

ANALISIS DE LAS POSIBILIDADES DE UTILIZACION DEL METODO DE SONDEOS ELECTROMAGNETICOS DE DOMINIO DE TIEMPOS A LA EXPLORACION EN ZONAS DE DIFICIL EMPLEO DEL METODO DE SEV. APLICACION - AL SECTOR DE LORCA (MURCIA).

TOMO II - ANEXOS 1, 2, 3 y 4.

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- Nº 1.- CURVAS TEORICAS CORRESPONDIENTES AL AREA DE LORCA.
- Nº 2.- CURVAS TEORICAS CORRESPONDIENTES AL AREA DE OLOT.
- Nº 3.- CURVAS TEORICAS DE UNA ZONA DE COMPLEJIDAD ESTRUCTURAL.
- Nº 4.- PROGRAMAS DE TRATAMIENTO DE SEDT.

ANEXO N° 1.- CURVAS TEORICAS CORRESPONDIENTES AL AREA
DE LORCA.

MODELOS EN EL AREA DE LORCA.

Los valores de resistividad utilizados en el cal
culo de los mismos se han tomado de los perfiles geoelectri
cos obtenidos mediante SEV en los trabajos previos.

CASO A

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>
30	-	20
80	-	10
	-	20

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>
30	-	20
120	-	10
	-	20

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>
30	-	20
80	-	5
	-	20

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>
30	-	20
120	-	5
	-	20

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>
30	-	20
80	-	10
	-	15

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>
30	-	20
120	-	10
	-	15

Nº 7

<u>h (m)</u>		<u>(ohm.m)</u>
30	-	20
80	-	5
	-	15

Nº 8

<u>h (m)</u>		<u>(ohm.m)</u>
30	-	20
120	-	5
	-	15

CASO B

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	Arcillas y arenas
40	-	5	Margas con yeso
80	-	10	Halita
	-	20	Margas bituminosas

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>
10	-	20
60	-	5
80	-	10
	-	20

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>
10	-	20
20	-	5
80	-	10
	-	20

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>
10	-	20
20	-	5
120	-	10
	-	20

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>
10	-	20
40	-	5
120	-	10
	-	20

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>
10	-	20
60	-	5
120	-	10
	-	20

Nº 7

<u>h (m)</u>		<u>(ohm.m)</u>
10	-	20
160	-	5
	-	20

CASO C

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
50	-	5	Margas con yeso
100	-	30	Halita
80	-	10	
	-	20	

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
100	-	5	
100	-	30	
80	-	10	
	-	20	

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
50	-	5	
50	-	30	Halita
80	-	10	
	-	20	

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
100	-	5	
50	-	30	
80	-	10	
	-	20	

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
50	-	5	
50	-	100	Halita
80	-	10	
	-	20	

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
50	-	5	
100	-	100	
80	-	10	
	-	20	

Nº 7

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
50	-	5	
150	-	30	Halita
80	-	10	
	-	20	

Nº 8

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
50	-	5	
150	-	100	
80	-	10	
	-	20	

Nº 9

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
50	-	5	
200	-	30	Halita
80	-	10	
	-	20	

Nº 10

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
50	-	5	
200	-	100	
80	-	10	
	-	20	

Nº 11

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
100	-	5	
200	-	30	Halita
80	-	10	
	-	20	

Nº 12

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
100	-	5	
200	-	100	
80	-	10	
	-	20	

Nº 13

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
100	-	5	
100	-	100	Halita
80	-	10	
	-	20	

Nº 14

<u>h (m)</u>		<u>(ohm.m)</u>	
10	-	20	
100	-	5	
50	-	100	
80	-	10	
	-	20	

CASO D

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
50	-	5	Margas con yeso
100	-	30	Halita
80	-	10	
	-	20	

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
100	-	5	
100	-	30	
80	-	10	
	-	20	

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
50	-	5	
50	-	30	Halita
80	-	10	
	-	20	

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
100	-	5	
50	-	30	
80	-	10	
	-	20	

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
50	-	5	
50	-	100	Halita
80	-	10	
	-	20	

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
50	-	5	
100	-	100	
80	-	10	
	-	20	

Nº 7

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
50	-	5	
150	-	30	Halita
80	-	10	
	-	20	

Nº 8

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
50	-	5	
150	-	100	
80	-	10	
	-	20	

Nº 9

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
50	-	5	
200	-	30	Halita
80	-	10	
	-	20	

Nº 10

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
50	-	5	
200	-	100	
80	-	10	
	-	20	

Nº 11

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
100	-	5	
200	-	30	Halita
80	-	10	
	-	20	

Nº 12

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
100	-	5	
200	-	100	
80	-	10	
	-	20	

Nº 13

<u>h (m)</u>		<u>(ohm.m)</u>	
40	-	60	
10	-	20	
100	-	5	
100	-	100	Halita
80	-	10	
	-	20	

Nº 14

<u>h (m)</u>		<u>(ohm.m)</u>
40	-	60
10	-	20
100	-	5
50	-	100
80	-	10
	-	20

(TCOLGDP): LORCA A-1

M = 3 XNORM=0.10E+02 IFCM= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-02 0.1000E+00 0.5000E+02 0.1429E+00 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+02 0.6000E+02 0.5000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-04	0.38261E+00	0.10000E+01	0.10000E+02	0.14672E+04
0.17783E+00	0.22347E-04	0.22010E+00	0.57525E+00	0.57525E+01	0.80227E+03
0.31623E+00	0.39738E-04	0.13503E+00	0.35291E+00	0.35291E+01	0.40339E+03
0.56234E+00	0.70666E-04	0.93017E-01	0.21697E+00	0.21697E+01	0.20058E+03
0.10000E+01	0.12566E-03	0.47836E-01	0.12502E+00	0.12502E+01	0.10887E+03
0.17783E+01	0.22347E-03	0.20420E-01	0.53370E-01	0.53370E+00	0.87873E+02
0.31623E+01	0.39738E-03	0.60237E-02	0.15744E-01	0.15744E+00	0.95499E+02
0.56234E+01	0.70666E-03	0.11290E-02	0.29508E-02	0.29508E-01	0.13184E+03
0.10000E+02	0.12566E-02	0.44958E-03	0.11750E-02	0.11750E-01	0.95911E+02
0.17783E+02	0.22347E-02	0.27800E-03	0.72657E-03	0.72657E-02	0.50283E+02
0.31623E+02	0.39738E-02	0.19668E-03	0.51404E-03	0.51404E-02	0.23812E+02
0.56234E+02	0.70666E-02	0.13723E-03	0.35867E-03	0.35867E-02	0.11355E+02
0.10000E+03	0.12566E-01	0.95560E-04	0.24976E-03	0.24976E-02	0.54017E+01
0.17783E+03	0.22347E-01	0.65467E-04	0.17110E-03	0.17110E-02	0.25911E+01
0.31623E+03	0.39738E-01	0.43796E-04	0.11446E-03	0.11446E-02	0.12615E+01
0.56234E+03	0.70666E-01	0.28263E-04	0.73867E-04	0.73867E-03	0.63061E+00
0.10000E+04	0.12566E+00	0.17312E-04	0.45246E-04	0.45246E-03	0.32902E+00
0.17783E+04	0.22347E+00	0.99053E-05	0.25890E-04	0.25890E-03	0.18219E+00
0.31623E+04	0.39738E+00	0.51996E-05	0.13590E-04	0.13590E-03	0.10887E+00
0.56234E+04	0.70666E+00	0.24448E-05	0.63897E-05	0.63897E-04	0.71380E-01
0.10000E+05	0.12566E+01	0.10120E-05	0.26449E-05	0.26449E-04	0.51605E-01

