41
      INPUT 42
      INPUT 43
      INPUT 44
      INPUT 45
      INPUT 46
      INPUT 47
      INPUT 48
      INPUT 49
      INPUT 50
      INPUT 51
      INPUT 52
      INPUT 53
      INPUT 54
      INPUT 55
      INPUT 56
      INPUT 57
      INPUT 58
      INPUT 59
      INPUT 60
      INPUT 61
      INPUT 62
      INPUT 63
      INPUT 64
      INPUT 65
      INPUT 66
      INPUT 67
      INPUT 68
      INPUT 69
      INPUT 70
      INPUT 71
      INPUT 72
      INPUT 73
      INPUT 74
      INPUT 75
      INPUT 76
      INPUT 77
      INPUT 78
      INPUT 79

```

1	SUBROUTINE INTS(T,M,L,E ,B,C,HMA ,HMI ,BET,DERIV)	INTS	2
	COMMON /ERINT/IER	ERINT	2
	DOUBLE PRECISION XX,XS,EU,P,A,MMAX,MMIN,BETA,EL ,H,XO,AK,EN,D,O,DI4	INTS	4
5	1,TEST1,TEST2	INTS	5
	DIMENSION T(100),XX(4),XS(2)	INTS	6
	EQUIVALENCE (TEM,ITEM)	INTS	7
	IER=0	INTS	8
	K=L	INTS	8
	N=H	INTS	10
10	N3=3*N	INTS	11
	N5=5*N	INTS	12
	N2=2*N	INTS	13
	N4=4*N	INTS	14
	N6=6*N	INTS	15
15	N10=10*N	INTS	16
	EU=E	INTS	17
	P=B	INTS	18
	JN=0	INTS	19
	A=C	INTS	20
20	XS(1)=T(2)	INTS	21
	MMAX=HMA	INTS	22
	IF (HMAX .LE.0.DD)HMAX=1.0036	INTS	23
	MMIN=HMI	INTS	24
	ITEM=N	INTS	25
25	T(1)=TEM	INTS	26
	IF (K-1) 1,2,2	INTS	27
1	IF (P .LE.0.DD)P=100.000	INTS	28
	IF (A .LE.0.DD) A=1.DD	INTS	29
30	BETA=BET	INTS	30
	IF (BETA .LE.0.DD.OR. BETA .GE. 1.DD)BETA=0.500	INTS	31
	EL=EU/P	INTS	32
	J=0	INTS	33
2	ISTEP=4	INTS	34
	H=T(3)	INTS	35
35	CALL DERIV	INTS	36
	IF(IER.NE.O) RETURN	INTS	37
	GO TO 25	INTS	38
	ENTRY INTS	INTS	39
10	IF (K-1) 20,11,20	INTS	40
11	XO=T(2)	INTS	41
	XX(2)=XO+H*0.500	INTS	42
	XX(1)=XX(2)	INTS	43
	XX(4)=XO+H	INTS	44
45	XX(3)=XX(4)	INTS	45
	DO 16 JJ=1,4	INTS	46
	T(2)=XX(JJ)	INTS	47
	DO 12 I=1,M	INTS	48
	II= 3*I	INTS	49
	IJ=II*N	INTS	50
50	IK=IJ*N	INTS	51
	IL=IK*N	INTS	52
	AK=H*T(IJ)	INTS	53
	GO TO (13,14,15,16),JJ	INTS	54
55	T(IK)=T(II)	INTS	55
	T(IL)=AK	INTS	56
	T(II)=T(IK)+O.500*AK	INTS	57
	GO TO 12	INTS	58

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14 T(II)=T(IK)+0.500*AK
17 T(IL)=T(IL)+2.000*AK
60 GO TO 12
15 T(IJ)=T(IK)+AK
GO TO 17
18 T(II)=T(IK)+(T(IL)+AK)/6.000
12 CONTINUE
65 CALL DERIV
IF(IER.NE.0) RETURN
16 CONTINUE
25 IF (K.EQ. 1) RETURN
DO 21 I=1,N2
70 II=3+I
IJ=II*N2*(J+2)
T(IJ)=T(II)
21 RETURN
20 IF (J .GE. 3) GO TO 22
J=J+1
GO TO 11
22 DO 23 I=1,N
II=3+I
IJ=II*N5
80 IK=IJ+H2
IL=IK+H2
IM=IL+H2
IN=IL+H
IP=II+H3
T(IP)=19.000*T(IH)-5.000*T(IL)+T(IK)
85 T(II)=T(IH)+H/24.00*(55.00*T(IH)-59.00*T(IL)+37.00*T(IK)
1 -9.00*T(IJ))
XS(2)=T(2)
XO=XS(2)
T(2)=XO+H
90 CALL DERIV
IF(IER.NE.0) RETURN
DO 24 I=1,N
II=3+I
IJ=II+H2
T(IJ)=T(II)
95 IL=II+2*N5
IK=II+H
IP=II+H3
100 T(II)=(IL)+H/24.00*(9.000*T(IK)+T(IP))
CONTINUE
IF (K .EQ. 2) GO TO 30
EM=0
DO 27 I=1,N
TEST1=I+3
105 O=DMAX1(DABS(TEST1 ),A)
D14=14.000+O
II=3+N2+I
TEST2=T(II)
110 EN=DMAX1(DABS((TEST2-TEST1)/D14),EN)
IF (EN .GE. EU) GO TO 28
JN=4
IF (EN .LT. EL) GO TO 29
31 ISTEP=ISTEP+1

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INTS 59
INTS 60
INTS 61
INTS 62
INTS 63
INTS 64
INTS 65
INTS 66
INTS 67
INTS 68
INTS 69
INTS 70
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INTS 72
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INTS 95
INTS 96
INTS 97
INTS 98
INTS 99
INTS 100
INTS 101
INTS 102
INTS 103
INTS 104
INTS 105
INTS 106
INTS 107
INTS 108
INTS 109
INTS 110
INTS 111
INTS 112
INTS 113
INTS 114
INTS 115

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115      GO TO 30
29      IF (1STEP .LT. 6) GO TO 31
        IF(DABS(H/BETA) .GT. HMAX) GO TO 30
        H=H/BETA
        T(3)=H
120      GO TO 2
28      IF(DABS(H*H/BETA) .LT. HMIN) GO TO 30
        H=H*BETA
        T(3)=H
125      IF (CUN.GE. 4) GO TO 40
        J=0
        DO 72 I=1,N
          I1=3*I
          I2=I1+M4
          T(I1)=T(IJ)
          T(2)=X5(1)
          CALL DERIV
          IF(IER.NE.O) RETURN
          GO TO 25
40      T(2)=X5(2)
          J=0
          DO 41 I=1,N
            I1=3*I
            I2=I1+M10
            T(I1)=T(IJ)
            CALL DERIV
            IF(IER.NE.O) RETURN
            GO TO 25
30      CALL DERIV
            DO 42 I=1,M5
              I1=3*I+M4
              I2=I1+M2
              T(I1)=T(IJ)
              DO 43 I=1,M2
                I1=3*I
                I2=I1+M10
                T(I1)=T(IJ)
              RETURN
            END
140      INTS 116
141      INTS 117
142      INTS 118
143      INTS 119
144      INTS 120
145      INTS 121
146      INTS 122
147      INTS 123
148      INTS 124
149      INTS 125
150      INTS 126
151      INTS 127
152      INTS 128
153      INTS 129
154      INTS 130
155      INTS 131
156      INTS 132
157      INTS 133
158      INTS 134
159      INTS 135
160      INTS 136
161      INTS 137
162      INTS 138
163      INTS 139
164      INTS 140
165      INTS 141
166      INTS 142
167      INTS 143
168      INTS 144
169      INTS 145
170      INTS 146
171      INTS 147
172      INTS 148
173      INTS 149
174      INTS 150
175      INTS 151
176      INTS 152
177      INTS 153
178      INTS 154
179      INTS 155

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1 SUBROUTINE IOCON(K1)
  LEVEL 2,ETEMP,EO,FO,GO,HO
  COMMON/LARGE/ETEMP(4,24,41),EO(4,24,41),
  * FO(4,24,41),GO(4,24,41),HO(4,24,41)
  COMMON /PVARB/RHO(24,41),P(24,41),UC(24,41),W(24,4
  * 1)
  * R0B(41),R0BZ(41),VINF(41),WINF(41),
  * ROBPH(41),AB(41),ROZ(41),RBPH(41)
  * DIDPH(24,41),BCT(41),OTDZ(24,41),DTDR(41),ACT(41)
  * ICONST(50),GAM(20),CONST(50),NREGION,AS(41)
  * RSZ(41),RUPHI(41),AST(41),ASZT(41),ASPHIT(41)
  * COMMON /IDVARB/RK,ETAC(41),PHIP(41),DTIL(41),DTILE(41),DETA,TP(24)
  * COMMON/SVARB/T,Z,PHI,OT,DI,DPA1,ZINI
  * ZLMO,PI,ALPHA,GAMMA,SIGMA,XRACH,TAPE1
  * TAPE2,DISK1,ALPH,DISK2,SIGM,NFRHT,DZDI
  * DZOPH,ZH,THMO,THD,THM,THL,TFM
  * TTM,RZ,BZ,NIPHI,NIT,KPHI,NITER
  * NPHI,NPH11,NPH12,NPH13,NPHM1,NPHM2,NPHM3
  * NT,NT1,NT2,NT3,PHIFD,NGONE,RAD1
  * PHIF,MEHOD,LAG,NBC,PINF,RHOLM,UINF
  * QINF,DIAM,ALEFCT,ZREF,ZCG,ZSHIFT,IFRHM
  * INTEGER DISK1,DISK2,TPP1,TAPE2
  * COMMON/RALG/MCAL,NMFRHT,BOOTH,BODYS,PSONIC,RSONIC,PLINF,RLINF
  * * VLINF,HLTANG,NMROUT
  * COMMON/MK/KOD/MUR,BHR,CUR,DWR,UMR,VUR,VHR,PUR,RHOUR,MRC1,NEUR,MTAL
  * COMMON/MCKO1/K,J,NPHIMR,INT2MR,MRMACH,PKEFLM,WRZ
  * COMMON/COH/3/A,SP0,WRRO,WRTO,WRCON,GASCON,WRHO,WRSO,WRAO,WRATO,WRGX
  * COMMON /ZACNT/NRECR(51)
  * COMMON/CLUSTR/RJ,XI(24),TXIT(24)
  * DIMENSION E(4),F(4),G(4),H(4)
  * DIMENSION GSOF(6)
  * COMMON/LIBOS/INTEST(11),NGRTA,NOSXY(4),NGRTB(3),NSMCH(32),INC(32)
  * DATA GSOF/4HEPR0,4HR IN,4H IOC,4HOH R,4HT J,4HK- /
  * JERK-1
  * NGB=NRECR(1)-2
  * IF(JERK.EQ.2) GO TO 2
  * I1-K1+1
  * GO TO (S,5,2),I1
  * CONTINUE
  * DO 3 K=2,NPH1
  * DO 3 J=3,NT2
  * I=XI(J)
  * C... CODE CONSERVATIVE VARIABLES
  * R=T*(R0B(K)-R0B(K))+R0B(K)
  * RR=RHO(J,K)
  * PP=P(J,K)
  * UU=U(J,K)
  * VV=V(J,K)
  * WW=W(J,K)
  * IF(NSMCH(11).GT.0)GO TO 10
  * A=DTDZ(J,K)
  * B=DTDR(K)
  * C=DTDPH(J,K)
  * D=R0B(K)-R0B(K)
  * IF(J.EQ.3)GO TO 4B75
  * RUM1=XI(J)-1)+D+R0B(K)
  * VSTAR1=DTDZ(J-1,K)+U(J-1,K)+8*W(J-1,K)+D*PH(J-1,K)/R,4H1
  * IOCON 2
  * CVARB 2
  * PVARB 3
  * PVARB 4
  * PVARB 5
  * PVARB 6
  * PVARB 7
  * PVARB 8
  * IDVARB 2
  * SVARB 2
  * SVARB 3
  * SVARB 4
  * SVARB 5
  * SVARB 6
  * SVARB 7
  * SVARB 8
  * SVARB 9
  * SVARB 10
  * SVARB 11
  * REALG 2
  * REALG 3
  * WDR0 2
  * WDR0 2
  * COHMG 2
  * ACCNT 2
  * CLUSTR 2
  * IOCON 13
  * IOCON 14
  * IOCON 15
  * IOCON 16
  * IOCON 17
  * IOCON 18
  * IOCON 19
  * IOCON 20
  * IOCON 21
  * IOCON 22
  * IOCON 23
  * IOCON 24
  * IOCON 25
  * IOCON 26
  * IOCON 27
  * IOCON 28
  * IOCON 29
  * IOCON 30
  * IOCON 31
  * IOCON 32
  * IOCON 33
  * IOCON 34
  * IOCON 35
  * IOCON 36
  * IOCON 37
  * IOCON 38
  * IOCON 39
  * IOCON 40

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4875 VSTAR1=VSTAR1*UU/U(J-1,K)
VSTAR2=AR*LU+B*VV+C*WM/R
IF(J.EQ.N72)GO TO 4775
R*P1=XI(J+1)*D+RB(K)
VSTAR3=DTZ(J+1,K)*UC(J+1,K)+B*V(J+1,K)+OTOPH(J+1,K)*H(J+1,K)/R*P1
VSTAR3=VSTAR3*UU/U(J+1,K)
4775 CONTINUE
IF(C11-1)*4.4.6
4 VBAR=VSTAR2
IF(J.LE.4)GO TO 14
IF(J.GE.(NT2-1))GO TO 14
IF(VSTAR2.GT.VSTAR1)VBAR=O.5*(VSTAR2+VSTAR1)
WBAR=WM
14 IF(WM.GT.H(J,K-1))WBAR=O.5*(WM+H(J,K-1))
GO TO 10
6 VBAR=VSTAR2
IF(J.LE.4)GO TO 15
IF(J.GE.(NT2-1))GO TO 15
IF(VSTAR3.GT.VSTAR2)WBAR=O.5*(VSTAR3+VSTAR2)
WBAR=WM
15 IF(W(J,K+1).GT.WM)WBAR=O.5*(H(J,K+1)+WM)
CONTINUE
10 E(1)=R*UU
E(2)=GM(2)*PP+E(1)*UU
E(3)=E(1)*VV
E(4)=E(1)*WW
IF(NS4CH(11))11.11.12
12 CONTINUE
F(1)=H*VV
F(2)=F(1)*UU
F(3)=GM(2)*PP+F(1)*VV
F(4)=F(1)*WW
G(1)=R*WM/R
G(2)=G(1)*UU
G(3)=G(1)*VV
G(4)=GM(2)*PP+R*WM*W2)/R
H(1)=F(1)/R
H(2)=H(1)*UU
H(3)=R*(V*W2-W*W2)/R
H(4)=2.0*G(3)
GO TO 13
11 CONTINUE
D=GM(2)*PP
F(1)=H*WM
F(2)=A*D+F(1)*UU
F(3)=B*D+F(1)*VV
F(4)=C*D/R+F(1)*WW
G(1)=R*WM/R
G(2)=G(1)*UU
G(3)=G(1)*VV
G(4)=D/R+G(1)*WW
H(1)=R*VV/W
H(2)=R*VV/H-ACT(K)*E(1)-(BCT(K)*OTILE(K))
H(3)=R*VV*UU/R
H(4)=H -ACT(K)*E(2)-(BCT(K)*OTILE(K))
H(5)=R*VV*VV/R
H(6)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(7)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(8)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(9)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(10)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(11)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(12)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(13)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(14)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(15)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(16)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(17)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(18)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(19)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(20)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(21)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(22)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(23)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(24)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(25)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(26)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(27)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(28)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(29)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(30)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(31)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(32)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(33)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(34)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(35)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(36)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(37)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(38)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(39)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(40)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(41)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(42)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(43)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(44)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(45)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(46)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(47)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(48)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(49)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(50)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(51)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(52)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(53)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(54)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(55)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(56)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(57)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(58)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(59)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(60)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(61)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(62)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(63)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(64)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(65)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(66)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(67)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(68)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(69)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(70)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(71)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(72)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(73)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(74)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(75)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(76)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(77)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(78)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(79)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(80)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(81)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(82)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(83)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(84)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(85)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(86)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(87)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(88)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(89)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(90)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(91)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(92)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(93)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(94)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(95)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(96)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))
H(97)=R*VV*W2)/R-ACT(K)*E(3)-(BCT(K)*OTILE(K))

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115 H(4)=2.0*RRVVVVW/R-ACT(K)*E(4)-(BCT(K)+DTILE(K))=(GRH(2)*P+ARR*W) IOCON 98
      I**2)/R-TXIT(J)*RR*VV*W IOCON 99
13 CONTINUE IOCON 100
      DO 16 N=1,4 IOCON 101
      IF(NSACH(I)) .GT. 0)F(N)-DTDZ(J,K)*E(N)+DIDR(K)*E(N)+DIDPH(J,K)* IOCON 102
      A G(N) IOCON 103
      I**2)/R-TXIT(J)*E(N) IOCON 104
120 H(N)=H(N) IOCON 105
      F(N)=F(N)*TXI(J) IOCON 106
      GCN)=GCN)+DITL(K) IOCON 107
125 CONTINUE IOCON 108
      GO TO (17,18),II IOCON 109
17 CONTINUE IOCON 110
      C..SET CONSERVATIVE VARIABLES AT N IOCON 111
      DO 20 N=1,4 IOCON 112
      EOCN,J,K)=E(N) IOCON 113
      FOCN,J,K)=F(N) IOCON 114
      GOCN,J,K)=G(N) IOCON 115
      HCN,J,K)=H(N) IOCON 116
135 CONTINUE IOCON 117
      GO TO 3 IOCON 118
18 CONTINUE IOCON 119
      C..SET CONSERVATIVE VARIABLES AT N+1 TILDE IOCON 120
      DO 9 N=1,4 IOCON 121
      IF(J.EQ.MT2) GO TO 36 IOCON 122
      GO TO 35 IOCON 123
      C..RESEY ETEMP AT BODY AND SHOCK IOCON 124
36 ETEMP(N,J,K)=E(N) IOCON 125
35 CONTINUE IOCON 126
      FOCN,J,K)=F(N) IOCON 127
      GOCN,J,K)=G(N) IOCON 128
      HOCN,J,K)=H(N) IOCON 129
9 CONTINUE IOCON 130
3 CONTINUE IOCON 131
      RETURN IOCON 132
2 CONTINUE IOCON 133
      C..DECODE CONSERVATIVE VARIABLES--PERFECT GAS. IOCON 134
      IF (NREAL.EQ.-1) GO TO 50 IOCON 135
      RA=1.0-GMK(2) IOCON 136
      DO 1 K=3,NPHI IOCON 137
      DO 1 J=3,NT2 IOCON 138
      IF(JLFX.EQ.2) IOCON 139
      A=ETEMP(1,J,K) GO TO 779 IOCON 140
      B=ETEMP(2,J,K) IOCON 141
      C=ETEMP(3,J,K) IOCON 142
      D=ETEMP(4,J,K) IOCON 143
      BB=-B/A IOCON 144
      V(J,K)=C/A IOCON 145
      W(J,K)=D/A IOCON 146
      CC=GRH(2)*K(1.0-V(J,K)**2-W(J,K)**2) IOCON 147
      DD=BB**2-4.0*AR*CC IOCON 148
      IF(DD) 7,8,8 IOCON 149
      CONTINUE IOCON 150
7 CONTINUE IOCON 151
      C 779 CONTINUE IOCON 152
      C IOCON 153
      C IOCON 154

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SUBROUTINE MULLER 76/76 OPT=1

FTN 4.6+460

06/15/79 18.58.36

PAGE 1

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1      C      MULLER
SUBROUTINE MULLER(COE,N1,ROOTR,ROOTI)
2      C      DIMENSION COE(16),ROOTR(15),ROOTI(15)
3      C      DIMENSION COE(16),ROOTR(15),ROOTI(15)
4      M2=N1+1
5      N4=0
      I=N1+1
      IF(COE(I))9,7,9
      N4=N4+1
      ROOTR(N4)=0.0
      ROOTI(N4)=0.0
      I=I-1
      IF(N4-N1)19,37,19
      CONTINUE
      AXR=0.8
      AXI=0.0
      L=1
      N3=1
      ALP1R=AXR
      ALP1I=AXI
      M=1
      GOT099
      BET1R=TEMR
      BET1I=TEMI
      AXR=0.85
      ALP2R=AXR
      ALP2I=AXI
      M=2
      GOT099
      BET2R=TEMR
      BET2I=TEMI
      AXR=0.9
      ALP3R=AXR
      ALP3I=AXI
      M=3
      GOT099
      BET3R=TEMR
      BET3I=TEMI
      TE1=ALP1R-ALP3R
      TE2=ALP1I-ALP3I
      TE3=ALP3R-ALP2R
      TE4=ALP3I-ALP2I
      TEM=TE3*TE1.5+TE6*TE6
      TE5=(TE1*TE5+TE2*TE6)/TEM
      TE4=(TE2*TE5-TE1*TE6)/TEM
      TE7=TE3+1.0
      TE9=TE3*TE3-TE4*TE4
      TE10=2.0*TE3*TE4
      CE15=TE7*CE12R-TE4*CE13I
      CE16=TE7*CE13I+TE4*CE12R
      TE11=TE3*BET2R-TE4*BET2I+BET1R-DE15
      TE12=TE3*BET2I+TE4*BET2R+BET1I-DE16
      TE7=TE9-1.0
      TE1=TE9*BET2R-TE10*BET2I
      TE2=TE9*BET2I+TE10*BET2R
      TE13=TE1*BET1R-TE7*BET1R
      TE14=TE2*BET1I-TE7*BET1I-TE10*BET1R
      M3LER

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60      TE15=DE15*TE3-DE16*TE4
        TE16=DE15*TE4+DE16*TE3
        TE1=TE13*TE13-TE14*TE14-4.0*(TE11*TE15-TE12*TE16)
        TE2=2.0*TE13*TE14-4.0*(TE12*TE15+TE11*TE16)
        TEM=SGRT(TE1*TE1+TE2*TE2)
        IF(TE1)113,113,112
        TE4=SGRT(.5*(TEM-TE1))
        IF(TE4.EQ.0.0) GO TO 111
        TE3=.5*TE2/TE4
        GO TO 111
112      TE3=SGRT(.5*(TEM+TE1))
        IF(TE2)110,200,200
110      TE3=-TE3
200      TE4=.5*TE2/TE3
111      TE7=TE13*TE3
        TEA=TE14*TE4
        TE9=TE13-TE3
        TE10=TE14-TE4
        TE1=2.0*TE15
        TE2=2.0*TE16
        IF(TE7*TE7+TE8*TE8-TE9*TE9-TE10*TE10)204,204,205
        TE7=TE9
        TE8=TE10
204      TEM=TE7*TE7+TE8*TE8
        IF(TEM.EQ.0.0) GO TO 6
        TE3=(TE1*TE7+TE2*TE8)/TEM
        TE4=(TE2*TE7-TE1*TE8)/TEM
        AXR=ALP3R*TE3*TES-TE4*TE6
        AXI=ALP3I*TE3*TE6+TE4*TES
        ALP4R=AXR
        ALP4I=AXI
        N=4
90      GO TO 99
15      M6=1
36      IF(ABS(HELL)*ABS(BELL)-1.E-20)18,18,16
16      TE7=ABS(ALP3R-AXR)*ABS(ALP3I-AXI)
        IF(TE7/(ABS(AXR)*ABS(AXI))-1.E-7)16,18,17
17      N3=N3+1
        ALP1R=ALP2R
        ALP1I=ALP2I
        ALP2R=ALP3R
        ALP2I=ALP3I
        ALP3R=ALP4R
        ALP3I=ALP4I
        BET1R=BET2R
        BET1I=BET2I
        BET2R=BET3R
        BET2I=BET3I
        BET3R=ICMR
        BET3I=IEMI
        IF(N3-100)14,18,18
18      N4=N4+1
        ROOTR(N4)=ALP4R
        ROOTI(N4)=ALP4I
        N3=0
41      IF(N4-N1)30,37,37
30      IF(ABS(ROOTI(N4))-1.E-5)10,10,31

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115      31      GO TO(32,10),L
          32      AXR=ALP1R
          AXI=-ALP1I
          ALP1I=-ALP1I
          M=5
120      33      GO TO 99
          BET1R=TEMPR
          BET1I=TEMI
          AXR=ALP2R
          AXI=-ALP2I
          ALP2I=-ALP2I
          M=6
125      34      GO TO 99
          BET2R=TEMPR
          BET2I=TEMI
          AXR=ALP3R
          AXI=-ALP3I
          ALP3I=-ALP3I
          L=2
          M=3
130      99      TEMP=COE(1)
          TEMI=0.0
          DO100I=1,M1
          TE1=TEMP*P**R-TEMI*AXI
          TEMI=TEMI-AXR*TEMP*AXI
          TEMR= TE1+COE(I+1)
          HELL=TEPR
          BELL=TEMI
          IF(N4)102,103,102
          DO101I=1,M4
          TEM1=AXR-ROOTR(I)
          TEM2=AXI-ROOTI(I)
          TE1=(TEMP*TEMI+TEMR*TEM2)/TE1
          TEMI=(TEMI*TEMI-TEMP*TEMP2)/TE1
          TEMR=TE2
140      101      GO TO(11,12,13,15,33,34),M
          103      RETURN
          37      END
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          MULLER 154

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1 SUBROUTINE OUTPUT(K2)
  LEVEL 2,ETEMP,EO,FO,GO,HO
  COMMON/LARGE/ETEMP(4,24,41),ED(4,24,41),
  * FO(4,24,41),GC(4,24,41),HO(4,24,41)
  COMMON /PYARB/RHO(24,41),P(24,41),U(24,41),V(24,41),W(24,4
  * )
  * ROBZ(41),ROBZ(41),VINP(41),VINP(41),
  * ROBPH(41),ROBPH(41),ROBZ(41),ROBPH(41),
  * DTOPH(24,41),BCT(41),DIDZ(24,41),DIDF(41),
  * ICONST(50),GAMC(20),CONST(50),NRECON,RS(41),
  * RSZ(41),ASPHI(41),ASPHI(41),RSZI(41),ASPHI(41)
  COMMON /IDVARB/RK,ETA(41),PHIP(41),DTIL(41),DTIL(41),DETA,IP(24)
  COMMON/SVARB/T,Z,PHI,DT,DZ,DPHI,ZINT,
  * ZENO,PI,ALPHA,GAMPA,SIGMA,XPACH,TAPF1,
  * TAPF2,DISK1,ALPH,DISK2,SIGM,NPHAT,DZDT,
  * DZOPH,ZM,THID,TPM,TML,TPM,
  * TML,RZ,BZ,NIPHI,NIT,KPHI,NIER,
  * NPHI,NPHI1,NPHI2,NPHI3,NPHI4,NPHI5,
  * NT,NIT,NIT2,NIT3,PHIFD,NCOHE,RADI,
  * PHIF,METHOD,LAG,NBC,PINF,RHOIN,UTNF,
  * QINF,DIAM,ALENGT,ZREF,ZCG,ZSHIFT,IFANOM
  INTEGER DISK1,DISK2,TAPF1,TAPF2
  COMMON/REAL/GAM,ERL,NMURPT,BODTH,BODYS,PSONIC,RSONIC,PIINF,RIINF
  *,VINP,NITAS,INROUT
  COMMON/COING/WIPO,WRHO,WRTO,WRCON,GASCON,WRHO,WRSO,WRPAO,WRATG,WRGX
  COMMON/ENTRO/5(41),ZBS,ZFLD,ITPFTB,ITPRTF,NCASE,INTDOS5
  COMMON/GLUSTR/RJ,XI(24),TXI(24),TXIT(24)
  DIMENSION YS(41)
  INTEGER CARDNO
  IF (NREAL.EQ.0) GO TO 17
  IF (NROUT.EQ.0) GO TO 17
  IF ((PIINF.EQ.PIINF).AND.(RIINF.EQ.RIINF)).AND.(VINP.EQ.VINP))
  * GO TO 17
  PIINF=PIINF
  RIINF=RIINF
  VINP=VINP
  CALL RGAS(PIINF,RIINF,AURFS,MURFS,TURFS,SURFS,GASCON,WRGX,-1,4,2)
  MURFS=HURFS*(VINP**2)*0.5
  VMAXH=GM*(MURFS*(HURFS**2)*0)
  PSTRG=GM*(MURFS*(HURFS**2)*0)
  PSTRG=PSTRG+GAMPA/(CGAMPA-1.)*VMAXH**2
  CONTINUE
  GO TO (1,2,3,4,5,6,14,15,19),K2
  17 CONTINUE
  1 C..OUTPUT INITIAL INPUT DATA
  C
  C
  WRITE(6,107) XNACH,ALPHA,GAMPA,BIIPA
  WRITE(6,101) ZINT,ZIMU,PHIPD
  WRITE(6,102) NIT,NIPHI,ICONST(2),NIER,NPHAT,ICONST(4),NCOHE,
  *NMURPT,NREAL
  WRITE(6,103) DZDT,CONST(4),CONST(5)
  WRITE(6,104) DISK1,DISK2,TPM E1,TPM E2
  WRITE(6,115) CONST(9),METHOD,MUR,PK,RJ
  IF (NREAL.EQ.-1)
  * WRITE(6,123) PIINF,RIINF,VINP
  11.BODTH,BODYS