(TCOLOOP):

LORCA A-2

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-02 0.1000E+00 0.5000E+02 0.1429E+00 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+02 0.1200E+03 0.5000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-04	0.38331E+00	0.10000E+01	0.10000E+02	0.14639E+04
0.17783E+00	0.22347E-04	0.21919E+00	0.57184E+00	0.57184E+01	0.80639E+03
0.31623E+00	0.39738E-04	0.13560E+00	0.35276E+00	0.35376E+01	0.40113E+03
0.56234E+00	0.70666E-04	0.83227E-01	0.21712E+00	0.21712E+01	0.19985E+03
0.10000E+01	0.12566E-02	0.49573E-01	0.12933E+00	0.12933E+01	0.10322E+03
0.17783E+01	0.22347E-03	0.28500E-01	0.74351E-01	0.74351E+00	0.56113E+02
0.31623E+01	0.39738E-03	0.14915E-01	0.38910E-01	0.38910E+00	0.35147E+02
0.56234E+01	0.70666E-03	0.61668E-02	0.16088E-01	0.16088E+00	0.29325E+02
0.10000E+02	0.12566E-02	0.15453E-02	0.40315E-02	0.40315E-01	0.36333E+02
0.17783E+02	0.22347E-02	0.30534E-03	0.79658E-03	0.79658E-02	0.46893E+02
0.31623E+02	0.39738E-02	0.82215E-04	0.21449E-03	0.21449E-02	0.45073E+02
0.56234E+02	0.70666E-02	0.56595E-04	0.14765E-03	0.14765E-02	0.21929E+02
0.10000E+03	0.12566E-01	0.37525E-04	0.97895E-04	0.97895E-03	0.10946E+02
0.17783E+03	0.22347E-01	0.25802E-04	0.67312E-04	0.67312E-03	0.53132E+01
0.31623E+03	0.39738E-01	0.17455E-04	0.45536E-04	0.45536E-03	0.26049E+01
0.56234E+03	0.70666E-01	0.11501E-04	0.30004E-04	0.30004E-03	0.13000E+01
0.10000E+04	0.12566E+00	0.72681E-05	0.18961E-04	0.18961E-03	0.66875E+00
0.17783E+04	0.22347E+00	0.43391E-05	0.11320E-04	0.11320E-03	0.35913E+00
0.31623E+04	0.39738E+00	0.24094E-05	0.62856E-05	0.62856E-04	0.20394E+00
0.56234E+04	0.70666E+00	0.12182E-05	0.31741E-05	0.31781E-04	0.12443E+00
0.10000E+05	0.12566E+01	0.55017E-06	0.14353E-05	0.14353E-04	0.82573E-01

(TCOLOOP): LORCA 4-4

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.5000E-01 0.1429E+00 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+02 0.1200E+03 0.5000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.12566E-03	0.04762E+00	0.10000E+01	0.10000E+02	0.63483E+02
0.17783E+00	0.22347E-03	0.34959E+00	0.53981E+00	0.53981E+01	0.38938E+02
0.31623E+00	0.39738E-03	0.18993E+00	0.29327E+00	0.29327E+01	0.23576E+02
0.56234E+00	0.70666E-03	0.10042E+00	0.15507E+00	0.15507E+01	0.14840E+02
0.10000E+01	0.12566E-02	0.50872E-01	0.78551E-01	0.78551E+00	0.99201E+01
0.17783E+01	0.22347E-02	0.23622E-01	0.36475E-01	0.36475E+00	0.73301E+01
0.31623E+01	0.39738E-02	0.91363E-02	0.14107E-01	0.14107E+00	0.63727E+01
0.56234E+01	0.70666E-02	0.26895E-02	0.41529E-02	0.41529E-01	0.65818E+01
0.10000E+02	0.12566E-01	0.65907E-03	0.10038E-02	0.10038E-01	0.72821E+01
0.17783E+02	0.22347E-01	0.13331E-03	0.20584E-03	0.20584E-02	0.85592E+01
0.31623E+02	0.39738E-01	0.25487E-04	0.39355E-04	0.39355E-03	0.10205E+02
0.56234E+02	0.70666E-01	0.51089E-05	0.78888E-05	0.78888E-04	0.11584E+02
0.10000E+03	0.12566E+00	0.94622E-06	0.14611E-05	0.14611E-04	0.13763E+02
0.17783E+03	0.22347E+00	0.19507E-06	0.30121E-06	0.30121E-05	0.15161E+02
0.31623E+03	0.39738E+00	0.43449E-07	0.67090E-07	0.67090E-06	0.15833E+02
0.56234E+03	0.70666E+00	0.93048E-08	0.14368E-07	0.14368E-06	0.16902E+02
0.10000E+04	0.12566E+01	0.19339E-08	0.29862E-08	0.29862E-07	0.18530E+02
0.17783E+04	0.22347E+01	0.40898E-09	0.63151E-09	0.63151E-08	0.20005E+02
0.31623E+04	0.39738E+01	0.84303E-10	0.13017E-09	0.13017E-08	0.21967E+02
0.56234E+04	0.70666E+01	0.34692E-10	0.53568E-10	0.53568E-09	0.15212E+02
0.10000E+05	0.12566E+02	0.14663E-12	0.22641E-12	0.22641E-11	0.22297E+03

{TCOLOOP}: LORCA A-5

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.1000E+00 0.6670E-01 0.1429E+00 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+02 0.6000E+02 0.5000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.12566E-03	0.77538E+00	0.10000E+01	0.10000E+02	0.39049E+02
0.17783E+00	0.22347E-03	0.40594E+00	0.52354E+00	0.52354E+01	0.27345E+02
0.31623E+00	0.39738E-03	0.21045E+00	0.27142E+00	0.27142E+01	0.18879E+02
0.56234E+00	0.70666E-03	0.10163E+00	0.13107E+00	0.13107E+01	0.14529E+02
0.10000E+01	0.12566E-02	0.41849E-01	0.53972E-01	0.53972E+00	0.13099E+02
0.17783E+01	0.22347E-02	0.14465E-01	0.18655E-01	0.18655E+00	0.12765E+02
0.31623E+01	0.39738E-02	0.42060E-02	0.54244E-02	0.54244E-01	0.13051E+02
0.56234E+01	0.70666E-02	0.10983E-02	0.14165E-02	0.14165E-01	0.13462E+02
0.10000E+02	0.12566E-01	0.27484E-03	0.35446E-03	0.35446E-02	0.13699E+02
0.17783E+02	0.22347E-01	0.55468E-04	0.84434E-04	0.84434E-03	0.14093E+02
0.31623E+02	0.39738E-01	0.15665E-04	0.20203E-04	0.20203E-03	0.14233E+02
0.56234E+02	0.70666E-01	0.37149E-05	0.47911E-05	0.47911E-04	0.14365E+02
0.10000E+03	0.12566E+00	0.86215E-06	0.11119E-05	0.11119E-04	0.14650E+02
0.17783E+03	0.22347E+00	0.20230E-06	0.26090E-06	0.26090E-05	0.14736E+02
0.31623E+03	0.39738E+00	0.48672E-07	0.62771E-07	0.62771E-06	0.14677E+02
0.56234E+03	0.70666E+00	0.11587E-07	0.14944E-07	0.14944E-06	0.14652E+02
0.10000E+04	0.12566E+01	0.26730E-08	0.34473E-08	0.34473E-07	0.14932E+02
0.17783E+04	0.22347E+01	0.10894E-08	0.14050E-08	0.14050E-07	0.10408E+02
0.31623E+04	0.39738E+01	0.12127E-10	0.15639E-10	0.15639E-09	0.80023E+02

(TCOLOOP): LORCA A-6

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.1000E+00 0.6670E-01 0.1429E+00 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+02 0.1200E+03 0.5000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.77542E+00	0.10000E+01	0.10000E+02	0.39043E+02
0.17783E+00	0.22347E-03	0.40235E+00	0.51887E+00	0.51887E+01	0.28019E+02
0.31623E+00	0.39738E-03	0.20355E+00	0.26251E+00	0.26251E+01	0.20344E+02
0.56234E+00	0.70666E-03	0.97132E-01	0.12526E+00	0.12526E+01	0.15718E+02
0.10000E+01	0.12566E-02	0.41917E-01	0.54057E-01	0.54057E+00	0.13072E+02
0.17783E+01	0.22347E-02	0.15467E-01	0.19946E-01	0.19946E+00	0.11927E+02
0.31623E+01	0.39738E-02	0.48025E-02	0.61934E-02	0.61934E-01	0.11663E+02
0.56234E+01	0.70666E-02	0.12732E-02	0.16420E-02	0.16420E-01	0.12030E+02
0.10000E+02	0.12566E-01	0.31742E-03	0.40936E-03	0.40936E-02	0.12355E+02
0.17783E+02	0.22347E-01	0.73857E-04	0.95248E-04	0.95248E-03	0.12953E+02
0.31623E+02	0.39738E-01	0.17202E-04	0.22184E-04	0.22184E-03	0.13354E+02
0.56234E+02	0.70666E-01	0.40078E-05	0.51685E-05	0.51685E-04	0.13648E+02
0.10000E+03	0.12566E+00	0.91013E-06	0.11737E-05	0.11737E-04	0.14127E+02
0.17783E+03	0.22347E+00	0.21169E-06	0.27299E-06	0.27299E-05	0.14354E+02
0.31623E+03	0.39738E+00	0.50137E-07	0.64657E-07	0.64657E-06	0.14389E+02
0.56234E+03	0.70666E+00	0.11654E-07	0.15029E-07	0.15029E-06	0.14596E+02
0.10000E+04	0.12566E+01	0.26338E-08	0.33967E-08	0.33967E-07	0.15079E+02
0.17783E+04	0.22347E+01	0.63582E-09	0.81997E-09	0.81997E-08	0.14905E+02
0.31623E+04	0.39738E+01	0.11784E-09	0.15197E-09	0.15197E-08	0.17571E+02
0.56234E+04	0.70666E+01	0.90774E-11	0.11706E-10	0.11706E-09	0.37187E+02
0.10000E+05	0.12566E+02	0.52121E-11	0.67216E-11	0.67216E-10	0.20623E+02

(TCOLOOP): LORCA A-7

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 TG= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 5 BQ= 0.1000E-02 NS = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.6670E-01 0.1429E+00 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+02 0.8000E+02 0.5000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.64801E+00	0.10000E+01	0.10000E+02	0.63399E+02
0.17783E+00	0.22347E-03	0.34911E+00	0.53874E+00	0.53874E+01	0.39047E+02
0.31623E+00	0.39738E-03	0.19086E+00	0.29453E+00	0.29453E+01	0.23357E+02
0.56234E+00	0.70666E-03	0.10404E+00	0.16056E+00	0.16056E+01	0.13924E+02
0.10000E+01	0.12566E-02	0.54549E-01	0.84179E-01	0.84179E+00	0.88584E+01
0.17783E+01	0.22347E-02	0.23977E-01	0.36847E-01	0.36847E+00	0.72270E+01
0.31623E+01	0.39738E-02	0.83736E-02	0.12922E-01	0.12922E+00	0.69717E+01
0.56234E+01	0.70666E-02	0.22415E-02	0.34590E-02	0.34590E-01	0.76750E+01
0.10000E+02	0.12566E-01	0.53349E-03	0.82327E-03	0.82327E-02	0.84493E+01
0.17783E+02	0.22347E-01	0.11289E-03	0.17421E-03	0.17421E-02	0.96270E+01
0.31623E+02	0.39738E-01	0.23954E-04	0.36966E-04	0.36966E-03	0.10648E+02
0.56234E+02	0.70666E-01	0.52130E-05	0.80446E-05	0.80446E-04	0.11427E+02
0.10000E+03	0.12566E+00	0.10981E-05	0.16792E-05	0.16792E-04	0.12531E+02
0.17783E+03	0.22347E+00	0.24142E-06	0.37255E-06	0.37255E-05	0.13145E+02
0.31623E+03	0.39738E+00	0.55886E-07	0.86242E-07	0.86242E-06	0.13383E+02
0.56234E+03	0.70666E+00	0.12504E-07	0.19296E-07	0.19296E-06	0.13926E+02
0.10000E+04	0.12566E+01	0.28503E-08	0.43986E-08	0.43986E-07	0.14305E+02
0.17783E+04	0.22347E+01	0.71453E-09	0.11027E-08	0.11027E-07	0.13739E+02
0.31623E+04	0.39738E+01	0.17114E-09	0.26410E-09	0.26410E-08	0.13700E+02
0.56234E+04	0.70666E+01	0.59348E-10	0.91584E-10	0.91584E-09	0.10634E+02