```

```

2 OUTPUT
3 CVARB
4 CVARB
5 CVARB
6 PYARB
7 PYARB
8 PYARB
9 PYARB
10 PYARB
11 REALG
12 REALG
13 COING
14 ENTRO
15 ENTRO
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39 ENTRO
40 ENTRO

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IF (NREAL.EQ.-1) WRITE (6,126) PSTAG,ASTAG,VMAXH,HURFS,SURFS
WRITE(6,116) PINF,RHOIN,GINF
WRITE (6,128) GASCON
DO 16 K=3,NPHI
  PHI=PHIP(K)*RADI
  IF (NREAL.EQ.0) WRITE (6,117) K,PHI,UINF,VINF(K),WINF(K)
  IF (NREAL.EQ.-1) WRITE (6,124) K,PHI,UINF,VINF(K),WINF(K)
CONTINUE
GO TO 7
16 CONTINUE
2
3
C..OUTPUT ALL FLOW FIELD VARIABLES
70
I=0
DO 9 K=3,NPHI
  PHI=PHIP(K)*RADI
  WRITE(6,105) K,PHI,Z
  IF (NREAL.EQ.0) WRITE (6,106)
  IF (NREAL.EQ.-1) WRITE (6,127)
  DO 10 J=3,NT2
    T=XI(J)
    R=T*(ROB(K)-RB(K))+RB(K)
    I=I+1
    XX(I)=R*SIN(PHIP(K))
    YY(I)=R*COS(PHIP(K))
    ZZ(I)=RHO(J,K)
    IF (NREAL.EQ.-1) GO TO 20
    GOO=GAH(I)*P(J,K)/RHO(J,K)
    IF(GOO) B.B.13
  CONTINUE
8
GOO=-GOO
WRITE(6,113)
CONTINUE
13
SPSNO=SGRT(GOO)
ENTRO=ALOG(RBS(P(J,K)/RHO(J,K))*GAMMA)
QSQ=U(J,K)**2+V(J,K)**2+W(J,K)**2
ENTH=1.0-QSQ
WRITE(6,107) J,R,P(J,K),RHO(J,K),UC(J,K),VC(J,K),ENTRO,SPSNO,
*ENTH
79
GO TO 21
20
IF (NROUT.EQ.1) GO TO 18
CALL FGAS(P(J,K),RHO(J,K),SPSNO,ENTH,TEM,ENTRO,GASCON,WFGX,-1,4,2)
ENTR=ENTRO/GASCON
ENTH=ENTH/GCOYH
LMA=U(J,K)/SPSND
VMA=V(J,K)/SPSND
WMA=W(J,K)/SPSND
COMP=P(J,K)/(GASCON*TEM) #RHO(J,K)
TEMP=TEM/1.8
WRITE (6,125) J,R,P(J,K),RHO(J,K),TEMP,LMA,VMA,WMA,ENTRO,SPSNO,T,
ENTH,COMP
91
GO TO 21
92
CONTINUE
93
XR=RHO(J,K)/PSTAG
XU=UC(J,K)/VMAXH
XV=V(J,K)/VMAXH
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OUTPUT
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115      XU=UC(J,K)/VMAXH
        WRITE(6,125) J,R,XP,XR,TEMP,XU,XV,XW,ENTRO,SP5ND,T,ENTH
        CONTINUE
10      CONTINUE
9       CONTINUE
C.....CALL JOE MALLENØS PRINTER PLOT
        KMAX=(NPHI-3)*1
        JMAX=(NT2-5)*1
        KMAX-KMAX#JMAX
        CALL APLOT(ZZ,XX,YY,1,3,20,KJMAX,FCUT,50,50)
        GO TO 7
3       CONTINUE
C
C...STORE DATA ON TAPE FOR DATA REDUCTION PROGRAM
C
        WRITE(9) Z,NT2,NPHI2,RK,RJ,PHIFD,((P(J,K),RHO(J,K),UC(J,K),V(J,K),W
        *(J,K),J-1
        *(NT2),RB(K),RBZ(K),RBP(K),RS(K),RSZ(K),RSPHI(K),K-1,NPHI2)
        GO TO 7
4       CONTINUE
C
C...STORE DATA ON DISK 1 OR 2
C
        REWIND 12
        WRITE(12) XHACH,ALPHA,GAMMA,NIT,NIPHI,NREAL,P1INF,R1INF,V1INF,GASC
        *ON,RK,PHIFD,RJ
        WRITE(12) Z,((P(J,K),RHO(J,K),UC(J,K),V(J,K),W(J,K),K-3,NPHI ),J-3,
        *NT2),(RS(K),RSZ(K),RSPHI(K),K-3,NPHI)
        END FILE 12
        REWIND 12
        WRITE(6,112)
        GO TO 7
14      CONTINUE
        REWIND 11
        WRITE(11) XHACH,ALPHA,GAMMA,NIT,NIPHI,NREAL,P1INF,R1INF,V1INF,GASC
        *ON,RK,PHIFD,RJ
        WRITE(11) Z,((P(J,K),RHO(J,K),UC(J,K),V(J,K),W(J,K),K-3,NPHI ),J-3,
        *NT2),(RS(K),RSZ(K),RSPHI(K),K-3,NPHI)
        END FILE 11
        REWIND 11
        WRITE(6,114)
        GO TO 7
155     CONTINUE
        WRITE(6,114)
        GO TO 7
C...STORE DATA ON PUNCHED CARDS FOR RESTART CAPABILITY
C
15      CONTINUE
        CARDNO=0
        CARDNO=CARDNO+1
        WRITE(7,132) XHACH,ALPHA,GAMMA,RK,PHIFD,CARDNO
        WRITE(7,132) RJ
        CARDNO=CARDNO+1
        WRITE(7,132) NIT,NIPHI,NREAL,P1INF,R1INF,V1INF,GASCON,CARDNO
        CARDNO=CARDNO+1
        WRITE(7,119) Z,CARDNO
        DO 30 J=3,NT2
        DO 30 K=3,NPHI
        CARDNO=CARDNO+1
170     OUTPUT
115     OUTPUT
99      OUTPUT
100     OUTPUT
101     OUTPUT
102     OUTPUT
103     OUTPUT
104     OUTPUT
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108     OUTPUT
109     OUTPUT
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151     OUTPUT
152     OUTPUT
153     OUTPUT
154     OUTPUT

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30 WRITE (7,120) P(J,K),RHO(J,K),UC(J,K),V(J,K),W(J,K),M(J,K),CARDNO
CONTINUE
DO 31 K=3,NPHI
CARDNO=CARDNO+1
31 WRITE (7,121) RS(K),RSZ(K),RSPHI(K),CARDNO
CONTINUE
END FILE 7
REWIND 7

180 C
C WRITE(6,118)
GO TO 7
185 S
CONTINUE
C..OUTPUT SURFACE FLOW VARIABLES
C
XL=Z/ZEND
WRITE(6,108) Z,XL,DZDT,ICONST(S)
PART=1
DO 11 K=3,NPHI
PHI=PHIP(K)*ERAOI
UFA=UC(3,K)
VFA=V(3,K)
WFA=W(3,K)
IF (CNRAL.NE.-1) GO TO 23
POPI=P(3,K)/PIINF
CP=2.0/(GA*MA**MACH**2)*E(POPI-1.0)
FORI=RHO(3,K)/RIINF
CALL RGAS(P(3,K),RHO(3,K),C.ENTH,TEM,ENTRO,GASCON,WRGX,-1.4,2)
RT=GASCON*TEM
TEMPK=TEM/1.8
PART=P(3,K)/(RHO(3,K)*RT)
HRT=ENTH/BOOTH
GO TO 24
23 CONTINUE
POPI=P(3,K)/PIINF
CP=2.0/(GA*MA**MACH**2)*E(POPI-1.0)
FORI=RHO(3,K)/RHOIN
POVENP=P(3,K)/RHO(3,K)
QSQ=(VFA**2+WFA**2+UFA**2)
HRT=1.0-QSQ
C=SORI(CAM(1)*ABS(POVENP))
ENTRO=LOG(RB(S(P(3,K)/RHO(3,K))))*(GA*MA)
IF (GASCON.NE.0.0) TEMPK=POVENP/GASCON
CONTINUE
UFA=UFA/C
VFA=VFA/C
WFA=WFA/C
WRITE (6,109) PHI,RB(K),CP,POPI,ROFI,UFA,VFA,WFA,C,PRRT,HRT,TEMPK,
1ENTRO
11 CONTINUE
GO TO 7
6 CONTINUE
C..OUTPUT SHOCK LOCATION
C WRITE(6,110) Z

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155 OUTPUT
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211 OUTPUT

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Line	Code	Text	Output
230	DO 12 K=3,NPHI		OUTPUT
	PHI=PHIP(K)*RAD1		OUTPUT
	WRITE(6,111) PHI,RB(K),RBZ(K),RBPBK(K),ROB(K),ROBZ(K),ROBPH(K)		OUTPUT
12	CONTINUE		OUTPUT
	GO TO 7		OUTPUT
19	CONTINUE		OUTPUT
235	C	C..PUNCH DATA CARDS FOR 3-D S-O-S CODE	OUTPUT
	C		OUTPUT
	READ(5,135) XMACHI,XLRA*DO		OUTPUT
240	135 FORMAT(2F10.5)		OUTPUT
	PIN=1.0		OUTPUT
	RIN=1.0		OUTPUT
	READ(11) XMACHO,ALPHAO,G,MIT,NIPHI,NR,P1,R1,Q1,GA,RA,PHIFD,RJ		OUTPUT
	AIN=START(G)		OUTPUT
	QIN=XMACHO*AIN		OUTPUT
245	READ(11) Z,((P(J,K),RHO(J,K),UC(J,K),V(J,K),W(J,K),K=3,NPHI),		OUTPUT
	* J=3,NT2),(RSZ(K),RSZ(K),RSPHI(K),K=3,NPHI)		OUTPUT
	P=OP1-(G+1.0)*XMACHI**2/(G-1.0)/(G+1.0)		OUTPUT
	R3OR1=(G+1.0)*XMACHI**2/((G-1.0)*XMACHI**2+2.0)		OUTPUT
	R3OR1=SGRT(P3OP1/R3OR1)		OUTPUT
250	JC=NT2-2		OUTPUT
	KH=NPHI-2		OUTPUT
	DO 22 K=3,NPHI		OUTPUT
	KK=K-2		OUTPUT
255	DO 25 J=3,NT2		OUTPUT
	JJ=J-2		OUTPUT
	P(J,K)=P(J,K)/PINF*PIN		OUTPUT
	RHO(J,K)=RHO(J,K)/RHOIN*RAIN		OUTPUT
	UC(J,K)=UC(J,K)/QINF*QIN		OUTPUT
	V(J,K)=V(J,K)/QINF*QIN		OUTPUT
	W(J,K)=W(J,K)/QINF*QIN		OUTPUT
260	ED(1,JJ,KK)=RHO(J,K)		OUTPUT
	ED(2,JJ,KK)=RHO(J,K)*RUC(J,K)		OUTPUT
	ED(3,JJ,KK)=RHO(J,K)*RUC(J,K)		OUTPUT
	ED(4,JJ,KK)=RHO(J,K)*RUC(J,K)		OUTPUT
265	25 FJ(1,JJ,KK)=P(J,K)*GINH(4)+O.5*RHO(J,K)*(U(J,K)**2-V(J,K)**2+W(J,K)		OUTPUT
	* **2)		OUTPUT
	ROB(KK)=RSZ(K)		OUTPUT
	ROB(JKK)=RSZ(K)		OUTPUT
270	22 ROBPH(KK)=RSPHI(K)		OUTPUT
	IF(MDSOS.GT.1) GO TO 28		OUTPUT
	WRITE(7,133) ((EO(I1,JJ,KK),I1=1,4),FO(1,JJ,KK),JJ=1,JC),KK=1,KH)		OUTPUT
	WRITE(7,134) (RGR(K),ROBZ(K),ROBPH(K),K=1,KH)		OUTPUT
	GO TO 29		OUTPUT
275	28 WRITE(7) ((EO(I1,JJ,KK),I1=1,4),FO(1,JJ,KK),JJ=1,JC),KK=1,KH),		OUTPUT
	29 *(ROB(K),ROBZ(K),ROBPH(K),K=1,KH)		OUTPUT
	29 CONTINUE		OUTPUT
	READ(12) XMACHN,ALPHAN,G,MIT,NIPHN,NR,P3,R3,Q3,GA,RA,PHIFD,RJ		OUTPUT
	READ(12) Z,((P(J,K),RHO(J,K),UC(J,K),V(J,K),W(J,K),K=3,NPHI),		OUTPUT
	* J=3,NT2),(RSZ(K),RSZ(K),RSPHI(K),K=3,NPHI)		OUTPUT
280	AA=1.0/GAM(1)*XMACHN**2		OUTPUT
	BB=AA-1.0		OUTPUT
	PINF4=1.0/AA**GAM(3)		OUTPUT
	AINF4=1.0/AA**GAM(4)		OUTPUT
	QINF4=SGRT(BB/AA)		OUTPUT
285	AINF4=SGRT(GAM(1)*(1.0-QINF4**2))		OUTPUT

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06/15/77 18.58.36

FTN 4.6.460

76/76 OPT=1

SUBROUTINE OUTPUT

OUTPUT 383

END

400

1	FUNCTION PGHS(H,S,M)	PGHS	2
	PRG. COMPUTES PRESSURE THAT CORRESPONDS TO A GIVEN ENERGY AND	PGHS	3
	ENTROPY.	PGHS	4
	EXTERNAL PROOT	PGHS	5
5	REAL H	PGHS	6
	COMPN/REAL/GANPEAL,INMPRT,BODY,BOOYS,PSONIC,ASONIC,PIIMF,MIIMF	REALG	3
	*,VIINF,NITVNG,INRGOUT	JOIMI	2
	COMPN/JOIMI/HP,SP,GRACH,NEW	CONRG1	2
10	COMPN/CONRG/PO,RO,TO,CANC,GASCON,MC,SO,AO,ATO,GX	PGHS	10
	LOGICAL BOL,TRN	PGHS	11
	HP=H	PGHS	12
	SP=5	PGHS	13
	GRACH=H	PGHS	14
	TRN=.FALSE	PGHS	15
15	PH=(1.OE+3)*PO	PGHS	16
	PL=(5.OE-8)*PO	PGHS	17
	CONTINUE	PGHS	18
	NEW=1	PGHS	19
20	CALL ZEROIN(PL,PH,1.OE-6,PROOT,BC,XX,VT)	PGHS	20
	PGHS=(XX*VT)/2.O	PGHS	21
	IF (BOL) GO TO 101	PGHS	22
	CALL GRAS(PGHS,AX,AX,AX,TX,SP,GASCON,GX,-1.5,2)	PGHS	23
	HX=H/(GRASCON*TX)	PGHS	24
	SX=5/GASCON	PGHS	25
25	RX=RX/PO	PGHS	26
	WRITE (6,100) HX,SX,PL,PH,M,PGHS,AX	PGHS	27
	FORMAT(1HD,1BHNCON,PGHS, H/RT=	PGHS	28
	,1PE11.4,1X,4HS/R=,1PE11.4	PGHS	29
30	11X,3HP,1PE11.4,1X,3HPH=,1PE11.4,1X,2HM=	PGHS	30
	21PE11.4,1X,5HR/RO=,1PE11.4)	PGHS	31
	IF (TRN) RETURN	PGHS	32
	TRN=.TRUE	PGHS	33
	PH=(3.5E+3)*PO	PGHS	34
	GO TO 99	PGHS	35
35	CONTINUE	PGHS	36
	IF (INMPRT.OE.2) GO TO 102	PGHS	37
	RETURN	PGHS	38
40	CONTINUE	PGHS	39
	CALL GRAS(PGHS,AX,AX,AX,TX,SP,GASCON,GX,-1.5,2)	PGHS	40
	HX=H/(GRASCON*TX)	PGHS	41
	PX=PGHS/PO	PGHS	42
	WRITE (6,103) H,S,M,PGHS,HX,SX,PX,TX	PGHS	43
103	FORMAT(1H,10HP,PGHS=,H=,1PE11.4,1X,2HS=,1PE11.4,1X,2HM=,OPF7.3,1X,	PGHS	44
	13HP,5=,1PE11.4,1X,5HR/RT=,1PE11.4,1X,4HS/R=,1PE11.4,1X,5HP/PO=,1PE11.4	PGHS	45
	2,1X,2HT=,1PE11.4)	PGHS	46
	RETURN	PGHS	47
	END	PGHS	48

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1      SUBROUTINE PHANG(P1,P2,R2,LR)
2      RELINQUT(10-0-71) --BY USE OF PHANOTL-MEYER FORMULA AND STATE
3      DCAM-STREAM FLOW PROP AND TURNING ANGLE PROGRAM COMPUTES
4      REAL MESSAGE
5      LOGICAL BGL
6      COMMON/CONV/TO,RO,TO,CONC,GASCON,NO,SO,AC,RTO,GX
7      COMPX/REAL/ANPEAL,NAMPRT, H, S,P,SONIC,RSONIC,PLINF,RIINF
8      * VITNF, NITRFG, NPROUT
9      DIMENSION EPRAC(2),NER(2)
10     DATA EPRAC(1),EPRAC(2),PTM(250)
11     DATA ERGON(1),ERGON(2),HWRES,HWANG /
12     DATA RAGEE(2),29578/
13     DATA HGT,STOT,1.,1.,1./
14     DATA DMACH/12./
15     DATA HMTI/D/250/
16     DATA I123/O/
17     DATA RYPR/O /
18     IF (I123.NE.123) GO TO B7
19     IF (CH.NE.HTOT,OR,S.NE.STOT) GO TO B7
20     IF (RNG.EQ.O.O) GO TO BB
21     GO TO 100
22     I123=123
23     RPA=GASCON
24     STOT=5
25     HTOT=H
26     * S
27     I1PE12=5
28     IF (NMPAT.GE.1) WRITE (6,106) NMG,H,S
29     FORMAT(140,13HPHANG ANGLE=-1PE12.5,1X,7HBODY-N=-1PE12.8,1X,7HBODY
30     =-5-
31     PXC=PGMS(N,S,1.0)
32     PLMRE=ALOG(PXC)
33     PTH(1)=PLMRE
34     PLNG=PLMRE
35     PTH(1)+O.O
36     SUM=O.O
37     CALL RGA5(PXC,RX,RY,HX,IX,STOT,RRX,GX,-1.5,2)
38     IF (NMPAT.GE.1) WRITE (6,107) PXC,RX,RY,HX,IX,STOT
39     FORMAT(1M,10HPHANG P5=-1PE11.4,1X,3HRS=1PE11.4,1X,3HAS=1PE11.4,1
40     *X,
41     23HRS=1PE11.4,1X,3HTS=1PE11.4,1X,3HSS=1PE11.4)
42     GRFO=ARRAX/RK/PXO
43     GG=1-SAREC/(GAREG-1.O)
44     PSONIC=PXO
45     RSONIC=RX
46     FPPE=HTOT-HX
47     FO=FPPE
48     AXO=RX
49     HXO=HX
50     DELP=O.O5
51     GPPE=O.O
52     NT=O
53     PLMRE=PLMRE+DELP
54     PLMRE=PLMRE-DELP
55     IF (NT.GE.NMPTAB) GO TO 96
56     PX=EXP(PLMRE)
57     CALL RGA5(PX ,RX,RY,HX,IX,STOT,RRX,GX,-1.5,2)

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60 RMACH=SQRT(RMS((HTOT-HX)*E2.O))/AX
F=HTOT-HX
TMOF=2.OFF
SQRTM=TUOF/(AX*AX)
G=SQRT(RMS((S*PACH-1.O))/TUOF)
TMS=7*(C(L*PRE))*(F-IPRE)*MO.5
SUM=TRMSUM+SUM
NI=NI+1
PIFABNT)=PIFABE
PIFABNT)=5.M
IF (CMLPART.NE.2) GO TO 151
IC=IX/1.8
PIFABO=IPM:PIFABOEG
PIFABS=SUBPABOEG
WRITE (6,110) NI,PK,AX,HX,TC,AMNCH,F,G,PIFABO,PIFABS
FORMAT(1H,13,1X,2M=,1PE13.6,1X,2M=,1PE10.3,1X,2M=,1PE10.3,1X,
2,1PE11.4,1X,2M=,OFF8.2,1X,2M=,OFF7.3,1X,2M=,1PE11.4,1X,2M=
CONTINUE
FPRE=F
CPRE=G
IF (AX.EQ.RXPRE) GO TO 96
IF (SUMPABOEG.GT.3/0.0) GO TO 96
IF (AMACH.GE.MYMACH) GO TO 96
RXPRE=RX
GO TO 91

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151

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IF (NI=1) GO TO 97
MYMACH=RMACH
HMAT=HX/RTO
SMAT=S/GASCON
WRITE (6,92) HMAT,SMAT,GAVEQ,GP7H,PO,MO,TO,MIK
FORMAT(1H,13,1H---PRMOTL-MEYER TL(ING)MAG---,A10TCENTH=,1PE15.7,1
RX
1.8ENTROPY=,1PE15.7,1X,10H(GRAPH)EQ=,1PE15.7,1X,5MCP/R=,1PE15.7
2/1H,3MPO=,1PE13.6,1X,3MRO=,1PE13.6,1X,3MTC=,1PE15.6,1X,8MGRAS=CGH=
3,1PE13.6/1HG,9X,4MPO/PO,9F,6MPC=PC,7X,5MCG=CG,8,8,4MPC/H,9X,
4MPC/HO,7X,5MPC/HO,8X,7MTEMP(K),6X,5MPC=PC,5X,5MPC=PC,5X,
DO 95 NI=1,NT
P=EXP(PIFAB(NI))
CALL RCAL(P,AX,AX,HX,IX,STOT,RIK,5X,-1.5,2)
AMACH=SQRT(RMS((HTOT-HX)*E2.O))/AX
PIFABO=PIFAB(NI)*TRACEG
RRAT=RX/RTO
HMAT=HX/RTO
IC=IX/1.8
CALL RCAL(P,AX,AX,HX,IX,ENTRO,RRK,6X,-1.4,2)
IF (CML.NE.NT) DACLP=(PIFAB(NI-1)-PIFAB(NI))/(PIFAB(NI-1)-PIFAB(NI))
WRITE(6,94) NI,PRAT,PIFABO,DACL,P,RYMACH,RRAT,HRAT,TC,AX,ENTRO

94
95
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115

94
95
97
100
105
110
115

FORMAT(1H,13,1X,9(1PE13.6))
CONTINUE
IF (MAG.NE.0.0) GO TO 100
P2=P1
GO TO 101