(TCOLOOP): LORCA A-8

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.6570E-01 0.1429E+00 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+02 0.1200E+03 0.5000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.04770E+00	0.10000E+01	0.10000E+02	0.63466E+02
0.17783E+00	0.22347E-03	0.34943E+00	0.53958E+00	0.53958E+01	0.38962E+02
0.31623E+00	0.39738E-03	0.18999E+00	0.29333E+00	0.29333E+01	0.23562E+02
0.56234E+00	0.70666E-03	0.10040E+00	0.15500E+00	0.15500E+01	0.14847E+02
0.10000E+01	0.12566E-02	0.50570E-01	0.78075E-01	0.78075E+00	0.10012E+02
0.17783E+01	0.22347E-02	0.23333E-01	0.36024E-01	0.36024E+00	0.74490E+01
0.31623E+01	0.39738E-02	0.90533E-02	0.13978E-01	0.13978E+00	0.64340E+01
0.56234E+01	0.70666E-02	0.27276E-02	0.42113E-02	0.42113E-01	0.65027E+01
0.10000E+02	0.12566E-01	0.68380E-03	0.10557E-02	0.10557E-01	0.70071E+01
0.17783E+02	0.22347E-01	0.14815E-03	0.22874E-03	0.22874E-02	0.79400E+01
0.31623E+02	0.39738E-01	0.30078E-04	0.46438E-04	0.46438E-03	0.91059E+01
0.56234E+02	0.70666E-01	0.63343E-05	0.97805E-05	0.97805E-04	0.10014E+02
0.10000E+03	0.12566E+00	0.12582E-05	0.19426E-05	0.19426E-04	0.11366E+02
0.17783E+03	0.22347E+00	0.26849E-06	0.41453E-06	0.41453E-05	0.12242E+02
0.31623E+03	0.39738E+00	0.60955E-07	0.94110E-07	0.94110E-06	0.12628E+02
0.56234E+03	0.70666E+00	0.13423E-07	0.20724E-07	0.20724E-06	0.13292E+02
0.10000E+04	0.12566E+01	0.29900E-08	0.46163E-08	0.46163E-07	0.13856E+02
0.17783E+04	0.22347E+01	0.61661E-09	0.95200E-09	0.95200E-08	0.15213E+02
0.31623E+04	0.39738E+01	0.15988E-09	0.24684E-09	0.24684E-08	0.14336E+02
0.56234E+04	0.70666E+01	0.21811E-10	0.33674E-10	0.33674E-09	0.20729E+02

(TCOLOOP): LORCA 3-1

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E+00 0.5000E-01 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.1000E+02 0.4000E+02 0.8000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.31534E+00	0.10000E+01	0.10000E+02	0.32322E+02
0.17783E+00	0.22347E-03	0.47730E+00	0.58540E+00	0.58540E+01	0.15298E+02
0.31623E+00	0.39738E-03	0.27281E+00	0.33459E+00	0.33459E+01	0.79532E+01
0.56234E+00	0.70666E-03	0.14637E+00	0.17952E+00	0.17952E+01	0.55325E+01
0.10000E+01	0.12566E-02	0.69392E-01	0.85108E-01	0.95108E+00	0.53970E+01
0.17783E+01	0.22347E-02	0.26491E-01	0.32491E-01	0.32491E+00	0.62608E+01
0.31623E+01	0.39738E-02	0.79836E-02	0.97917E-02	0.97917E-01	0.73132E+01
0.56234E+01	0.70666E-02	0.18835E-02	0.23101E-02	0.23101E-01	0.88470E+01
0.10000E+02	0.12566E-01	0.41326E-03	0.50686E-03	0.50686E-02	0.10203E+02
0.17783E+02	0.22347E-01	0.81741E-04	0.10025E-03	0.10025E-02	0.12070E+02
0.31623E+02	0.39738E-01	0.17051E-04	0.20912E-04	0.20912E-03	0.13434E+02
0.56234E+02	0.70666E-01	0.36080E-05	0.44251E-05	0.44251E-04	0.14651E+02
0.10000E+03	0.12566E+00	0.73575E-06	0.90238E-06	0.90238E-05	0.16234E+02
0.17783E+03	0.22347E+00	0.16188E-06	0.19854E-06	0.19854E-05	0.17175E+02
0.31623E+03	0.39738E+00	0.36526E-07	0.44798E-07	0.44798E-06	0.17779E+02
0.56234E+03	0.70666E+00	0.82516E-08	0.10120E-07	0.10120E-06	0.18378E+02
0.10000E+04	0.12566E+01	0.17627E-08	0.21619E-08	0.21619E-07	0.19712E+02
0.17783E+04	0.22347E+01	0.41018E-09	0.50308E-09	0.50308E-08	0.19966E+02
0.31623E+04	0.39738E+01	0.96682E-10	0.11858E-09	0.11858E-08	0.20049E+02
0.56234E+04	0.70666E+01	0.16363E-10	0.20682E-10	0.20682E-09	0.24608E+02
0.10000E+05	0.12566E+02	0.51575E-11	0.63256E-11	0.63256E-10	0.20769E+02

(TCOLOOP):

LORCA B-2

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NS = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E+00 0.5000E-01 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.6000E+02 0.8000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80786E+00	0.10000E+01	0.10000E+02	0.33531E+02
0.17783E+00	0.22347E-03	0.45733E+00	0.56610E+00	0.56610E+01	0.18361E+02
0.31623E+00	0.39738E-03	0.25653E+00	0.31754E+00	0.31754E+01	0.10426E+02
0.56234E+00	0.70666E-03	0.14009E+00	0.17341E+00	0.17341E+01	0.65663E+01
0.10000E+01	0.12566E-02	0.70913E-01	0.86665E-01	0.86665E+00	0.52759E+01
0.17783E+01	0.22347E-02	0.28754E-01	0.35593E-01	0.35593E+00	0.55340E+01
0.31623E+01	0.39738E-02	0.93744E-02	0.11604E-01	0.11604E+00	0.62019E+01
0.56234E+01	0.70666E-02	0.23234E-02	0.28760E-02	0.28760E-01	0.74493E+01
0.10000E+02	0.12566E-01	0.51563E-03	0.63826E-03	0.63826E-02	0.86664E+01
0.17783E+02	0.22347E-01	0.10036E-03	0.12423E-03	0.12423E-02	0.10457E+02
0.31623E+02	0.39738E-01	0.20090E-04	0.24868E-04	0.24868E-03	0.12011E+02
0.56234E+02	0.70666E-01	0.41389E-05	0.51233E-05	0.51233E-04	0.13355E+02
0.10000E+03	0.12566E+00	0.80635E-06	0.99813E-06	0.99813E-05	0.15323E+02
0.17783E+03	0.22347E+00	0.17281E-06	0.21391E-06	0.21391E-05	0.16441E+02
0.31623E+03	0.39738E+00	0.39116E-07	0.48420E-07	0.48420E-06	0.16984E+02
0.56234E+03	0.70666E+00	0.84930E-08	0.10513E-07	0.10513E-06	0.18028E+02
0.10000E+04	0.12566E+01	0.18140E-08	0.22454E-08	0.22454E-07	0.19338E+02
0.17783E+04	0.22347E+01	0.41524E-09	0.51400E-09	0.51400E-08	0.19803E+02
0.31623E+04	0.39738E+01	0.89097E-10	0.11029E-09	0.11029E-08	0.21172E+02
0.56234E+04	0.70666E+01	0.80596E-11	0.99765E-11	0.99765E-10	0.40256E+02
0.10000E+05	0.12566E+02	0.36397E-11	0.45673E-11	0.45673E-10	0.25964E+02

(TCOLOOP): LORCA 8-3

M = 4 XNORM=0.100E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 S0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E+00 0.5000E-01 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.2000E+02 0.8000E+02 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XXNORM	APP.RES.
0.10000E+00	0.12566E-03	0.89933E+00	0.10000E+01	0.10000E+02	0.19960E+02
0.17783E+00	0.22347E-03	0.51987E+00	0.57806E+00	0.57806E+01	0.93356E+01
0.31623E+00	0.39738E-03	0.28450E+00	0.31635E+00	0.31635E+01	0.62973E+01
0.56234E+00	0.70666E-03	0.14355E+00	0.15962E+00	0.15962E+01	0.59807E+01
0.10000E+01	0.12566E-02	0.63063E-01	0.70122E-01	0.70122E+00	0.67215E+01
0.17783E+01	0.22347E-02	0.22212E-01	0.24699E-01	0.24699E+00	0.79315E+01
0.31623E+01	0.39738E-02	0.62081E-02	0.69030E-02	0.69030E-01	0.92911E+01
0.56234E+01	0.70666E-02	0.14367E-02	0.15975E-02	0.15975E-01	0.10959E+02
0.10000E+02	0.12566E-01	0.31822E-03	0.35384E-03	0.35384E-02	0.12333E+02
0.17783E+02	0.22347E-01	0.65659E-04	0.73009E-04	0.73009E-03	0.14054E+02
0.31623E+02	0.39738E-01	0.14347E-04	0.15953E-04	0.15953E-03	0.15111E+02
0.56234E+02	0.70666E-01	0.31354E-05	0.34863E-05	0.34863E-04	0.16105E+02
0.10000E+03	0.12566E+00	0.67083E-06	0.74597E-06	0.74597E-05	0.17334E+02
0.17783E+03	0.22347E+00	0.15022E-06	0.16703E-06	0.16703E-05	0.18056E+02
0.31623E+03	0.39738E+00	0.34435E-07	0.38290E-07	0.38290E-06	0.18493E+02
0.56234E+03	0.70666E+00	0.77331E-08	0.85987E-08	0.85987E-07	0.19191E+02
0.10000E+04	0.12566E+01	0.17660E-08	0.19637E-08	0.19637E-07	0.19687E+02
0.17783E+04	0.22347E+01	0.38707E-09	0.43040E-09	0.43040E-08	0.20753E+02
0.31623E+04	0.39738E+01	0.69642E-10	0.77438E-10	0.77438E-09	0.24951E+02
0.56234E+04	0.70666E+01	0.23943E-10	0.26624E-10	0.26624E-09	0.19479E+02

(TCOLOOP):

LORCA 8-4

M = 4 XNORM=0.10E+02 IFCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E+00 0.5000E-01 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.1000E+02 0.2000E+02 0.1200E+03 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.89841E+00	0.10000E+01	0.10000E+02	0.20087E+02
0.17783E+00	0.22347E-03	0.52084E+00	0.57974E+00	0.57974E+01	0.92094E+01
0.31623E+00	0.39738E-03	0.28247E+00	0.31442E+00	0.31442E+01	0.65767E+01
0.56234E+00	0.70666E-03	0.14014E+00	0.15599E+00	0.15599E+01	0.65565E+01
0.10000E+01	0.12566E-02	0.61559E-01	0.68520E-01	0.68520E+00	0.70640E+01
0.17783E+01	0.22347E-02	0.22547E-01	0.25096E-01	0.25096E+00	0.77836E+01
0.31623E+01	0.39738E-02	0.67196E-02	0.74794E-02	0.74794E-01	0.86346E+01
0.56234E+01	0.70666E-02	0.16279E-02	0.18120E-02	0.18120E-01	0.99379E+01
0.10000E+02	0.12566E-01	0.36615E-03	0.40755E-03	0.40755E-02	0.11143E+02
0.17783E+02	0.22347E-01	0.75030E-04	0.83514E-04	0.83514E-03	0.12812E+02
0.31623E+02	0.39738E-01	0.15944E-04	0.17747E-04	0.17747E-03	0.14063E+02
0.56234E+02	0.70666E-01	0.34263E-05	0.38137E-05	0.38137E-04	0.15171E+02
0.10000E+03	0.12566E+00	0.71257E-06	0.79215E-06	0.79315E-05	0.16648E+02
0.17783E+03	0.22347E+00	0.15766E-06	0.17548E-06	0.17548E-05	0.17482E+02
0.31623E+03	0.39738E+00	0.36049E-07	0.40126E-07	0.40126E-06	0.17936E+02
0.56234E+03	0.70666E+00	0.81568E-08	0.90792E-08	0.90792E-07	0.18520E+02
0.10000E+04	0.12566E+01	0.17607E-08	0.19598E-08	0.19598E-07	0.19726E+02
0.17783E+04	0.22347E+01	0.32852E-09	0.36567E-09	0.36567E-08	0.23151E+02
0.31623E+04	0.39738E+01	0.14175E-09	0.15777E-09	0.15777E-08	0.15534E+02
0.56234E+04	0.70666E+01	0.26613E-10	0.29627E-10	0.29627E-09	0.18151E+02