```

115      CONTINUE
116      IF (P1.GT.PSONIC) GO TO 101
117      ALNP1=ALNGC(P1)
118      JPP=1
119      CALL SEARCH(ALNP1,PTAB,1,NT,1,NZ,NER(1))
120      IF (.NOT.(NER(1).NE.O)) GO TO 102
121      ALNP2=PTAB(NZ)
122      ALNP2=PTAB(NZ+1)
123      ANGO=PTAB(NZ)
124      ANG2=PTAB(NZ+1)
125      DER1=(ALNP1-ALNP2)/(ALNP2-ALNP0)
126      ANGZ=(ANG1-ANG2)/(ANG2-ANG0)
127      ANG1=ANGZ*ANGZ
128      JPP=2
129      CALL SEARCH(ANG1,PTAB,1,NT,1,NY,NER(2))
130      IF (.NOT.(NER(2).NE.O)) GO TO 102
131      ANGO=PTAB(NY)
132      ANG2=PTAB(NY+1)
133      BLNP0=PTAB(NY)
134      BLNP2=PTAB(NY+1)
135      DER2=(ANG1-ANG2)/(ANG2-ANG0)
136      ALNP2=BLNP0*(BLNP2-BLNP0)/DER2
137      P2=EXP(ALNP2)
138      CALL RG35(P2,R2,R2,H2,T2,STOT,ANX,DX,-1.5,2)
139      UR=SIGN(NGS*((NTOT-H2)*2.0))
140      URMA=H-U2/R2
141      IF (URPART.LE.1) RETURN
142      WRITE (6,110) DER1,ALNP0,ALNP1,ALNP2,ANG0,ANGZ,ANG2,DER2,ANG0,ANG1
143      1,ANG2,BLNP0,ALNP2,BLNP2,P2,R2,R2,H2,T2,STOT,URMA=H
144      FORMAT(1H,12H)PHANGZ- F-P-OPF1.4,2X,4HUR-3(IPE11.4,1X),2X,3HUR=
145      13(IPE11.4,1X)/1H, 0X,4HF-R-OPF1.4,2X,4HUR-3(IPE11.4,1X),2X,4HUR=
146      23(IPE11.4,1X)/1H, 0X,2HF-PE11.4,1X,2HF-PE11.4,
147      31X,2HF-PE11.4,1X,2HF-PE11.4,1X,2HF-PE11.4,1X,2HF-PE11.4
148      RETURN
149      CONTINUE
150      WRITE (6,103) ERROR(JPP),NER(JPP),PTAB(1),P1,PTAB(NT),PMTAB(1),
151      1ANG1,PMTAB(NT)
152      FORMAT(1H, 5H)ERROR IN SEARCH FROM PHANG ROUTINE, 2X,AM,2X,13,2X,
153      125RETURNED WITH P2=P1, ETC./1H, 5HF(1)-IPE11.6,1X,2HF-PE13.6,1X,
154      25HF(N)-IPE13.6,1X,5HF(1)-IPE13.6,1X,2HF-PE13.6,1X,5HF(N)-IPE13.6)
155      GO TO 00
156      CONTINUE
157      WRITE (6,105) P1,PSGNIC
158      FORMAT(1H, 12H)ENTRNY PRES TO PHANG ROUTINE TOO LARGE, P1=,1PE13.6,1
159      *X.
160      129HIS GREATER THAN SONIC P(CH.5)=,1PE13.6,1X,2HFRETURNED WITH P2=P1
161      *ETC.)
162      GO TO 00
163      END

```

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PHANG 115
PHANG 116
PHANG 117
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PHANG 159
PHANG 160
PHANG 161
PHANG 162
PHANG 163