(TCOLOOP): LORCA 8-5

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E+00 0.5000E-01 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.4000E+02 0.1200E+03 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.81534E+00	0.10000E+01	0.10000E+02	0.32322E+02
0.17783E+00	0.22347E-03	0.47733E+00	0.58544E+00	0.58544E+01	0.15294E+02
0.31623E+00	0.39738E-03	0.27264E+00	0.33439E+00	0.33439E+01	0.79776E+01
0.56234E+00	0.70666E-03	0.14521E+00	0.17809E+00	0.17809E+01	0.57138E+01
0.10000E+01	0.12566E-02	0.67937E-01	0.83323E-01	0.83323E+00	0.56864E+01
0.17783E+01	0.22347E-02	0.26332E-01	0.32296E-01	0.32296E+00	0.63153E+01
0.31623E+01	0.39738E-02	0.82435E-02	0.10111E-01	0.10111E+00	0.70827E+01
0.56234E+01	0.70666E-02	0.20461E-02	0.25095E-02	0.25095E-01	0.82727E+01
0.10000E+02	0.12566E-01	0.45975E-03	0.56387E-03	0.56387E-02	0.94344E+01
0.17783E+02	0.22347E-01	0.91979E-04	0.11281E-03	0.11281E-02	0.11116E+02
0.31623E+02	0.39738E-01	0.18801E-04	0.23059E-04	0.23059E-03	0.12568E+02
0.56234E+02	0.70666E-01	0.39244E-05	0.48132E-05	0.48132E-04	0.13843E+02
0.10000E+03	0.12566E+00	0.78145E-06	0.95843E-06	0.95843E-05	0.15649E+02
0.17783E+03	0.22347E+00	0.16854E-06	0.20671E-06	0.20671E-05	0.16719E+02
0.31623E+03	0.39738E+00	0.38437E-07	0.47142E-07	0.47142E-06	0.17184E+02
0.56234E+03	0.70666E+00	0.86362E-08	0.10592E-07	0.10592E-06	0.17828E+02
0.10000E+04	0.12566E+01	0.18631E-08	0.22850E-08	0.22850E-07	0.18997E+02
0.17783E+04	0.22347E+01	0.47783E-09	0.58605E-09	0.58605E-08	0.18033E+02
0.31623E+04	0.39738E+01	0.10556E-09	0.12946E-09	0.12946E-08	0.18909E+02

(TCOLOOP):

LORCA 8-6

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E+00 0.5000E-01 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.6000E+02 0.1200E+03 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80814E+00	0.10000E+01	0.10000E+02	0.33485E+02
0.17783E+00	0.22347E-03	0.45697E+00	0.56547E+00	0.56547E+01	0.18416E+02
0.31623E+00	0.39738E-03	0.25670E+00	0.31765E+00	0.31765E+01	0.10396E+02
0.56234E+00	0.70666E-03	0.13984E+00	0.17304E+00	0.17304E+01	0.66087E+01
0.10000E+01	0.12566E-02	0.69084E-01	0.85486E-01	0.85486E+00	0.54576E+01
0.17783E+01	0.22347E-02	0.28437E-01	0.35188E-01	0.35188E+00	0.56305E+01
0.31623E+01	0.39738E-02	0.94519E-02	0.11696E-01	0.11696E+00	0.61478E+01
0.56234E+01	0.70666E-02	0.24450E-02	0.30255E-02	0.30255E-01	0.71374E+01
0.10000E+02	0.12566E-01	0.55752E-03	0.68988E-03	0.68988E-02	0.81757E+01
0.17783E+02	0.22347E-01	0.11097E-03	0.13731E-03	0.13731E-02	0.97441E+01
0.31623E+02	0.39738E-01	0.21964E-04	0.27179E-04	0.27179E-03	0.11300E+02
0.56234E+02	0.70666E-01	0.44779E-05	0.55410E-05	0.55410E-04	0.12663E+02
0.10000E+03	0.12566E+00	0.85970E-06	0.10638E-05	0.10638E-04	0.14678E+02
0.17783E+03	0.22347E+00	0.18184E-06	0.22501E-06	0.22501E-05	0.15890E+02
0.31623E+03	0.39738E+00	0.40664E-07	0.50318E-07	0.50318E-06	0.16550E+02
0.56234E+03	0.70666E+00	0.88666E-08	0.10972E-07	0.10972E-06	0.17517E+02
0.10000E+04	0.12566E+01	0.19244E-08	0.23813E-08	0.23813E-07	0.18591E+02
0.17783E+04	0.22347E+01	0.50337E-09	0.62288E-09	0.62288E-08	0.17418E+02
0.31623E+04	0.39738E+01	0.15156E-09	0.18754E-09	0.18754E-08	0.14856E+02
0.56234E+04	0.70666E+01	0.43200E-10	0.53457E-10	0.53457E-09	0.13142E+02

(TCOLOOP): LORCA 8-7

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.5000E-01 0.5000E-01 0.3330E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.1000E+02 0.1600E+03 0.1200E+03 0.2000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80809E+00	0.10000E+01	0.10000E+02	0.33493E+02
0.17783E+00	0.22347E-03	0.45476E+00	0.56277E+00	0.56277E+01	0.18777E+02
0.31623E+00	0.39738E-03	0.24864E+00	0.30769E+00	0.30769E+01	0.11758E+02
0.56234E+00	0.70666E-03	0.12954E+00	0.16030E+00	0.16030E+01	0.84309E+01
0.10000E+01	0.12566E-02	0.62842E-01	0.77767E-01	0.77767E+00	0.67711E+01
0.17783E+01	0.22347E-02	0.28294E-01	0.35013E-01	0.35013E+00	0.56747E+01
0.31623E+01	0.39738E-02	0.11023E-01	0.13641E-01	0.13641E+00	0.51837E+01
0.56234E+01	0.70666E-02	0.34374E-02	0.42538E-02	0.42538E-01	0.52992E+01
0.10000E+02	0.12566E-01	0.85951E-03	0.10636E-02	0.10636E-01	0.58723E+01
0.17783E+02	0.22347E-01	0.18043E-03	0.22335E-03	0.22335E-02	0.68926E+01
0.31623E+02	0.39738E-01	0.33627E-04	0.41613E-04	0.41613E-03	0.84314E+01
0.56234E+02	0.70666E-01	0.65056E-05	0.80506E-05	0.80506E-04	0.99345E+01
0.10000E+03	0.12566E+00	0.11487E-05	0.14216E-05	0.14216E-04	0.12093E+02
0.17783E+03	0.22347E+00	0.22514E-06	0.27861E-06	0.27861E-05	0.13774E+02
0.31623E+03	0.39738E+00	0.48932E-07	0.60553E-07	0.60553E-06	0.14625E+02
0.56234E+03	0.70666E+00	0.98858E-08	0.12234E-07	0.12234E-06	0.16290E+02
0.10000E+04	0.12566E+01	0.21996E-08	0.27220E-08	0.27220E-07	0.17005E+02
0.17783E+04	0.22347E+01	0.54469E-09	0.67405E-09	0.67405E-08	0.16525E+02
0.31623E+04	0.39738E+01	0.17950E-09	0.22213E-09	0.22213E-08	0.13271E+02
0.56234E+04	0.70666E+01	0.39766E-10	0.49210E-10	0.49210E-09	0.13899E+02