```

FUNCTION POLY 76/76 OPT-1 FTN 4,6*460 04/15/79 18.58.36 PAGE 1

```
1      C      POLY
        FUNCTION POLY(X,M,C,XO)
        DIMENSION C(20)
        K=M-1
        SUM=C(M)
        DO 2 I=1,K
            II=M-I
            SUM=SUM*(X-XO)+C(II)
        CONTINUE
        POLY=SUM
        RETURN
        END
```

POLY 2
POLY 3
POLY 4
POLY 5
POLY 6
POLY 7
POLY 8
POLY 9
POLY 10
POLY 11
POLY 12
POLY 13

1	FUNCTION PROOT(PX)	PROOT	2
	COMMON/REALG/NREAL,NURPRT,BODYH,BODYS,PSONIC,RSONIC,P1INF,R1INF	REALG	2
	*VINF,NITAVG,NUROUT	REALG	3
5	COMMON/CONRG/PO,RO,TO,CONC,GASCON,HO,SO,AO,RTO,GX	CONRGI	2
	COMMON/JOINI/HP,SP,GHACH,NEW	JOINI	2
	DATA I123/O/	PROOT	6
	DATA NEW/O/	PROOT	7
	IF (NEW.NE.NEW) NT=0	PROOT	8
	NEW=0	PROOT	9
10	NT=NT+1	PROOT	10
	IF (I123.EQ.123) GO TO 99	PROOT	11
	NEW=NEW	PROOT	12
	I123=123	PROOT	13
	NT=1	PROOT	14
15	RXX=GASCON	PROOT	15
	CONTINUE	PROOT	16
	CALL RSAS(PX,RX,AX,HX,TX,SP,RRX,GX,-1,5,2)	PROOT	17
	IF (GHACH.EQ.0) GO TO 100	PROOT	18
	VEL=AX*GHACH	PROOT	19
20	ENG=VEL*VEL#0.5	PROOT	20
	PROOT=(HP-HX)/ENG-1.0	PROOT	21
	IF (NURPRT.GE.2) GO TO 102	PROOT	22
	RETURN	PROOT	23
100	IF (HP.EQ.0) GO TO 101	PROOT	24
	PROOT=(HP-HX)/HP	PROOT	25
25	IF (NURPRT.GE.2) GO TO 102	PROOT	26
	RETURN	PROOT	27
101	PROOT=HX	PROOT	28
	IF (NURPRT.GE.2) GO TO 102	PROOT	29
30	RETURN	PROOT	30
	CONTINUE	PROOT	31
	TX=TX/1.0	PROOT	32
	PRAT=PX/PO	PROOT	33
	RRAT=RX/RO	PROOT	34
35	WRITE (6,103) NT,PX,PRAT,VEL,HP,HX,PROOT,RRAT,SP	PROOT	35
	FORMAT(1H,7H#PROOT=,12,1X,2HT=,1PE11.4,1X,5HP/PO=,1PE11.4,1X,	PROOT	36
	12HV=,1PE11.4,1X,3HHP=,1PE11.4,1X,2HH=,1PE11.4,1X,2HF=,1PE11.4,1X,	PROOT	37
	25HR/RO=,1PE11.4,1X,2HS=,1PE11.4)	PROOT	38
	RETURN	PROOT	39
40	END	PROOT	40

```

1  FUNCTION PROOT1(U)
   COMMON/REALG/AREAL, NHRPRT, BODYH, BODYD, PSONIC, PSONIC, P1INF, R1INF
   *, V1INF, NITAVG, NMR0UT
5  COMMON/WRKX02/AVR, BWR, CWR, DWR, UWR, YWR, VWR, PWR, RHOHR, WRC1, NEWR, NTL
   COMMON/WRKX02/AX, HX, TX, SX
   COMMON/CONRG/WRPO, WRRD, WRTD, WRCN, GASCON, WRHO, WRSO, WRRTO, WRGX
   UWR=U
   PWR=BWR-AHR*UWR
   IF (PWR.LE.0.0) GO TO 102
   RHOHR=AWR/UWR
   NURX=-2
   IF (NTAL.GT.400) NURX=2
   CALL FGAS(PWR, RHOHR, AX, HX, TX, SX, GASCON, WRGX, -1, NURX, 2)
99  PROOT1=WRC1-HX-UWR*UWR*0.5
   NTL=NTAL+100
   IF (NEWR.NE.1) GO TO 103
   AX=0.0
   NTL=100
   NEWR=0
103  CONTINUE
   IF (NEWR.EQ.2) GO TO 100
   IF (NHRPRT.EQ.0) RETURN
   IF (NHRPRT.NE.4) RETURN
   USQ=UWR*.5
   ENTHC=WRC1-USQ
   CALL FGAS(PWR, RHOHR, AX, HX, TX, SX, GASCON, WRGX, -1, 4, 2)
   NTXX=NTAL/100
   PZ=PWR/WIPO
   RHOZ=RHOHR/WRO
   HZ=HX/(TX*GASCON)
   TZ=TX/1.8
   IF (AWR.NE.0.0) LMI=BWR/AWR
   IF (UHI.NE.0.0) FFF=U/UHI
   WRITE (6,101) NTXX, PWR, RHOHR, U, WRC1, ENTHC, HX, PROOT1, PZ, AX, RHOZ,
101  ITZ, SZ, HZ, FFF
   FORMAT(CI1, 2HN=13, 1X, 2HP=1PE13.6, 1X, 2HR=1PE13.6, 1X, 2HU=1PE13.6, 1X,
16HH=CON=1PE13.6, 1X, 6HH=SQ=1PE13.6, 1X, 2HH=1PE13.6, 1X, 5HROOT=
21PE13.6 /1H, 4X, 5HP/PO=, 1PE11.4, 1X, 2HA=, 1PE11.4, 1X, 5HR/RO=, 1PE11.4
3, 1X, 2HT=, 1PE11.4, 1X, 4HS/R=, 1PE11.4, 1X, 5HH/RT=, 1PE11.4, 1X, 2HF=,
40FB8.4)
   RETURN
100  NEWP=0
   CALL FGAS(PWR, RHOHR, AX, HX, TX, SX, GASCON, WRGX, -1, 2, 2)
   RETURN
102  U=BWR/AWR
   RHOHR=BWR/U
   HX=0.0
   GO TO 99
50  END

```

```

PROOT1 2
AREAL 2
REALG 3
WRKX02 2
WRKX02 2
CONRG 7
PROOT1 8
PROOT1 9
PROOT1 10
PROOT1 11
PROOT1 12
PROOT1 13
PROOT1 14
PROOT1 15
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PROOT1 46
PROOT1 47
PROOT1 48
PROOT1 49
PROOT1 50

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1 SUBROUTINE ROCODE(P,RHO,U,NR)
  EXTERNAL PRGOT1
  COMMON/WRK00/AMR,BUR,CUR,DIR,UUR,VUR,WUR,PLP,RHOVR,WRCL,NEUR,NTAL
  COMMON/WRK01/K,J,NPHIWR,NTZWR,HRMACH,PKKFUN,WRZ
  COMMON/WRK02/AX,HX,IX,IXS
  COMMON/WRK03/WRPO,WRPO,WRPO,WRTO,WRCON,GASCON,WRHO,WRSO,WRAG,WRHTD,WRGX
  COMMON/REALG/REAL,NWRPRT,BODYH,BODY$,PSONIC,RSONIC,PLINF,RLINE
  * VLINE,NITAVG,NWRHOUT
  LOGICAL BOL,TRN,TRN1,TRN2,TRN3,TRM4,BOL1,APRXPFR
  LOGICAL LOTST,KTST,T11H,T12H,T21H,T22H,T3L
  DATA NTOT,NTOT1/O/
  DATA LHTSTL,LHTSTH/1HL,1HM/
  DATA I123/O/
  LOGICAL CODES FOR M>= 0
  TRN=.TRUE.
  TRN1=.FALSE.
  TRN2=.TRUE.
  TRN3=.TRUE.
  TRM4=.FALSE.
  BOL=.TRUE.
  BOL1=.FALSE.
  APRXPFR=.FALSE.
  APRXPFR=.TRUE.
  CON1=.0/(2.0*(1.0-PKKFUN))
  CON2=4.0*PKKFUN/CON1
  UPER=1.0
  JWR1=NTZWR/3
  JWR2=2*JWR1
  RPOD=0.35
  KWR=NPHIWR/2
  T11H=.FALSE.
  T12H=.FALSE.
  T21H=.FALSE.
  T22H=.FALSE.
  T3L=.FALSE.
  R11LO=.98
  R11HI=.999
  R12LO=.98
  R12HI=.999
  R21LO=.98
  R21HI=.999
  R22LO=.98
  R22HI=.999
  R3LO=.5
  R3HI=.6
  TRN=.TRUE.
  TRN3=.TRUE.
  TRM4=.TRUE.
  CONTINUE
  IF (M=APRXPFR) GO TO 300

```

```

2 ROCODE
3 ROCODE
4 WRK00
5 WRK01
6 WRK02
7 WRK03
8 CONFG
9 REALG
10 REALG
11 ROCODE
12 ROCODE
13 ROCODE
14 ROCODE
15 ROCODE
16 ROCODE
17 ROCODE
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57 ROCODE

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100

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60      TRN=.TRUE.
        TRN1=.FALSE.
        TRN2=.TRUE.
        KTST=.TRUE.
        IF (K.LE.KWR) KTST=.FALSE.
        IF (J.LT.JWR1) GO TO 80
        IF (J.GT.JWR2) GO TO 81
        JREG=0
        IF (KTST) GO TO 83
        FACTLO=R21LO
        FACTHI=R21HI
        GO TO 82
70      CONTINUE
        FACTLO=R22LO
        FACTHI=R22HI
        GO TO 82
80      JREG=-1
        IF (KTST) GO TO 84
        FACTLO=R1LO
        FACTHI=R1HI
        GO TO 82
84      CONTINUE
        FACTLO=R1LO
        FACTHI=R12HI
        GO TO 82
81      JREG=1
        FACTLO=R3LO
        FACTHI=R3HI
82      CONTINUE
        NEUR=1
101     CONTINUE
99      UL=FACTLO*UMI
        UR=FACTHI*UMI
97      CONTINUE
        CALL ZERGIN(UL,UM,1.0E-5,PROOT1,BOL,XX,YY)
        IF (CRO) GO TO 102
        IF (TRN2) GO TO 107
        IF (LO1ST.AND.JREG.EQ.-1) GO TO 111
        NP=1
504     NWRPT=NWRPRT
        IF (NREAL.EQ.-1) GO TO 103
        NWRPT=4
100     CALL ZERGIN(UL,UM,1.0E-5,PROOT1,BOL,XX,YY)
        WRITE (6,501) AWR,BWR,CWR,DWR,VWR,WR,BODYH,BODY$
        FORMAT(1H0,65PRINT TO CHECK FOR ROOTS OF PROOT1, THIS IS PRINTED
105     FROM RDCODE /1H,3X,2WR,1PE11.4,1X,2WR,1PE11.4,1Y,2WC,1PE11.4,
        21X,2HD,1PE11.4,3X,2HW,1PE11.4,1X,2HW,1PE11.4,1X,2HW,1PE11.4)
        33HHT,1PE11.4,1X,2HS,1PE11.4)
        DELTSP=0.01
        ULIST=0.0
500     CONTINUE
        ULIST=ULIST+DELTSP
        IF (ULIST.GE.1.0) GO TO 503
        XXX=PROOT1(ULIST#UHI)
        GO TO 500
503     CONTINUE
        WRITE (6,502)

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RDCODE 58
RDCODE 59
RDCODE 60
RDCODE 61
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RDCODE 111
RDCODE 112
RDCODE 113
RDCODE 114

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115 502 FORPAT(1HO,33HEND OF CHECK FOR ROOTS OF PROOT1.)
      NWRPT=NWRPT+1
      GO TO 103
111 RMD=RMED*.9
107 CONTINUE
      TRN2=.FALSE.
      UFAIL=UWR
      FACTLO=RMED
      FACTHI=O.999996
      IF (ABS(UMR-UL).LT.O.001*UL) GO TO 96
      LOTST=.FALSE.
      BFAIL=UH
      LHTSTX=LHTSTH
      GO TO 99
96      LOTST=.TRUE.
      BFAIL=UL
      LHTSTX=LHTSTL
      GO TO 99
102      U=UWR
      P=PWR
      RHO=RHOWR
      IF (AX.NE.O.O) GO TO 110
      U=CAX*(T)/2.O
      NWR=2
      XXX=PROOT1(U)
      P=PWR
      RHO=RHOWR
      IF (AX.EQ.O.O) GO TO 97
      AMACH=U/AX
      IF (AMACH.GE.1.O) GO TO 108
      NR=1
      GO TO 106
108      CONTINUE
      NR=O
      IF (K.NE.3) GO TO 109
      IF (J.NE.3) GO TO 109
      NTOT=O
      NTOT1=O
      CONTINUE
      NTOT=NTOT+NTAL
      NTOT1=NTOT1+1
      NITAVG=NTOT/NTOT1
      IF (TRN2) GO TO 91
      RESETS ITERATION BOUNDS
      JALG=-1
      O
      JWR1=LE(J).LT.JWR1
      JWR2=LT(J).LT.NTWR
      LOTST=.TRUE. ROOT HAS BELOW LOWER BOUND.
      .FALSE. ROOT HAS ABOVE UPPER BOUND.
      KTST=.TRUE. 3.LE.(K).LT.KWR
      .FALSE. KWR.LT.(K).LT.MPHWR
      T11H,T12H,T21H,T22H,T3L ARE LOGICAL VARIABLES THAT FACILITATE
      COLLAPSING THE UPPER ITERATION BOUNDS TO REASURABLE VALUES.
      EACH VARIABLE (SUCH AS T11H) IS SET ONLY ONCE. WHEN THIS
      OCCURS THE LOGICAL VARIABLES ARE CHANGED FROM .FALSE. TO .TRUE...
      DATA BCPDFY7O,0257
160 C
161 C
162 C
163 C
164 C
165 C
166 C
167 C
168 C
169 C
170 C
171 C

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RDCODE 115
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RDCODE 171

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175      PERC-U/WMI
        RATIOI=PERC
        RATIOH=PERC*1.01
        IF (RATIOH.GE.1.) RATIOH=0.99999
        IF (.JREG) 70,74,78
        CLOSE TO BODY - 1ST THIRD
        IF (CLOTST) GO TO 72
        IF (KTST) GO TO 71
180      R11HI=RATIOH
        IF (T21H) GO TO 65
        IF (T11H) GO TO 69
        GO TO 60
185      IF (R11HI.GT.R21LO) R21LO=(R11HI+2.*R21LO)/3.0
        GO TO 69
        R12HI=RATIOH
        IF (T22H) GO TO 67
        IF (T12H) GO TO 69
        GO TO 61
190      IF (R12HI.GT.R22LO) R22LO=(R12HI+2.*R22LO)/3.0
        GO TO 69
        IF (KTST) GO TO 73
        R11LO=RATIOI
        IF (T11H) GO TO 69
195      R11HI=RATIOI*(1.+BCPDFY)
        IF (R11HI.GE.1.) R11HI=.9999
        T11H=.TRUE.
        GO TO 69
        R12LO=RATIOI
        IF (T12H) GO TO 69
        R12HI=RATIOI*(1.+BCPDFY)
        IF (R12HI.GE.1.) R12HI=.9999
        T12H=.TRUE.
        GO TO 69
200      R21LO=RATIOI
        IF (T12H) GO TO 69
        R21HI=RATIOI*(1.+BCPDFY)
        IF (R21HI.GE.1.) R21HI=.9999
        T21H=.TRUE.
        GO TO 69
205      MIDWAY BETWEEN BODY AND SHOCK - 2ND THIRD
        IF (CLOTST) GO TO 76
        IF (KTST) GO TO 75
        R21HI=RATIOH
        IF (T21H) GO TO 66
        IF (T21H) GO TO 69
        GO TO 62
210      IF (R21HI.GT.R3LO) R3LO=(R21HI+2.*R3LO)/3.0
        GO TO 69
        R22HI=RATIOH
        IF (T22H) GO TO 69
        GO TO 63
215      IF (KTST) GO TO 77
        R21LO=RATIOI
        IF (T21H) GO TO 69
        R21HI=RATIOI*(1.+BCPDFY)
        IF (R21HI.GE.1.) R21HI=.9999
        T21H=.TRUE.
        GO TO 69
220      R22LO=RATIOI
        IF (T22H) GO TO 69
        R22HI=RATIOI*(1.+BCPDFY)
        IF (R22HI.GE.1.) R22HI=.9999
        T22H=.TRUE.
        GO TO 69
225      R3LO=RATIOI
        IF (T22H) GO TO 69
        R3HI=RATIOI*(1.+BCPDFY)
        IF (R3HI.GE.1.) R3HI=.9999
        T3H=.TRUE.
        GO TO 69
230

```

230	C	GO TO 69	RDCODE 229
	78	CLOSE TO SHOCK - LAST THIRD	RDCODE 230
		IF (LST) GO TO 79	RDCODE 231
		R3HI=RATIOH	RDCODE 232
235	64	IF (T3L) GO TO 69	RDCODE 233
		R3LO=RATIOH*(1.-BCMFY)	RDCODE 234
		T3L=.TRUE.	RDCODE 235
		GO TO 69	RDCODE 236
240	79	R3LO=RATIOH	RDCODE 237
	69	IF (.NOT.T3L) GO TO 64	RDCODE 238
	C	GO TO 106	RDCODE 239
	91	CONTINUE	RDCODE 240
		IF (N3UPRT.GE.1) GO TO 106	RDCODE 241
		RETURN	RDCODE 242
245	105	CONTINUE	RDCODE 243
		TRN=.FALSE.	RDCODE 244
		LA=1.OOY=AWR	RDCODE 245
		R3ED=UL/UHI	RDCODE 246
		IF (N3UPRT.GE.1) GO TO 103	RDCODE 247
		GO TO 97	RDCODE 248
250	106	CONTINUE	RDCODE 249
	C	TRN=.TRUE.	RDCODE 250
	103	----MONITOR PRINTING-----	RDCODE 251
		CONTINUE	RDCODE 252
255		IF (N3UPRT.EQ.0) GO TO 115	RDCODE 253
		USQ=UWR/BUR	RDCODE 254
		HTOT=HX,CUR*(YPPH)*0.5	RDCODE 255
		B=PW/RHCH/R3USQ	RDCODE 256
		A=RHCWR/BUR	RDCODE 257
260		IF (AWR.NE.O) A=(AWR-A)/AWR	RDCODE 258
		IF (BUR.NE.O) B=(BUR-B)/BUR	RDCODE 259
		HTOT=(BODYH-HTOT)/BODYH	RDCODE 260
		DATA CH,RCH/1.OE+6,6/	RDCODE 261
		A=RCH	RDCODE 262
		B=RCH	RDCODE 263
265		HTOT=HTOT*BCH	RDCODE 264
		IF (UHI.NE.O) PERC=UWR/UHI	RDCODE 265
		IF (TRN2.AND.(MOD(J,2).EQ.O)) GO TO 115	RDCODE 266
		NTR=HTAL/100	RDCODE 267
		AVGNX1=HTOT	RDCODE 268
270		AVGNX2=100*NTOT1	RDCODE 269
		IF (CVRX2.NE.O) AVGNIT=AVGNX1/AVGNX2	RDCODE 270
		WRITE (6,104) POL,NTR,PUR,RHCHR,UWR,AWRCH,UHI,PERC,AWR,A,B,HTOT,	RDCODE 271
		1NCH,J,K,AVGNIT	RDCODE 272
275	104	FORMAT (I4,5H,COD,11,12,2H,P,1PE11.4, 2H,R,1PE11.4, 2H,U,	RDCODE 273
		1PE11.4, 2H,M,OPF6.5, 4H,B/A,1PE11.4, 2H,F,OPF7.4	RDCODE 274
		2, 2H,A,1PE11.4, OPFS.2, OPFS.2,3H,HT,OPF8.3,1H,11, 2H,J	RDCODE 275
		3,12,2H,K,12,1X,OPF6.2)	RDCODE 276
		IF (TRN2) GO TO 120	RDCODE 277
		UFAIL=UFAIL/UHI	RDCODE 278
280		BEAIL=BEAIL/UHI	RDCODE 279
		WRITE (6,119) JREG,KTST,UFAIL,UMSTX,BFAIL,FACTLO,FACTHI,RI11.0,	RDCODE 280
		RI11H,RI2LO,RI2HI,RI21LO,RI21HI,RI22LO,RI22HI,RI3LO,RI3HI,11H,11Z,	RDCODE 281
		2T2H,13L,WRZ	RDCODE 282
119		FORMAT (I4,1H,12,11.1H),1X,3HUF=.F8.5,1X,1HB,RI,1H=.F8.5,1X,	RDCODE 283
		FORMAT (I4,1H,12,11.1H),1X,3HUF=.F8.5,1X,SHR11L=.F8.5,1X,SHR11H=.F8.5,1X,	RDCODE 284
285		13HBL=.F8.5,1X,3HBL=.F8.5,1X,SHR11L=.F8.5,1X,SHR11H=.F8.5,1X,SHR12L	RDCODE 285
		PCODE	RDCODE

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290      2=,F8.5,1X,SHR12H=,F8.5 /1H, 6X,SHR21L=,F8.5,1X,SHR21H=,F8.5,1X,
300      3SHR22L=,F8.5,1X,SHR22H=,F8.5,1X,4HR3L=,F8.5,1X,4HR3H=,F8.5,2X,5L1
120      4,1X,6H--- Z=,1PE11.4)
        CONTINUE
        IF (MNFRT.LE.1.AND.TRN2) GO TO 115
        IF (AMACH.LE.1.0) GO TO 113
        UFERH=UFER
        IF (APRPR) GO TO 116
        RATHU=CON2*WRC1/UH1**2
        IF (RATHU.GI.1.) RATHU=1.
        RADIC=SQRT(1.-RATHU)
        UFER=CON1*(1.+RADIC)
        CONTINUE
116      UFERH=2.0*CON1-UFERH
        ULMOD=10.
        UHMOD=.99*UJUR
        NTALS=NTAL
        MEMR=1
        CALL ZEROIN(ULMOD,UHMOD,1.0E-5,PROOT1,BOL1,XX,YY)
        SECRET=(XX+YY)/2.0
        IF (AX.NE.0.0) AMACH2=SECRET/AX
        F2HD=SECRET/UH1
        RPED=F2HD
        NTAL=NTALS
        ULX=UL/UH1
        UHY=UH/UH1
        WRITE (6,112) BOL1,UL,UH,ULX,UHY,AMACH2,SECRET,F2HD,UFERH,UFERH,
112      1TH4,TRN1,TRN2,TRN3,TRN4,APRXP
        FORMAT(1H ,5X,11.1X,8H(1T, B)=,2(IPE11.4,1X),2(OFF7.4,1X),4H,1P2=
315      10OFF7.4,1X,3H,2=IPE11.4,1X,3HF2=OFF7.4,2X,11H1<P.G.> FL=,0OFF7.4,1X,
        23HFH=OFF7.4,1X,611)
        IF (TRN1) RETURN
        IF (MNFRT.LE.2) GO TO 115
        SPGM=(CX**2)/THO/P
        SPK=(SPGM-1.0)/(2.0*SPCAM)
        SPC1=1./(2.0*(1.-SPK))
        SPC2=4.*SPK/SPC1
        SRADIC=PERC/SPC1-1.
        SRATHU=1.-SRADIC**2
325      WRITE (6,117) SPGM,CON1,SPC1,CON2,SPC2,RATHU,SRATHU,RADIC,SRADIC
        FORMAT(1H ,7X,7HGAM=SP=OFF7.3,4H,C1=,2(OFF9.4,1X),4H,C2=,
117      12(OFF9.4,1X),6H,H/KE=,2(IPE11.4,1X),6H,SQRT=,2(IPE11.4,1X))
        GO TO 115
        CONTINUE
113      WRITE (6,114) TRN,TRN1,TRN2,TRN3,TRN4,APRXP,BOL,BOL1
114      FORMAT(1X,8(11.1X))
115      CONTINUE
        IF (TRN1) RETURN
        IF (BOL.AND..NOT.TRN) GO TO 97
        IF (BOL.AND..NOT.TRN3) GO TO 302
        RETURN
        - - - - -
        C      ITERATION WHEN FLOW IS APPROX PERFECT.
        C      LOGICAL CODES FOR M<B.0
        C      TRN3=.TRUE.      STBD MODE
        C      =.FALSE.      (SAME AS TRN DEFINED ABOVE)
340      341
342

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345 C          TRNH=.TRUE.      STGO MODE
C          =.FALSE.          (SAME AS TRN2 DEFINED ABOVE)
300 RATHU=CON2*URC1/UHI**2
      SORTAR=1.-RATHU
      IF (SORTAR.GE.0.0) GO TO 308
309 WRITE (6,309) RATHU,SORTAR
      FORMAT(10,4)NEG. SQ. ROOT IN RDCCDE. ARG SET TO ZERO. RATHU=
1.1FE14 7.1X,10H(1-RATHU)=,1PE14,7)
      SORTAR=0.0
      CONTINUE
306 RADIC=SQRT(SORTAR)
      UPER=CON1*(1.+RADIC)
      UPE%=-UPER*UHI
      TRN3=.TRUE.
      TRN4=.TRUE.
      FACTLO=0.95
      FACTHI=1.01
      NEWAR=1
301 UL=FACTLO*UPERF
306 UH=FACTHI*UPERF
302 IF (UH.GT.UHI) UH=UHI*.999
      CALL ZURQIN(UL,UH,1.0E-5,PROOT1,BOL,XX,YY)
365 IF (BOL) GO TO 303
      IF (TRNH) GO TO 305
      NR=1
      GO TO 304
370 U=UWR
      P=PW
      RHO=RHOHR
      IF (CAX.NE.0.0) GO TO 307
      U=(XX*YY)/Z.O
      XXX=PROOT1(U)
      P=PW
      RHO=RHOHR
307 AMCH=U/RX
      IF (AMCH.GE.1.0) GO TO 108
      IF (TRN3) GO TO 304
      NR=1
      GO TO 106
304 CONTINUE
      TRN3=.FALSE.
      LR=1.001*U
      GO TO 302
385 IF (NMPRT.GE.2) GO TO 103
      CONTINUE
      TRNH=.FALSE.
      UL=O.S*UPERF
      UH=UHI*.999
      GO TO 302
390 END
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RDCCDE 388
RDCCDE 389
RDCCDE 390
RDCCDE 391
RDCCDE 392

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60      C***      CARD READ PROCEDURE BEG.
        READ ( 5,2012) WTMIX,(C(N),N=1,7)
        FORMAT(S(IPE15,7))
        2012
        2013      (MDZ(N),N=1,89)
        FORMAT(12I6)
        65      READ ( 5,2012) (TZ(N),N=1,NJM)
        CARD READ PROCEDURE END.
        GO TO 56
        55      CONTINUE
        56      READ ( 5) WTMIX,(C(N),N=1,7),(NDZ(N),N=1,89),(TZ(N),N=1,2563)
        CONTINUE
        C
        70      C
        DO 120 N=1,89
        120      NDZ(N)=5*NDZ(N)
        CONC=WTMIX/28.966
        CONC(AIR)=28.858566/28.966-.9962910
        75      C
        C
        PO=(ATH.) 2116. LB PER FT**2
        PO=2116.
        C
        RO=STED DENSITY=2.478E-3 SLUGS/FT**3
        RO=.002478*CONC
        80      C***
        SP. GAS CONSTANT= 1716 FT-LB PER SLUG DEG. RANKIN= (FT/SEC)**2
        RRR=1716./CONC
        RRR=RRR
        C
        493.635 APPROX. STD TEMP (491.69 DEG. R OR 273.16 DEG. K)
        ATO=RRR*493.635
        85      C
        SOPORO=SQRT (RO/PO)
        B=TZ(N)*2)
        D=12(NJM)
        FM=2.1632+.3468*CONC
        AR=D*FM
        BB=E*FM+1.
        CCC=B*FM
        P=ALOG10(P/PO)
        90      9
        11      IF (NJM=5) 40,31,4
        C***      (NUM.EQ.5) DEPENDENT VARIABLES ARE PRESSURE AND ENTROPY
        95      31      REAL=5/RIR
        GG=(REAL-C(1)-C(2)*P)/(C(3)+P*(C(4)+P*(C(5))))
        110      AL=P-B
        CC=CCC-P
        RH=CC*(1.+AR*CC/(RB*BB))/BB+.005
        IF(RH>7.)183,185,185
        183      9H=-7
        185      IF(R-RH) 180,181,181
        180      R=RH
        184      AL=3.
        105      181      IF(C3.-RL) 184,186,186
        186      IF(RL-R) 182,163,163
        182      R=RL
        163      NJM=0
        NJM=0
        110      35      NJM=5
        NJM=5
        NJM=9-NJM
        NJM=NJM
        GO TO 42
    
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 RGAS 113

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115 C*** (1,GE,MM,LE,4) DEPENDENT VARIABLES ARE PRESSURE AND DENSITY
    R=ALOG10(R/RO)
    NUPH=5
    NDOT=1
    NUP=NCM
    IF (NUPR.EQ.1) NDOT=2
    CONTINUE
120 IF(R) 12,12,13
    12 NR=R-1
    IF(NR*7) 16,16,15
    16 NR=-7
    GO TO 15
    13 NR=R
    IF(NR-3) 15,14,14
    14 NA=2
    15 OX=R-FLOAT (NR)
    NR=NI*8
    F=(P-R-B)/(1.+R*(E*DR))
    IF(NUMH-9*NUM) 22,162,22
    162 IF(F-.00001) 27,161,161
    161 IF(FH-F) 44,22,22
    22 DO 17 N1=NDOT,NUP
    36 NER1=NI
    NER2=NI+4
    NL=NDU(N1,NR)
    IF(NLL(NER1)-NL) 301,302,301
    302 J=JXX(NER1)
    DIFF2=F-TH(S,J)
    308 IF(DZ(NH1)-RBS (DIFF2)) 301,301,303
    301 NU=NDU(N1,NR)
    CALL SEARCH(F,TH,NL,NU,S,J,NER)
    J=J/5
    DZ(NER1)=RBS (TH(S,J+1)-TH(S,J))
    JX(NER1)=J
    NLL(NER1)=NL
    303 XYZ=XYZ
    NL=NL+(N1,NR+1)
    IF(NLL(NER2)-NL) 305,306,305
    306 K=JXY(NER2)
    DIFF2=F-TH(S,K)
    309 IF(DZ(NER2)-RBS(DIFF2)) 305,305,307
    305 NU=NDU(N1,NR+1)
    CALL SEARCH(F,TH,NL,NU,S,K,NER)
    K=K/5
    100 PI=PI
    DZ(NER2)=RBS (TH(S,K+1)-TH(S,K))
    JX(NER2)=K
    NLL(NER2)=NL
    165 Y1=TH(1,J)+F*(TH(2,J)+F*(TH(3,J)+F*TH(4,J)))
    128 Y2=TH(1,K)+F*(TH(2,K)+F*(TH(3,K)+F*TH(4,K)))
    ANCH1=Y1-DX*(Y2-Y1)
    GO TO 17
    170 AN(N1)=REAL
    81 AN(N1)=REAL
    17 CONTINUE

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RGAS 114
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175      51      IF (NUM/R.EQ.1) GO TO 18
176      52      IF (NUM-S) 51,52,4
177      53      GO TO (121,122,123,124,124),NUM
178      54      IF (NUM.LE.5) SX=AN(4)*RAR
179      55      TX= AI(3)*1.8
180      56      HX=AN(2)*RTO
181      57      RX=AN(1)/SQPORO
182      58      RETURN
183      59      HX=AN(2)*RTO
184      60      RETURN
185      61      IF (NUM-9+NUM) 39,108,39
186      62      RX=RO*10.*PR
187      63      GO TO 51
188      64      DIFF=H5 ((REAL-AN(NUP))/REAL)
189      65      IF (DIFF-.0001) 37,37,36
190      66      NUMP=9-NUM
191      67      NBP=1
192      68      NLP=4
193      69      GO TO 42
194      70      NUMB=NLB+1
195      71      NIMX=NIMX+1
196      72      IF (NIMX-20) 43,43,44
197      73      IF (NLB-2) 82,83,84
198      74      IF (REAL-AN(NUP)) 85,37,86
199      85      R1=R
200      86      S1=AN(NUP)
201      87      R=R+.3
202      88      IF (RL-R)150,99,99
203      89      R=RL
204      90      R2=R
205      91      L=0
206      92      GO TO 42
207      93      R2=R
208      94      S2=AN(NUP)
209      95      R=R-.3
210      96      IF (R-RH)142,102,102
211      97      R=RH
212      98      R1=R
213      99      L=1
214      100      GO TO 42
215      101      IF (L) 91,90,91
216      102      S2=AN(NUP)
217      103      R=R2-(S2-REAL)/(S2-S1)*(R2-R1)
218      104      IF (RL-R) 187,93,93
219      105      R=RL
220      106      GO TO 93
221      107      S1=AN(NUP)
222      108      R=(REAL-S1)/(S2-S1)*(R2-R1)+R1
223      109      IF (R-RH) 188,93,93
224      110      R=RH
225      111      IF (R2-R) 104,37,105
226      112      NUMB=1
227      113      R1=R2
228      114      S1=S2
229      115      L=0
230      116      IF (R2+.3-RL) 210,211,211
231      117      R2=RL

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230      R=R2
      GO TO 42
      R2=R2+.3
      R=R2
      GO TO 42
      IF(R-R1) 106,37,42
      NUB=1
      R2=R1
      S2=51
      L=1
      IF(RH-R1+.3) 212,213,213
      R=R1
      R=R1
      GO TO 42
      R1=R1-.3
      R=R1
      GO TO 42
      IF(REAL-RNCNUP) 87,87,88
      R1=R
      GO TO 91
      R2=R
      GO TO 90
      IF(E-.000001) 27,444,444
      NTIMES=NTIMES+1
      WRITE(6,190)
      FORMAT(1H0,10X,36HOUTSIDE TABLES IN RGAS ENTERING WITH)
      WRITE(6,191) PX
      FORMAT(11X,2HP,-.E13.6)
      IF(NUM=5) 192,193,193
      WRITE(6,194) RX
      FORMAT(11X,2HP,-E14.6)
      GO TO 196
      WRITE(6,195) SX
      FORMAT(11X,2HP,-.E13.6)
      IF (NTIMES-10) 199,197,197
      WRITE(6,198)
      FORMAT(20X,2BHEXIT CALLED ON TENTH FAILURE)
      GO TO 25
      RETURN
      C***
      L=0
      IF(GTEST-GX) 64,441,64
      GTEST=GX
      L1=2
      ANR(1)=RRX
      ANR(1)=GAS CONSTANT
      ANR(2)=GX
      ANR(2)=ENTROPIC EXPONENT
      ANR(3)=ANR(1)/(ANR(2)-1.)
      ANR(3)=DIMENSIONLESS SPECIFIC HEAT (CONST. DENSITY)
      ANR(4)=ANR(1)+ANR(3)
      ANR(4)=DIMENSIONLESS SPECIFIC HEAT (CONST. PRESSURE)
      ANR(8)=4508.609-ANR(3)*ALPG(171.6/.0001)*ANR(2)
      ANR(8)=REFERENCE ENTROPY
      ANR(L+5)=1./ANR(L+2)
      ANR(L+6)=ANR(L+4)/ANR(L+1)
      ANR(L+7)=ANR(L+6)/ANR(L+2)
231  RGAS
229  RGAS
230  RGAS
231  RGAS
232  RGAS
233  RGAS
234  RGAS
235  RGAS
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282  RGAS
283  RGAS
284  RGAS