{TCOLOOP): LORCA C-1

M = 5 XNORM=0.10E+02 IPCM= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.5000E+02 0.1000E+03 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80913E+00	0.10000E+01	0.10000E+02	0.33317E+02
0.17783E+00	0.22347E-03	0.47417E+00	0.58602E+00	0.58602E+01	0.15767E+02
0.31623E+00	0.39738E-03	0.28297E+00	0.34972E+00	0.34972E+01	0.65077E+01
0.56234E+00	0.70666E-03	0.15690E+00	0.19392E+00	0.19392E+01	0.39705E+01
0.10000E+01	0.12566E-02	0.70604E-01	0.87259E-01	0.87259E+00	0.51619E+01
0.17783E+01	0.22347E-02	0.24665E-01	0.30484E-01	0.30484E+00	0.69193E+01
0.31623E+01	0.39738E-02	0.67779E-02	0.83767E-02	0.83767E-01	0.85649E+01
0.56234E+01	0.70666E-02	0.16072E-02	0.19864E-02	0.19864E-01	0.10038E+02
0.10000E+02	0.12566E-01	0.36370E-03	0.44949E-03	0.44949E-02	0.11198E+02
0.17783E+02	0.22347E-01	0.76274E-04	0.94266E-04	0.94266E-03	0.12666E+02
0.31623E+02	0.39738E-01	0.16349E-04	0.20205E-04	0.20205E-03	0.13825E+02
0.56234E+02	0.70666E-01	0.35067E-05	0.43338E-05	0.43338E-04	0.14935E+02
0.10000E+03	0.12566E+00	0.73090E-06	0.90332E-06	0.90332E-05	0.16367E+02
0.17783E+03	0.22347E+00	0.16110E-06	0.19911E-06	0.19911E-05	0.17231E+02
0.31623E+03	0.39738E+00	0.36725E-07	0.45388E-07	0.45388E-06	0.17715E+02
0.56234E+03	0.70666E+00	0.82952E-08	0.10252E-07	0.10252E-06	0.18313E+02
0.10000E+04	0.12566E+01	0.18303E-08	0.22621E-08	0.22621E-07	0.19223E+02
0.17783E+04	0.22347E+01	0.38747E-09	0.47887E-09	0.47887E-08	0.20739E+02
0.31623E+04	0.39738E+01	0.13389E-09	0.16548E-09	0.16548E-08	0.16136E+02
0.56234E+04	0.70666E+01	0.28784E-10	0.35574E-10	0.35574E-09	0.17228E+02

(TCOLOOP): LORCA C-2

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.2330E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.1000E+03 0.1000E+03 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80715E+00	0.10000E+01	0.10000E+02	0.33649E+02
0.17783E+00	0.22347E-03	0.45598E+00	0.56492E+00	0.56492E+01	0.18574E+02
0.31623E+00	0.39738E-03	0.24825E+00	0.30757E+00	0.30757E+01	0.11824E+02
0.56234E+00	0.70666E-03	0.13245E+00	0.16409E+00	0.16409E+01	0.79007E+01
0.10000E+01	0.12566E-02	0.68821E-01	0.85264E-01	0.85264E+00	0.55096E+01
0.17783E+01	0.22347E-02	0.29894E-01	0.37036E-01	0.37036E+00	0.51998E+01
0.31623E+01	0.39738E-02	0.10320E-01	0.12786E-01	0.12786E+00	0.55862E+01
0.56234E+01	0.70666E-02	0.26622E-02	0.32995E-02	0.32995E-01	0.66377E+01
0.10000E+02	0.12566E-01	0.61055E-03	0.75643E-03	0.75643E-02	0.76361E+01
0.17783E+02	0.22347E-01	0.12170E-03	0.15078E-03	0.15078E-02	0.91297E+01
0.31623E+02	0.39738E-01	0.24105E-04	0.29865E-04	0.29865E-03	0.10602E+02
0.56234E+02	0.70666E-01	0.48711E-05	0.60349E-05	0.60349E-04	0.11963E+02
0.10000E+03	0.12566E+00	0.92375E-06	0.11445E-05	0.11445E-04	0.13997E+02
0.17783E+03	0.22347E+00	0.19197E-06	0.23783E-06	0.23783E-05	0.15325E+02
0.31623E+03	0.39738E+00	0.42206E-07	0.52290E-07	0.52290E-06	0.16143E+02
0.56234E+03	0.70666E+00	0.92553E-08	0.11467E-07	0.11467E-06	0.17023E+02
0.10000E+04	0.12566E+01	0.19968E-08	0.24738E-08	0.24738E-07	0.18139E+02
0.17783E+04	0.22347E+01	0.45327E-09	0.56157E-09	0.56157E-08	0.18679E+02
0.31623E+04	0.39738E+01	0.15744E-09	0.19506E-09	0.19506E-08	0.14484E+02
0.56234E+04	0.70666E+01	0.50303E-10	0.62321E-10	0.62321E-09	0.11874E+02

(TCOLGDP):