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441 290 441 GO TO (440,440,440,440,440,69,70,71,72),NUM
440 QUOD=P/R**ANR(L+2)
68 S=ANR(L+8)+ANR(L+3)*ALOG(QUOD)
67 T=QUOT/ANR(L+1)
66 H=QUOT*ANR(L+6)
65 LL=L+1
295 A=SQRT (ANR(LL )*QUOT)
69 GO TO 30
EX=5-ANR(L+8)
EX=EXP (EX/ANR(L+3))
R=(P/EX)**ANR(L+5)
QUOD=P/R**ANR(L+2)
QUOT=P/R
300 GO TO 67
A=P/(T*ANR(L+1))
QUOD=P/R**ANR(L+2)
QUOT=P/R
305 S=ANR(L+8)+ANR(L+3)*ALOG(QUOD)
GO TO 66
71 ASSIGN 65 TO NJUMP
73 T=H/ANR(L+4)
R=P/(T*ANR(L+1))
QUOD=P/R**ANR(L+2)
QUOT=P/R
310 S=ANR(L+8)+ANR(L+3)*ALOG(QUOD)
GO TO NJUMP,(65,30)
72 ASSIGN 30 TO NJUMP
H=ANR(L+7)*I**2
GO TO 73
30 AX=R
HX=H
TX= T
IF (NUM.NE.S) SX=S
IF (NUM.EQ.S) RX=R
RETURN
320 C*** F L.T. (1.0E-6)
27 L=8
P=PX
A=RX
IF(GTESTR-GX) 24,441,24
24 GTESTF=GX
L1=9
Z2=RO/10.**7
PR=-7.+8
PR=PO*10.**PR
Z1=PR
00 21 N1=1,4
NL=MOL(N1,1)
NU=NDU(N1,1)
F=0.
CALL SEARCHF,TH,NL,NU,5,J,NER)
J=J/5
21 BN(N1)=TH(1,J)
BN(1)=BH(1)/SQPORO
BN(2)=BH(2)/RTO

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RGAS 285
 RGAS 286
 RGAS 287
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 RGAS 339
 RGAS 340
 RGAS 341

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345  BN(3)=BN(3)*1.8
      BN(4)=BN(4)*RRR
      ANR(9)=PR/Z2 *BN(3)
      RIX=ANR(9)
      ANR(12)=BN(2)/BN (3)
      ANR(10)=1.+ANR(9)/(ANR(12)-ANR(9))
      ANR(11)=ANR(12)/ANR(10)
      ANR(17)=BN(1)*BN(1)*Z2/Z1
      ANR(16)=BN(4)-ANR(11)*ALOG(Z1/Z2)*ANR(10)
      GO TO 26
      END
      RGAS 342
      RGAS 343
      RGAS 344
      RGAS 345
      RGAS 346
      RGAS 347
      RGAS 348
      RGAS 349
      RGAS 350
      RGAS 351
      RGAS 352

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```

1      FUNCTION RHOFN(P,HT,QSQ)
COMMON/CONRG/PO,RO,TO,CONC,GASCON,HO,SO,AO,RTO,GX
COMMON/WPDKO3/PIT,HTOT,QSG2
EXTERNAL RHOOT
LOGICAL BOL
RL=1.OE-7*RO
RH=1.OE+3*RO
PIT=P
HTOT=HT
QSQ=QSQ/2.
CALL ZEROIN(RL,RH,1.OE-5,RHOOT,BOL,XX,YY)
RHOFN=(XX*YY)/2.0
IF (BOL) GO TO 102
WRITE (6,101) XX,YY,RHOFN
FORMAT(1HO,22#ERROR RETURN IN RHOFN ,3(1PE13.5))
RETURN
END
101
102

```

```

2      RHOFN
3      CORRGI
4      WRDKO3
5      RHOFN
6      RHOFN
7      RHOFN
8      RHOFN
9      RHOFN
10     RHOFN
11     RHOFN
12     RHOFN
13     RHOFN
14     RHOFN
15     RHOFN
16     RHOFN
17     RHOFN
18     RHOFN

```

```

1      FUNCTION ROOT(RHO)
      COMMON/CONRG/PD,RO,TO,CONC,GASCON,HO,SO,AD,RTD,GX
      COMMON/WRKX/03/PIT,HTOT,QSQ2
      CALL RGAS(PIT,RHO,AX,HX,TX,SX,GASCON,GX,-1,-1.2)
      FUN=1.0-(HX+QSQ2)/HTOT
      AROOT=FUN
      RETURN
      END
5
      RROOT 2
      CONRG1 2
      WRKX03 2
      AROOT 5
      RROOT 6
      RROOT 7
      RROOT 8
      RROOT 9

```

```

1 SUBROUTINE ASHOCK(P1,R1,U1,A1,H1,T1,S1,P2,R2,U2,R2,H2,T2,S2)
COMMON/CONRG/PO,RO,TO,CONHC,GRASCON,HO,SO,PO,RTIO,GX
COMMON/PEALG/PEALG,RLAL,RMRPR1,BOGTH,BODYS,P,SONIC,ISONIC,P1INF,R1T,HF
* VLINE ,NITRYG,NAROUT
5 DIMENSION NX(30),XPMIN(30),XP2(30),XPMAX(30)
DATA NTOT/30/
DATA I123/0/
DATA PIX,R1X/0.0./
10 IF (I123.EQ.123) GO TO 99
RAX=GRASCON
TEST=5.0E-5
99 CONTINUE
UIX=U1
PIX=P1
R1X=R1
CALL GRAS(PIX,R1X,A1,H1X,T1,S1,RRX,GX,-1,4,2)
H1=H1X
98 CONTINUE
UI2=U1*U1
H1T0T=H1X*0.5*UI2
110 C1=U1*R1
C2=P1*U1*C1
C3=H1T0T
C15=C1*C1
C4= S*C2*C2/C15-C3
C5=C2/C15
C6=.9/C15
N=1
30 IF (NMRPR1.LE.2) GO TO 108
DO 109 KZ=1,30
NX(KZ)=0
XPMIN(KZ)=0.0
XP2(KZ)=0.0
109 XPMAX(KZ)=0.0
108 CONTINUE
EMIN=U1/R1
IF (EMIN.GT.7.) GO TO 1091
40 W1=3.
W2=4.
GO TO 1092
1091 CONTINUE
W1=2.
45 W1=3.
1092 CONTINUE
PSTR=(GX+1.0)/((GX-1.0)+2.0/(EMIN*EMIN))
PMIN=P1+(C2-P1)*PSTR-1./PSTR
PF5X=C2
50 CONTINUE
P2=(H1*PMIN+PMAX)/W2
IF (NMRPR1.LE.2) GO TO 1111
IF (N.GE.NTOT) GO TO 1111
NX(N)=N
N=LAST-N
XPMIN(N)=PMIN
XP2(N)=P2
55 ASHOCK
CONTIG1 2
ALALG 2
REALG 3
ASHOCK 5
ASHOCK 6
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ASHOCK 57

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60      XPMAX(N)=PPAX
        CONTINUE
        PMAX1=PPAX/PMIN
        DELT1=PPAX1-1.0
        R=C15/(C2-P2)
        IF (N<4FAT.GT.2) WRITE (6,122) P2,R,PMAX,PMIN,C1,C2,C3
122     FORMAT(1H,12H#RSHOCK- P2=,1PE12.5,1X,2H#R,1PE12.5,1X,5HPMAX=1PE12.
        *5,
        21X,5HPMIN=1PE12.5,1X,3HCH=1PE11.4,1X,3HCP=1PE11.4,1X,3HCH=1PE11.4)
        CALL RGAS(P2,R,A2,H2,T2,S2,GASCON,GA,-1,4,2)
        DELTA=C4+P2*(P2*C6-C5)*H2
        IF (DELTA) 113,116,114
113     PPOX=P2
        GO TO 115
114     PRIN=P2
        M1=1
        M2=2
115     CONTINUE
        N=N+1
        IF (N.GT.500) GO TO 120
        IF (ABS(DELTA).GT.1.E-6) GO TO 111
        R2=C15/(C2-P2)
        U2=C1/P2
        IF (N=PART.E2.0) RETURN
        IF (N=PART.LE.2) RETURN
        K3=0
101     CONTINUE
        K1=K3+1
        K2=K1+2
102     WRITE (6,100) (NXX(KX),XPMIN(KX),XP2(KX),XPPMAX(KX),KX-K1,K3)
        IF (K3.GE.NLAST) GO TO 103
100     FORMAT(1H,2(2X,12,1X,1PE12.5,1X,1PE12.5,1X,1PE12.5))
        GO TO 101
103     CONTINUE
        RETURN
120     WRITE (6,121)
121     FORMAT(1H,21H#ERROR IN NORMAL SHOCK)
        RETURN
        ENDO
95

```

```

1 SUBROUTINE RUITLD(P2X,R2X,U1X)
  COM=KN/CONIG/PO,RO,TO,CGNC,GASCON,HO,SO,RO,RTO,GX
  COMMON/REALG/REAL,NMRPAT,BODYH,BOOYS,PSGNC,RSONIC,P1INF,R1INF
  *V1NF,NITVNG,MROUT
  DIMENSION P2I(350),R2I(350),U1I(350)
  DATA MROUT/350/
  DATA U1,DN,UP,D,DND/4HC(1)-,4HC(2)-,4HC(1)D,4HC(2)D/
  DATA P1,R1/O,0,0,0/
  IF (P1.EQ.P1INF.RND.R1.EQ.R1INF) GO TO 110
  RMX=GASCON
  AFACIHA=10
  CONTINUE
101 IF (NMRPAT.NE.O) WRITE (6,102)
  FORMAT(1H1,2SHUPHML,SHOCK CONDITIONS /1H0,1X,1HP,1HX,3HRHO,12X,
15 1HX,12X,3ASOUND,10X,4HEMTN,11X,4NTEFP,11X,5HEMTR0)
  P1=PIINF
  R1=R1INF
  CALL AGAS(P1,R1,HA,T1,S1,RRX,GX,-1.4,2)
  NH=1
  U1=U1
  N=1
103 CALL RSHOCK(P1,R1,U1,HA,T1,S1,P2,R2,U2,R2,T2,S2)
  U1I(N)=U1
  P2I(N)=P2
  R2I(N)=R2
  NTO=N
  U1Y=U1/A1
  IF (NMRPAT.EQ.O) GO TO 107
  IF (N.NE.1) GO TO 106
  P1Y=P1/PO
  R1Y=R1/RO
  T1Y=T1/1.0
  S1Y=S1/GASCON
  CP1=R1/RI
  CP1=P1/U1*CM1
  CH1=HA*U1*U1#O.5
  WRITE (6,104)CH1,CP1,CH1
  FOR=INT(1H0,11X,19HUPSTREAM CONDITIONS,2X,4HCMI-1PE13.6,1X,4HCPI=
40 1PE13.6,1X,4HCMI-1PE13.6)
  NZ=N+1
  WRITE (6,104)NZ,UP,P1Y,R1Y,U1Y,A1,M1Y,T1Y,S1Y
  WRITE (6,104)NZ,UP,D,P1,RI,U1,HA,T1,S1
  CONTINUE
106 U1Y=U1/A1
  CP1=R1/RI
  CP1=P1/U1*CM1
  CH1=HA*U1*U1#O.5
  WRITE (6,1043) U1,U1Y,CH1,CP1,CH1
1043 FORMAT(1H0,13HUPSTREAM VEL=,1PE15.7,1X,5MHCH=OFF9.5,10X,4HCMI=
  P2Y=R2/RO
  R2Y=R2/HO
  U2Y=U2/A2
  H2Y=R2/ATO
  T2Y=T2/1.0

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RUITLD 2
COMRG1 2
REALG 2
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114 RUITLD

S2Y=S2/GASCON
CM2=R2*U2
CP2=P2*U2*CM2
CH2=H2*U2*CU2*O.5
IF (N.LE.1) GO TO 104S
DP2=P2*(N)-P2*(N-1)
DP2X=ALOG(DP2(N))-ALOG(DP2(N-1))
IF (DP2.EQ.O) GO TO 104S
DR2CP2=(R2*(N)-R2*(N-1))/DP2
DU1DP2=(U1*(N)-U1*(N-1))/DP2
IF (DPEX.EQ.O) GO TO 104S
DR2OLN=DP2*DU1DP2/DP2X
DU1OLN=DP2*DU1DP2/DP2X
CONTINUE
WRITE (6,104) R,DN,P2,R2Y,U2Y,R2,M2Y,T2Y,S2Y
WRITE (6,104) N,DND,P2,R2,U2,M2,T2,S2
IF (N.LE.1) WRITE (6,1042)
IF (N.GT.1) WRITE (6,1044) DR2CP2,DU1DP2,DR2OLN,DU1OLN
*
1041 FORMAT(1H .11X,21H00M5TREAM CONDITIONS,21X,4HCP2=1PE13.6,1X,4HCP2
1PE13.6,1X,4HCH2=1PE13.6)
1042 FORMAT(1HC)
1044 FORMAT(1HO,13X,6HORZ/DP2=,1PE12.5,2X,8HDUI/DP2=,1PE12.5,3X,
11HCH2/DLNP2=,1PE12.5,2X,10HDUI/DLNP2=,1PE12.5)
104 FORMAT (1H .14,2X,RH,1X,7(1PE15.7))
CONTINUE
IF (U1Y.GT.AMACHH) GO TO 105
N=N+1
U1-U1Y*AI*1.02
GO TO 103
C
105 CONTINUE
IF (NMRPRT.LT.2) GO TO 110
WRITE (6,120) (NNN,P2*(NNN),R2T(NNN),U1T(NNN),NNN=NH,NTOT)
NH=NTOT+1
FORMAT(1H .13,1PE12.5,1X,1PE12.5,1X,1PE12.5)
CONTINUE
IF (PEX.GT.P2*(NTOT)) GO TO 112
ARG=P2X
CALL SEARCH(ARG,P2T,1,NTOT,1,NX,HERR)
PL=P2T(NX)
PH=P2T(NX+1)
FACT1=(ARG-PL)/(PH-PL)
RL=R2T(NX)
RH=P2T(NX+1)
RM=RL+FACT1*(RH-RL)
UL=U1T(NX)
UH=U1T(NX+1)
UM=UL+FACT1*(UH-UL)
R2X=RH
U1X=UH
IF (NMRPRT.EQ.O) RETURN
WRITE (6,118) FACT1,PL,ARG,PH,RL,RH,UL,UH
FORMAT (1H .11H#RUITLD- F=,OPF7.4,1X,3H,P=,3(1PE10.3,1X),3H,R=,
13(1PE10.3,1X),3H,U=,3(1PE10.3,1X))
RETURN

```

SUBROUTINE	RUITLD	76/76	OPT=1	FTN 4.6+460	06/15/79	18.58.36	PAGE	3
115								
	112	AMACHH-AMACHH*1.5						
	117	WRITE (6,117) P2X,P2T(NTOT),R2T(NTOT),UIT(NTOT)						
		FORMAT(1H0,25HARRY IN RUITLD EXPANDED. 3H#2-1PE13.6,1X,6H#2(N)-						
		11PE13.6,1X,6HR2(N)-1PE13.6,1X,6HUI(N)-1PE13.6)						
		GO TO 107						
	114	WRITE (6,115)						
120	115	FORMAT(1H0,48HEXITED. ARRY STORAGE IS INSUFFICIENT IN RUITLD.)						
		IF (P2X.GT.P2T(NTOT)) STOP						
		GO TO 110						
		END						
					RUITLD	115		
					RUITLD	116		
					RUITLD	117		
					RUITLD	118		
					RUITLD	119		
					RUITLD	120		
					RUITLD	121		
					RUITLD	122		
					RUITLD	123		
					RUITLD	124		

```

1  SUBROUTINE SERCH(X,Q,NL,NU,NS,NOUT,NERR)
   DIMENSION Q(1)
   IF (Q(NU)-Q(NL)) 30,40,40
   C  SET MONOTONIC DECREASING
   30  NTRN=-1
   IF (X.LT.Q(NU)) GO TO 69
   IF (X.GT.Q(NL)) GO TO 68
   GO TO 50
   C  X IS NOT WITHIN DESIGNATED BOUNDS.
   68  NOUT=N1
   NERR=-1
   GO TO 70
   69  NOUT=NU
   NERR=1
   70  RETURN
   C  SET MONOTONIC INCREASING
   40  NTRN=1
   IF (X.LT.Q(NL)) GO TO 68
   IF (X.GT.Q(NU)) GO TO 69
   NERR=0
   50  MI=NL
   MI=NL+((NU-NL)/NS)*NS
   IF (NTRN) 130,60,60
   60  IO=(MI-MI)/NS
   IF (IO.LE.1) GO TO 120
   MI=MI+NS*(IO/2)
   IF (Q(MI)-X) 100,90,110
   90  NOUT=MI
   RETURN
   100 MI=MI
   GO TO 60
   110 MI=MI
   GO TO 60
   120 NOUT=MI
   RETURN
   130 IO=(MI-MI)/NS
   IF (IO.LE.1) GO TO 120
   MI=MI+NS*(IO/2)
   IF (Q(MI)-X) 160,90,150
   140 MI=MI
   GO TO 130
   150 MI=MI
   GO TO 130
   160 MI=MI
   GO TO 130
   END

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SERCH 2
 SERCH 3
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 SERCH 45


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60      DO 59 K=1,NPHM2
        GO TO (66,67,68,69),N
        P(J+2,K+2)=PPB(K,J)
        GO TO 59
        .
67      UC(J+2,K+2)=PPB(K,J)
        GO TO 59
68      V(J+2,K+2)=PPB(K,J)
        GO TO 59
69      W(J+2,K+2)=PPB(K,J)
        GO TO 59
59      CONTINUE
65      WRITE(6,100) NIT,NITT,RJ,RJT
        NIT=HITI
        NIT2=NIT+4
        RJ=RJT
        IF (NREAL,EQ,-1) GO TO 31
        DO 70 J=3,NT2
        DO 70 K=3,NPHI
        RHG(J,K)=P(J,K)/(1.0-U(J,K)**2-V(J,K)**2-W(J,K)**2)
        GO TO 54
31      CONTINUE
        DO 32 J=3,NT2
        DO 32 K=3,NPHI
        QSA=UC(J,K)**2+V(J,K)**2+W(J,K)**2
        RHG(J,K)=RHGFN(P(J,K),BODYH,QSQ)
32      CONTINUE
34      IF(NPHIT,EQ,NPHI,AND,RT,EQ,RK,AND,PHIFDT,EQ,PHIFD) GO TO 56
85      C.....RESPACE IN PERIDINOL DIRECTION
        NX=NT2+2
        MX=NPHM2
        NC1=NT2+2
        MC1=NIPHIT+1
        IF(RKT,EQ,0.0) GO TO 85
        Y0=0.5/ARKT*ALOG(1.0+(EXP(RKT)-1.0)*PHIFDT/180.0)/
        * (1.0-C1.0*EXP(-RKT))*PHIFDT/180.0)
        Y01=51NH(RKT*Y0)
        CONTINUE
        DO 55 K=3,NPHI
        PB(NX-1,K-2)=RSPHI(K)
        PB(NX-2,K-2)=RSZ(K)
        PB(NX-3,K-2)=RS(K)
        IF(RKT,GT,0.0) GO TO 86
        PB(NX,K-2)=PHIP(K)
        GO TO 55
        .
86      Y02=CPHIP(K)/PHIFDT*RAID1-1.0)*Y01
        PB(NX,K-2)=(Y0+1.0/ARKT*ALOG(Y02+SQRT(Y02**2+1.0)))*PI
        CONTINUE
55      DO 61 N=1,4
        DO 60 J=3,NT2
        DO 60 K=3,NPHI
        GO TO (71,72,73,74),N
        PB(J-2,K-2)=P(J,K)
        GO TO 60
        .
72      PB(J-2,K-2)=UC(J,K)
        GO TO 60
73      PB(J-2,K-2)=V(J,K)

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SETSPC 41
SETSPC 42
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115      GO TO 60
116      PB(J+2,K+2)=W(J,K)
117      CONTINUE
118      CALL ESPACE(PB,45,MX,NC1,MC1,PPB)
119      NT2=NT2-1
120      DO 75 J=1,NT2
121      DO 75 K=1,MC1
122      GO TO (76,77,78,79),M
123      P(J+2,K+2)=PPB(J,K)
124      IF (P(J+2,K+2).LE..0) WRITE (6,115) J,K,P(J+2,K+2)
125      IF (P(J+2,K+2).LE. 0.0)P(J+2,K+2)=PING*(1.-GAMMA*O.5)
126      GO TO 75
127      U(J+2,K+2)=PPB(J,K)
128      GO TO 75
129      V(J+2,K+2)=PPB(J,K)
130      GO TO 75
131      W(J+2,K+2)=PPB(J,K)
132      CONTINUE
133      CONTINUE
134      WRITE(6,101) NIPHI,NIPHIT,RE,AKT,PHIFD,PHIFDT
135      NIPHI=NIPHIT
136      NPHI=NIPHIT*3
137      RK=AKT
138      PHIFD=PHIFDT
139      IF (NREAL.EQ.-1)GO TO 33
140      DO 80 J=3,NT2
141      DO 80 K=3,NPHI
142      RHO(J,K)=P(J,K)/(1.0-U(J,K)**2-V(J,K)**2-W(J,K)**2)
143      GO TO 83
144      CONTINUE
145      DO 84 J=3,NT2
146      DO 84 K=3,NPHI
147      Q52=U(J,K)**2+V(J,K)**2+W(J,K)**2
148      Q52=U(J,K)**2+V(J,K)**2+Q52
149      RHO(J,K)=RHO*P(J,K),800*Q52
150      CONTINUE
151      CONTINUE
152      DO 82 K=1,MC1
153      R5(K+2)=PPB(NX-3,K)
154      R5(K+2)=PPB(NX-2,K)
155      R5(K+2)=PPB(NX-1,K)
156      CONTINUE
157      ICONST(48)=1
158      CALL INITA
159      CALL RDRY(2)
160      FORMAT(10,4HJ-2=.12,3X,4HJ-2=.12,3X,7HP(J,K)=,E15.6)
161      * 3H TO,13,2HOR,1X,37HRADIAL SPACING PARAMETER CHANGED FROM,FS,2.
162      * 3H TO,FS,2)
163      * 3H TO,13,3H OR,1X,49NUMBER OF POINTS IN RADIAL DIRECTION CHANGED FROM,13
164      * 3H TO,13,3H OR,1X,49NUMBER OF POINTS IN RADIAL DIRECTION CHANGED FROM,13
165      * 3H TO,13,3H OR,1X,49NUMBER OF POINTS IN RADIAL DIRECTION CHANGED FROM,13
166      * 3H TO,FS,2,3H OR,1X,29CLUSTERING POINT CHANGED FROM,FS,1,3H TO
167      * 3H TO,FS,2)
168      * F6.1,8H DEGREES)
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SUBROUTINE SETSPC 76/76 OPT-1 FTN 4.6*160 06/15/79 18.58.36 PAGE 4
END SETSPC 155

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1 SUBROUTINE SHOCK(K4)
  LEVEL=2,ETEP=10,FO,GO,HO
  COMMON/LPAGE/ETEP(4,24,41),EC(4,24,41),
  * FOC(4,24,41),GOC(4,24,41),MOC(4,24,41)
5 COMMON /PVARS/RHC(24,41),P(24,41),U(24,41),V(24,41),W(24,4
  * R1),
  * R0BZ(41),VINF(41),VINF(41),WINF(41),
  * R0BPH(41),R0(41),R0Z(41),R0Z(41),R0Z(41),
  * DTPHC(24,41),BCT(41),DTGZ(24,41),DILR(41),ACT(41),
  * ICONST(50),GANC(20),CONST(50),HAPIC(4),PS(41),
  * R5Z(41),RPHI(41),RST(41),RST(41),RST(41),RSPHIT(41),
  * COMMON /IDVARS/AL,ETA(41),PHIP(41),DTIL(41),DTILE(41),DETA,TP(24)
  * COMMON/SVARS/1,Z,PHI,DT,0Z,GP,HI,ZINT,
  * ZEND,PI,ALPHA,GATPA,SICMA,ZINACH,TAPR1,
  * TAPR2,DISK1,ALPH,DISK2,SIGM,WRNIT,DZDT,
  * DZLPH,ZH,THSO,THLD,THM,THL,THM,THM,
  * TPL,ARZ,BZ,NTPHI,NIT,KPHI,NIER,
  * NPHI,NPHI1,NPHI2,NPHI3,NPHI4,NPHI5,
  * NI,NII,NI3,NI5,PHI0,MCDA,RQI,
  * PHF,PHF0,LAG,NBC,PIHF,PHOIN,UIHF,
  * QINF,DEMP,AL,DT,ZREF,ICG,ZSHFT,IPACH
  * INTEGER DISK1,DISK2,IN11,TAPR2
  * COMMON/PEL/MP,AL,IN=RT,BODYH,BOOTS,PSONIC,ASONIC,P,LINE,RTINE
  * VLINE,NITAG,IN=OUT
25 C...RANKINE-M-G-M-I-OI FUNCTIONS
  UTILD(N)=SRT(C1+C2*(A-1))
  ANSC(A,B,C,D)=CUMPRC+ASRT(D*(C1+8*B5)+C(C)))/D
  ABAR(A,B,D,E,F)=(F-1)*B*H5*(-UIHF+D*A-B*E)/(D*(D+1)+E*E)*F)
30 US(A,B,C)=A-C*B
  VS(A,B)=A*B
  VS(R,B,C)=A-B*C
  GAFPI=3444
  GAFPI=GATPA-1,
  GAFPI=GATPA-1,
  GATIO=GATPI/GATPI
  * C1=0.5848418PIHF/RHOIN
  * C2=0.5848418PI
40 C...AUTOMATIC INKALE OF ATTACK INCREMENTER FOR COME SOLUTIONS
  IF(CONE,ED,2,GR,K4,E3,2) GO TO 17
  IF(ICONST(5),G,1) KLAG=0
  IF(KLAG,GT,100)GO TO 17
  ALP=ALPH+ALPH/100,
  CONST(1)=SINC(ALP)
  CONST(2)=COS(ALP)
  UIHF=GINF*CONST(2)
  DO 16 K=2,NPHI1
  PHIP=PHIP(K)
  VINC(K)=GINF*CONST(1)*COS(PHI)
  * WINF(K)=GINF*CONST(1)*SINC(PHI)
  * ALPD=ALP+RHOI
  * KLAG=KLAG+1
  * 17 CONTINUE
  * 12 CONTINUE
  * GO TO (1,2),K4
  * 1 CONTINUE
  
```

SHOCK 2
 CVARB 2
 CVARB 3
 CVARB 4
 CVARB 2
 PVARB 3
 PVARB 5
 PVARB 6
 PVARB 7
 PVARB 8
 IDVARS 2
 SVARS 2
 SVARS 3
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 SVARS 10
 SVARS 11
 REALG 3
 REALG 8
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C...SHOCK PREDICTOR
DO 3 K=3,NPHI
  RST(K)=RST(K)+DZ*PSZ(K)
  DO 4 K=1,2
    M=6-K
    I=NPHI-K
    N=NPHI-K
    RST(K)=RST(K)+M
    RST(I)=RST(N)
    CONTZ=4-E
    DO 5 K=3,NPHI
      RST(K)=(RST(K)+RST(K-1))/(2.0+DZETA)*DZTIL(K)
      PS=PS+RST(K)
      PSRAT=PS/PSIN
      IF (NREAL.EQ.-1) GO TO 13
      UIT=UITILG(PSRAT)
      RHART=RHOS(PSRAT)
      GO TO 14
    13 CALL RUTLDCPS,POST,UIT)
      FMRAT=ROST/RHIF
    14 CONTINUE
      RSI=RST(K)
      RSPH=RSPHT(K)
      RSPHR=RSPH/RSI
      FACT1=VING(K)-VING(K)*RSPHR
      FACT2=UNG*RUINE-UIT*RU1
      IF(FACT2.LT.0)UIT=-UIT
      IF(FACT2.LT.0)WRITE(6,200)UINE,UIT,FACT2
    200 FMRAT=UIT*(1.0+SHOUP-E*3.6,3X,4*UIT-E13.6,3X,6-F*FACT2-E13.6)
      RST(K)=RST1
      RST(K)=RST(K)+VING(K)-VING(K)*RST1+RSPHR,RHART)
      UIT=UIT*(UIRE,RHART,RST1)
      VST=VS(VING(K),RHART)
      MST=MS*VING(K),RHART,RSPHR)
      IF (NREAL.EQ.0) ROST=RHART*RHOMIN
      RH(NTR,K)=ROST
      UCNTR,K)=UST
      VCNTR,K)=VST
      WCNTR,K)=WST
      DATA N,CN1,NQ,MENQ/13,15/
      IF (NPHI.NE.-1) GO TO 5
      IF (N=NPHI.GE.2) WRITE (6,100) N,NPHI,K,PS,ROST,UIT,UST,VST,WST,
16RART
    5 CONTINUE
      DO 6 K=1,2
        M=6-K
        I=NPHI-K
        N=NPHI-K
        RST(K)=RST(K)+M
        RST(I)=RST(N)
        RSPHT(K)=RSPHT(M)
        RSPHT(I)=RSPHT(N)
        RSPHT(I)=RSPHT(N)
      CONTINUE
      RETURN
    2 CONTINUE
C...SHOCK CONNECTOR

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SHOCK 41
SHOCK 42
SHOCK 43
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SHOCK 94
SHOCK 95
SHOCK 96
SHOCK 97

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115      DO 8 I=3,NPHI
          RS(K)=RS(K)+0.5*(RSZ(K)+RSZT(K))*DZ
          DO 9 K=1,2
            M=6-K
            I=NPHI+K
            N=NPHI-K
            R1(K)=RS(M)
            RSZ(I)=RS(N)
            CONTINUE
          DO 10 K=3,NPHI
            ASPHI(K)=(RS(K+1)+RS(K-1))/(2.0*DELTA)*DZTIL(K)
            PS=P(NT2,K)
            PSFAT=PS/PINF
            IF (NRLAL.EQ.-1) GO TO 15
            UIT=UITLD(PSHAT)
            RHART=RAGS(PSHAT)
            GO TO 16
          15      CALL RUTLD(PS,ROSF,UIT)
            RHART=ROSF/RIINF
          16      CONTINUE
            RSI=RS(K)
            RSPH=RSPI(K)
            RSPHR=RSPI/RSI
            FACT1=VINF(K)-VINF(K)*RSPHR
            FACT2=VINF(K)-UIT*UIT
            IF(FACT2.LT.0)UIT=-UIT
            IF(FACT2.LT.0)WRITE(6,200)VINF,UIT,FACT2
            RSZ(K)=R1Z1
            RSPHRT=ROSF/VINF(K),MINF(K),RSZ1,RSPHR,RHART)
            USF=US(VINF(K),RHART)
            VSF=VS(VINF(K),RHART)
            MSF=M*(VINF(K),RHART,RSPHR)
            IF (NRLAL.EQ.0) ROSF=RHART*RHARTIN
            RHOC(NT2,K)=ROSF
            V(NT2,K)=VSF
            W(NT2,K)=WSF
            IF (NRLAL.EQ.-1) GO TO 10
            IF (NRPRT.GE.2) WRITE (6,100) NSHENG,K,PS,ROSF,UIT,USF,VSF,MSF.
            1ABART
          10      CONTINUE
            DO 11 K=1,2
              M=6-K
              I=NPHI+K
              N=NPHI-K
              RSZ(K)=RSZ(M)
              RSZ(I)=RSZ(N)
              RSPHI(K)=RSPHI(M)
              RSPHI(I)=RSPHI(N)
              CONTINUE
            11      RETURN
          100      FORMAT(1H,16HSHOCK- STAT NO=-12,1X,2H=-12,1X,2HP=-12,1X,4,1X,
                    12H-1PE11.4,1X,3HUT=-1PE11.4,1X,2HUP=-1PE11.4,1X,2HW=-1PE11.4,1X,
                    22HW=-1PE11.4,1X,3HAB-1PE11.4)
          200      END
          SHOCK 98
          SHOCK 99
          SHOCK 100
          SHOCK 101
          SHOCK 102
          SHOCK 103
          SHOCK 104
          SHOCK 105
          SHOCK 106
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          SHOCK 148
          SHOCK 149
          SHOCK 150
          SHOCK 151
          SHOCK 152
          SHOCK 153

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1 SUBROUTINE START (THETAS,HPFS,GAMMA,XO,THAB,M,MM,Y,U,Y,RHO,P,PER, START
1TH) START 2
C A SUBROUTINE TO COMPUTE STARTING VALUES FROM CONICAL FLOW SOLUTION START 3
COMMON T(27) BLANK 4
COMMON /COM1/PER1,GAMMA1 2
COMMON /ERINT/IER 2
EXTERNAL DERIV 6
DIMENSION THCM,Y(H),U(H),V(H),RHO(H),P(H) 9
GAMMA1=GAMMA 10
PER=0 11
CALL USTHUC(HMF5,THETAS,GAMMA1,U5,THE TAU,PER) 12
IF (PER) 999,50,999 13
AR=H-1 14
AMU=HW-1 15
DS=XO/COS(THETAS) 16
THDIF=THE TAU-TIAB 17
YU=(DS*SIN(THETAU-THETAS))/COS(THETAU-THAB) 18
DELY=TH/AMU 19
DO 100 I=1,M 20
AI=I 21
TH(I)=THE TAS* ATAN(((AI-1.0)*DELY*COS(THDIF))/(DS*(AI-1.0)*DELY* 22
1SIN(THDIF))) 23
Z1=HPFS*Z+SIN(THETAU)**2 24
Z2=GAMMA*1.0 25
Z3=GAMMA-1.0 26
PZP1=((Z2*Z1)/(Z3*Z1+2.0))*((GAMMA/Z3)**(Z2/(2.0*GAMMA*Z1-Z3)))** 27
1(1.0/Z3) 28
VFS=SBRT((Z3*HPFS**2/2.0)/(1.0+Z3*HPFS**2/2.0)) 29
T(2)=TH(I) 30
T(4)=0.0 31
T(5)=US 32
I=0 33
I=I+1 34
AI=I 35
CIAB=COS(T(2)-THAB) 36
SIAB=SIN(T(2)-THAB) 37
Y(I)=(AI-1.0)*DELY 38
U(I)=T(5)*CIAB-T(4)*SIAB 39
V(I)=T(4)*CIAB+T(5)*SIAB 40
P(I)=PZP1*(1.0-T(4)**2-T(5)**2)**(GAMMA/Z3) 41
RHO(I)=PZP1*(1.0-T(4)**2-T(5)**2)**(1.0/Z3) 42
IF((I+1).GT.M) GO TO 999 43
T(3)=TH(I+1)-TH(I) 44
T2=T(3) 45
CALL INTSCT,2.0,5.0E-6,0.0,0.0,T3 ,0.0,0.0,C,DERIV 46
IF (IER.NE.0) GO TO 998 47
CALL INTHT,2.0,5.0E-6,0.0,0.0,T3 ,0.0,0.0,DERIV 48
IF (IER.NE.0) GO TO 998 49
IF(T(2)-TH(I+1))475,300,500 50
IF(ABS(T(2)-TH(I+1))-5.0E-6) 300,300,600 51
T(2)=T2 52
T(3)=TH(I+1)-T2 53
T(4)=T4 54
T(5)=T5 55
CALL INTSCT,2.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,DERIV 56
IF (IER.NE.0) GO TO 998 57
CALL INTHT,2.0,0.0,0.0,0.0,0.0,0.0,0.0,0.0,DERIV 58

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SUBROUTINE START	76/76	OPT=1	FTN 4.6+160	06/15/79	18.58.36	PAGE	2
60	475	IF (IER.NE.0) GO TO 998				START	59
		GO TO 300				START	60
		T2=I(2)				START	61
		T4=I(4)				START	62
		T5=I(5)				START	63
		GO TO 450				START	64
65	998	MER-MER1				START	65
	999	RETURN				START	66
		END				START	67

```

1      SUBROUTINE USTHW, HMFS, THETAS, GAMMA, US, THETAU, PER)
C      A SUBROUTINE TO COMPUTE SURFACE VELOCITY AND MACH ANGLE WHEN
C      THE FREE STREAM MACH NUMBER AND CONE ANGLE ARE GIVEN
      PER=0
      US1=SQRT((GAMMA-1.0)/(GAMMA+1.0))
      CALL HMACH(US1, THETAS, GAMMA, HM1, THETAU, PER)
      IF(HMFS-HM1) 200,100,10
200    PER=3
100    GO TO 999
      US=US1
      GO TO 999
10    IF(PER) 999,20,999
20    IF(US1-0.700) 21,22,22
21    US3=0.5*(US1+1.0)
      GO TO 23
15    US3=US1+0.005
22    CONTINUE
23    CALL HMACH(US3, THETAS, GAMMA, HM3, THETAU, PER)
      IF(MER) 999,25,999
20    IF(HMFS-HM3) 30,27,29
27    US=US3
      GO TO 999
29    US1=US3
      HM1=HM3
25    GO TO 20
30    US2=0.5*(US1+US3)
      CALL HMACH(US2, THETAS, GAMMA, HM2, THETAU, PER)
      DET=(HM2-HM1)*(HM3-HM1)**2-(HM3-HM1)*(HM2-HM1)**2
      A1=((US2-US1)*(HM3-HM1)**2-(US3-US1)*(HM2-HM1)**2)/DET
      A2=((HM2-HM1)*(US3-US1)-(US2-US1)*(HM3-HM1))/DET
      CALL HMACH(UT, THETAU, GAMMA, HMAC, THETAU, HM A)
      IF(HM2<1.0-HMFS/HMAC)-2.0E-4) 45,45,60
45    US=UT
35    GO TO 999
60    USE=USE+(A1+2.0*A2*(HMAC-HM1))*(HMFS-HMAC)
      GO TO 40
999    RETURN
      END

```

2 USTHW
 3 USTHW
 4 USTHW
 5 USTHW
 6 USTHW
 7 USTHW
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 13 USTHW
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 39 USTHW
 40 USTHW

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SUBROUTINE ZEROIN 76/76 OPT-1
1  SUBROUTINE ZEROIN(X1,Y1,TOLX,FYN,BOL,X,Y)
   LOGICAL BOL
   A=X1
   FA=FXN(A)
   B=Y1
   X=B
   FB=FXN(B)
   C=A
10  FC=FA
   IF ( ABS(FC) .GE. ABS(FB) ) GO TO 30
   A=B
   FA=FB
   X=C
   B=C
   FB=FC
   C=A
15  FC=FA
   TOL=TOLX*MAX1(ABS(A),ABS(B))
   EM=0.5*(C+B)
20  IF ( ABS(EM-B) .LE. TOL ) GO TO 40
   P=FB*(B-A)
   Q=FB-FA
   P=Q-P
   GO TO 32
31  Q=FA - FB
32  A=B
   FA=FB
   IF ( P .LE. ABS(Q)*TOL ) GO TO 34
   IF ( P .LT. (EM-B)*Q ) GO TO 33
   X=EM
   B=EM
   GO TO 35
33  X=P/Q+B
   B=X
34  GO TO 35
   X=SIGN(TOL,C-B)+B
   B=X
35  FB=FXN(X)
   IF (FB.EQ.0.0) GO TO 50
   IF ( SIGN(1.,FC) .EQ. SIGN(1.,FB) ) GO TO 10
   GO TO 20
40  Y=C
45  BOL= SIGN(1.,FB)*SIGN(1.,FC) .LE. 0.0
   RETURN
   BOL=.TRUE.
   Y=X
   RETURN
   END
ZEROIN 2
ZEROIN 3
ZEROIN 4
ZEROIN 5
ZEROIN 6
ZEROIN 7
ZEROIN 8
ZEROIN 9
ZEROIN 10
ZEROIN 11
ZEROIN 12
ZEROIN 13
ZEROIN 14
ZEROIN 15
ZEROIN 16
ZEROIN 17
ZEROIN 18
ZEROIN 19
ZEROIN 20
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ZEROIN 22
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ZEROIN 38
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ZEROIN 40
ZEROIN 41
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ZEROIN 43
ZEROIN 44
ZEROIN 45
ZEROIN 46
ZEROIN 47
ZEROIN 48
ZEROIN 49
ZEROIN 50

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1  SUBROUTINE TAINT(XTAB,FTAB,X,FX,N,K,NER,MON)
   DIMENSION XTAB(1),FTAB(1),T(10),C(10)
   CPSOHO= TAINT SUBROUTINE- IN FORTRAN II.
5  IF (N - K) 1,1.2
   1 NER=2
   RETURN
   2 IF (K-9) 3,3,1
   3 IF ( MON) 4,4,5
   5 IF ( MON-2) 6,7,4
   4 J=0
10  NMI=N-1
   DO 8 I=1,NMI
   IF (XTAB(I)-XTAB(I+1)) 9,11,10
11 NER=3
   RETURN
   9 J=J+1
   GO TO 8
10 J=J+1
   8 CONTINUE
   MOH=1
20  IF (J) 12,6,6
12 FON=2
   7 DO 13 I=1,N
   IF (X-XTAB(I)) 14,14,13
25  14 J=I
   GO TO 18
13 CONTINUE
   GO TO 15
   6 DO 16 I=1,N
   IF (X-XTAB(I)) 16,17,17
30  17 J=I
   GO TO 18
16 CONTINUE
15 J=N
35  18 J=J-(K+1)/2
   IF (J) 19,19,20
19 J=1
20 M=J+K
40  IF (M-N) 21,21,22
   22 J=J-1
   GO TO 20
21 KPI=K+1
   JSAVE=J
45  26 DO 23 L=1,KPI
   C(L)=X-XTAB(J)
   T(L)=FTAB(J)
23 J=J+1
   DO 24 J=1,K
   I=J+1
50  25 Y(I)=(C(J)*T(I)-C(I)*T(J))/(C(J)-C(I))
   I=I+1
   IF (I-KPI) 25,25 ,24
24 CONTINUE
   FX=T(KPI)
   MFR=1
55  RETURN
   END

```

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TAINT 2
TAINT 3
TAINT 4
TAINT 5
TAINT 6
TAINT 7
TAINT 8
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TAINT 58

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SUBROUTINE GEOMH
1      C      SUBROUTINE GEOMH(K7,PHIP,NPHI,Z,R,RZ,RPHI,IPRNT,ZO,ZJUNC,NCONE)
5      C      COMMON/BODY/ARR(52),IND(500),X(3),XU(3),DUMH(6),XM(3),DUMZ(33)
        C      COMMON/MINIB/ ZSAV(25),NP5AV(25),NDH
10     C      DIMENSION PHIP(41),R(41),PZ(41),RPHI(41)
        DIMENSION RONE(41),RPCONE(41),RZCONE(41)
        DATA EPS,NIT,ISTRT/,1E-5,20,3/
15     C      IF(K7.GT.0) GO TO 21
        IFLAG=0
        READ(5,457) NPAT
        FORMAT(15)
        CALL OPERMS(1,IND,500,0)
        CALL READMS(1,ZSAV,51,NPAT+1)
        RETURN
21     IF(IFLAG.EQ.0) GO TO 458
22     IF(NCONE.EQ.2) GO TO 456
20     C      ZFRACT=(Z-ZO)/(ZJUNC-ZO)
        DO 20 I=1,ISTRT,NPHI
        R(I)=RONE(I)*ZFRACT
        RPHI(I)=RPCONE(I)*ZFRACT
        RZ(I)=RZCONE(I)
        GO TO 18
25     C      458 ZSAVE=Z
        Z=ZJUNC
30     456 DO 17 I=1,ISTRT,NPHI
        IEND=0
        PHIP=PHIP(I)
        IF(I.NE.1,ISTRT) GO TO 40
        U=U+.5
35     C      DO 1 J=1,NOM
        NSEG=J
        IF(Z.LE.ZSAV(J+1))GO TO 3
        1 CONTINUE
        WRITE(6,100)Z
40     100 FORMAT(* STOP - GEOMH - Z = *,E12.5,* EXCEEDS TABLE*)
        3 N=NT-NP5AV(NSEG+1)
        4 CALL READMS(1,ARR,52,NPAT)
        WRITE(6,105)NPAT,PHI,(ARR(I0),I0=49,52)
45     C      105 FORMAT(* NPAT,Z,PHI,NB = *,I5,6E12.5)
        40 IEU=IEU+0
50     C      DO 15 IT=1,NIT
        CALL POINT(NPAT,U,W,1)
        X(2)=ABS(X(2))
        PH=ATAN2(X(2),-X(1))
        G=PH-PHI
        F=X(2)-Z
55     C      106 WRITE(6,106)IT,NPAT,U,W,F,G
        FORMAT(* IT,NPAT,U,W,F,G = *,2F5.4E12.5)
        IF(ABS(F).LT.EPS.AND.AOS(G).LT.EPS)IEND=1
        RAQ2=X(1)**2+X(2)**2
        GEOMH
2      GEOMH
3      GEOMH
4      GEOMH
5      GEOMH
6      GEOMH
7      GEOMH
8      GEOMH
9      GEOMH
10     GEOMH
11     GEOMH
12     GEOMH
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18     GEOMH
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54     GEOMH
55     GEOMH
56     GEOMH
57     GEOMH
58     GEOMH

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60  DPHIDU=XX(2)*XU(1)-X(1)*XU(2))/RAD2
    DPHIDU=XX(2)*XU(1)-X(1)*XU(2))/RAD2
    DEN=XUC(3)*DPHICM-XUC(3)*DPHIU
    IF(IEWD.EQ.1)GO TO 16
    IF(DEN.NE.0.)GO TO 5
    WRITE(6,102)
102 FORMAT(* STOP - GEOMH - DEN = D.F)
    GO TO 18
65  5 M=U*(F*DPHIU-G*XUC(3))/DEN
    U=U*(G*XUC(3)-F*DPHIU)/DEN
    IF(IPANT.EQ.2)WRITE(6,106)IT,NPAT,U,W,F,G
    IF(M.LT.0.)GO TO 7
    IF(M.GT.1.)GO TO 9
    6 IF(U.LT.0.)GO TO 11
    IF(U.GT.1.)GO TO 13
    GO TO 15
    7 IF(PAR(S2).NE.0.)GO TO 70
    M=0.
    GO TO 6
70  M=1.
    IF(IEW.EQ.0)GO TO 8
    NPAT=PAR(S2)
    IF(NPAT.EQ.0)GO TO 900
    GO TO 400
80  8 IEW=1
    M=0.
    GO TO 6
85  9 IF(PAR(S0).NE.0.)GO TO 71
    M=1.
    GO TO 6
71  M=0.
    IF(IEW.EQ.0)GO TO 10
    NPAT=PAR(S0)
    IF(NPAT.EQ.0)GO TO 900
    GO TO 400
10  IEW=1
    M=1.
    GO TO 15
95  11 IF(PAR(49).NE.0.)GO TO 72
    U=0.
    GO TO 15
72  U=1.
    IF(IEU.EQ.0)GO TO 12
    NPAT=PAR(49)
    IF(NPAT.EQ.0)GO TO 900
    GO TO 400
12  IEU=1
    U=0.
    GO TO 15
100 13 IF(PAR(S1).NE.0.)GO TO 73
    U=1.
    GO TO 15
73  U=0.
    IF(IEU.EQ.0)GO TO 14
    NPAT=PAR(S1)
    IF(NPAT.EQ.0)GO TO 900
    GO TO 400

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GEOMH 59
 GEOMH 60
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 GEOMH 112
 GEOMH 113
 GEOMH 114
 GEOMH 115

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115      14 IEU=1
        U=1.
        GO TO 15
120      400 CALL REOMS(1,AAR,52,NPAT)
        IEU=IEU+O
        15 CONTINUE
C
125      WRITE(6,103)F,G,EPS
        103 FORMAT(* STOP - GEOPH - EXCEEDED MAX ITERATIONS - F,G,EPS = *,3E12
        1,S)
        WRITE(6,108)I,NPAT,PHI,Z
130      108 FORMAT(* I,NPAT,PHI,Z*,5X,2I10,2F20.6)
        GO TO 16
C
135      900 WRITE(6,104)
        104 FORMAT(* STOP - GEOPH - PATCH POINTER =0*)
        GO TO 18
C
140      16 R(1)=SQRT(CR02)
        DRG=-CX(1)*XW(1)+X(2)*XU(2))/R(1)
        DRGU=-CX(1)*XU(1)+X(2)*XU(2))/R(1)
        RZ(1)=(DPHIOW*DRDU-DPHIDU*DRDW)/DEN
        RPHI(1)=(DRDU*RX(3)-DRDU*RX(3))/DEN
        IF(IPANT.EQ.O)GO TO 17
        PHO=PHI/.017453293
        IF(IPRNT.EQ.2) WRITE(6,107)I,PHO,X,DRDU,DRDW,DPHIDU,DPHIDU,DEN
145      107 FORMAT(15,F1.1,9E12.5)
        17 CONTINUE
        RPHI(CISTRT)=O.O
        RPHI(NPHI)=O.O
C
150      IF(IFLAG.GT.O) GO TO 18
        ZFRACT=1.O/(ZJUNC-ZO)
        DO 19 I=1,START,NPHI
            RCON(I)=R(1)
            RPCONE(I)=RPHI(I)
            RZCONE(I)=R(1)*ZFRACT
            Z*ZSAVE
        IFLAG=1
        GO TO 22
C
155      18 RETURN
        END

```

GEOPH 116
 GEOPH 117
 GEOPH 118
 GEOPH 119
 GEOPH 120
 GEOPH 121
 GEOPH 122
 GEOPH 123
 GEOPH 124
 GEOPH 125
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 GEOPH 144
 GEOPH 145
 GEOPH 146
 GEOPH 147
 GEOPH 148
 GEOPH 149
 GEOPH 150
 GEOPH 151
 GEOPH 152
 GEOPH 153
 GEOPH 154
 GEOPH 155
 GEOPH 156
 GEOPH 157
 GEOPH 158

```

1  SUBROUTINE POINT(K,U,W,ND)
COMMON/BOGY/ARR(S2),IND(SOO),X(3),XU(3),XUW(3),X3U(3),X3W(3),XUM(3)
1) X2UW(3),X3UW(3),X4U(3),X4W(3),X2UW(3),X3UW(3),X3U(3),X3W(3),
2) X3UW(3),X3UW(3)
ND1=ND+1
DO 10 I=1,3
J=16*(I-1)
J1=J+1
J2=J+5
J3=J+9
A1=((ARR(J1)*U+ARR(J2))*U+ARR(J3))*U+ARR(J3+4)
IF(ND1.EQ.1)GO TO 1
C1=ARR(J1)+ARR(J1)+ARR(J1)
C2=ARR(J2)+ARR(J2)
A1P=(C1*U+C2)*U+ARR(J3)
IF(ND1.EQ.2)GO TO 1
A1PP=(C1+C1)*U+C2
1 J1=J1+1
J2=J2+1
J3=J3+1
A2=((ARR(J1)*U+ARR(J2))*U+ARR(J3))*U+ARR(J3+4)
IF(ND1.EQ.1)GO TO 2
C1=ARR(J1)+ARR(J1)+ARR(J1)
C2=ARR(J2)+ARR(J2)
A2P=(C1*U+C2)*U+ARR(J3)
IF(ND1.EQ.2)GO TO 2
A2PP=(C1+C1)*U+C2
2 J1=J1+1
J2=J2+1
J3=J3+1
A3=((ARR(J1)*U+ARR(J2))*U+ARR(J3))*U+ARR(J3+4)
IF(ND1.EQ.1)GO TO 3
C1=ARR(J1)+ARR(J1)+ARR(J1)
C2=ARR(J2)+ARR(J2)
A3P=(C1*U+C2)*U+ARR(J3)
IF(ND1.EQ.2)GO TO 3
A3PP=(C1+C1)*U+C2
3 J1=J1+1
J2=J2+1
J3=J3+1
A4=((ARR(J1)*U+ARR(J2))*U+ARR(J3))*U+ARR(J3+4)
IF(ND1.EQ.1)GO TO 4
C1=ARR(J1)+ARR(J1)+ARR(J1)
C2=ARR(J2)+ARR(J2)
A4P=(C1*U+C2)*U+ARR(J3)
IF(ND1.EQ.2)GO TO 4
A4PP=(C1+C1)*U+C2
4 X(I)=((A1*W+A2)*U+A3)*U+AH
IF(ND1.EQ.1)GO TO 10
XUC1)=((A1P*W+A2P)*U+A3P)*U+AMP
C1=A1+A1+A1
C2=A2+A2
XWC1)=((C1*W+C2)*U+A3)
IF(ND1.EQ.2)GO TO 10
XUC1)=((A1PP*W+A2PP)*U+A3PP)*U+AMP
XUM(I)=((C1P*W+C2P)*U+A3P)*U+A3P
XUM(I)=((C1+C1)*U+C2

```

SUBROUTINE POINT 76/76 OPT-1 FTN 4.6+460 06/15/79 18.58.36 PRICE 2

60 10 CONTINUE
RETURN
END

POINT 59
POINT 60
POINT 61

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16. Abstract <p>The use of a computer code for the calculation of steady, supersonic, three-dimensional, inviscid flow over blunt bodies is illustrated. Input and output are given and explained for two cases: a pointed cone of 20° half angle at 15° angle of attack in a free stream with $M_\infty = 7$, and a cone-ogive-cylinder at 10° angle of attack with $M_\infty = 2.86$.</p> <p>A source listing of the computer code is provided.</p>					
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