LGRC4 C-3

M = 5 XNJRM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 N6 = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.5000E+02 0.5000E+02 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80823E+00	0.10000E+01	0.10000E+02	0.33468E+02
0.17783E+00	0.22347E-03	0.47475E+00	0.58739E+00	0.58739E+01	0.15680E+02
0.31623E+00	0.39738E-03	0.27949E+00	0.34580E+00	0.34580E+01	0.69946E+01
0.56234E+00	0.70666E-03	0.15242E+00	0.18858E+00	0.18858E+01	0.46183E+01
0.10000E+01	0.12566E-02	0.69202E-01	0.85621E-01	0.85621E+00	0.54344E+01
0.17783E+01	0.22347E-02	0.25338E-01	0.31350E-01	0.31350E+00	0.66631E+01
0.31623E+01	0.39738E-02	0.74458E-02	0.92124E-02	0.92124E-01	0.78308E+01
0.56234E+01	0.70666E-02	0.18102E-02	0.22397E-02	0.22397E-01	0.91336E+01
0.10000E+02	0.12566E-01	0.40673E-03	0.50324E-03	0.50324E-02	0.10322E+02
0.17783E+02	0.22347E-01	0.82956E-04	0.10264E-03	0.10264E-02	0.11947E+02
0.31623E+02	0.39738E-01	0.17368E-04	0.21488E-04	0.21488E-03	0.13267E+02
0.56234E+02	0.70666E-01	0.36767E-05	0.45491E-05	0.45491E-04	0.14466E+02
0.10000E+03	0.12566E+00	0.75101E-06	0.92919E-06	0.92919E-05	0.16071E+02
0.17783E+03	0.22347E+00	0.16435E-06	0.20335E-06	0.20335E-05	0.17002E+02
0.31623E+03	0.39738E+00	0.37421E-07	0.46299E-07	0.46299E-06	0.17494E+02
0.56234E+03	0.70666E+00	0.34152E-08	0.10412E-07	0.10412E-06	0.18139E+02
0.10000E+04	0.12566E+01	0.18244E-08	0.22572E-08	0.22572E-07	0.19265E+02
0.17783E+04	0.22347E+01	0.42712E-09	0.52846E-09	0.52846E-08	0.19434E+02
0.31623E+04	0.39738E+01	0.27028E-10	0.33440E-10	0.33440E-09	0.46898E+02
0.56234E+04	0.70666E+01	0.23650E-10	0.29261E-10	0.29261E-09	0.19639E+02
0.10000E+05	0.12566E+02	0.46441E-11	0.57460E-11	0.57460E-10	0.22272E+02

(TCOLOOP): LORCA C-4

M = 5 XNORM=0.10E+02 IPCM= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.1000E+03 0.5000E+02 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80745E+00	0.10000E+01	0.10000E+02	0.33600E+02
0.17783E+00	0.22347E-03	0.45556E+00	0.56423E+00	0.56423E+01	0.18639E+02
0.31623E+00	0.39738E-03	0.24845E+00	0.30770E+00	0.30770E+01	0.11789E+02
0.56234E+00	0.70666E-03	0.13225E+00	0.16379E+00	0.16379E+01	0.79367E+01
0.10000E+01	0.12566E-02	0.67904E-01	0.84097E-01	0.84097E+00	0.56930E+01
0.17783E+01	0.22347E-02	0.29574E-01	0.36626E-01	0.36626E+00	0.52916E+01
0.31623E+01	0.39738E-02	0.10403E-01	0.12883E-01	0.12883E+00	0.55368E+01
0.56234E+01	0.70666E-02	0.27897E-02	0.34552E-02	0.34552E-01	0.63773E+01
0.10000E+02	0.12566E-01	0.65016E-03	0.80520E-03	0.80520E-02	0.72813E+01
0.17783E+02	0.22347E-01	0.13062E-03	0.16177E-03	0.16177E-02	0.86839E+01
0.31623E+02	0.39738E-01	0.25405E-04	0.31463E-04	0.31463E-03	0.10227E+02
0.56234E+02	0.70666E-01	0.50892E-05	0.63028E-05	0.63028E-04	0.11614E+02
0.10000E+03	0.12566E+00	0.95026E-06	0.11769E-05	0.11769E-04	0.13724E+02
0.17783E+03	0.22347E+00	0.19608E-06	0.24234E-06	0.24284E-05	0.15109E+02
0.31623E+03	0.39738E+00	0.43010E-07	0.53267E-07	0.53267E-06	0.15941E+02
0.56234E+03	0.70666E+00	0.93147E-08	0.11536E-07	0.11536E-06	0.16950E+02
0.10000E+04	0.12566E+01	0.18789E-08	0.23270E-08	0.23270E-07	0.18890E+02
0.17783E+04	0.22347E+01	0.47295E-09	0.58573E-09	0.58573E-08	0.18157E+02
0.31623E+04	0.39738E+01	0.69148E-10	0.85638E-10	0.85638E-09	0.25070E+02
0.56234E+04	0.70666E+01	0.22138E-10	0.27417E-10	0.27417E-09	0.20524E+02

(TCOLOOP): LBPC C-5

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 5 B0= 0.1000E+02 N5 = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.5000E+02 0.5000E+02 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80861E+00	0.10000E+01	0.10000E+02	0.33405E+02
0.17783E+00	0.22347E-03	0.48123E+00	0.59514E+00	0.59514E+01	0.14715E+02
0.31623E+00	0.39738E-03	0.28623E+00	0.35416E+00	0.35416E+01	0.60417E+01
0.56234E+00	0.70666E-03	0.15550E+00	0.19230E+00	0.19230E+01	0.41708E+01
0.10000E+01	0.12566E-02	0.68826E-01	0.85116E-01	0.85116E+00	0.55087E+01
0.17783E+01	0.22347E-02	0.24386E-01	0.30158E-01	0.30158E+00	0.70267E+01
0.31623E+01	0.39738E-02	0.69159E-02	0.85529E-02	0.85529E-01	0.84037E+01
0.56234E+01	0.70666E-02	0.16581E-02	0.20505E-02	0.20505E-01	0.97947E+01
0.10000E+02	0.12566E-01	0.37164E-03	0.45960E-03	0.45960E-02	0.11023E+02
0.17783E+02	0.22347E-01	0.76574E-04	0.94698E-04	0.94698E-03	0.12632E+02
0.31623E+02	0.39738E-01	0.16288E-04	0.20143E-04	0.20143E-03	0.13860E+02
0.56234E+02	0.70666E-01	0.34571E-05	0.43125E-05	0.43125E-04	0.14992E+02
0.10000E+03	0.12566E+00	0.72490E-06	0.89648E-06	0.89648E-05	0.16457E+02
0.17783E+03	0.22347E+00	0.15960E-06	0.19738E-06	0.19738E-05	0.17339E+02
0.31623E+03	0.39738E+00	0.36020E-07	0.44546E-07	0.44546E-06	0.17946E+02
0.56234E+03	0.70666E+00	0.83362E-08	0.10309E-07	0.10309E-06	0.18253E+02
0.10000E+04	0.12566E+01	0.18608E-08	0.23013E-08	0.23013E-07	0.19012E+02
0.17783E+04	0.22347E+01	0.44445E-09	0.54965E-09	0.54965E-08	0.18926E+02
0.31623E+04	0.39738E+01	0.96276E-10	0.11906E-09	0.11906E-08	0.20105E+02
0.56234E+04	0.70666E+01	0.24779E-10	0.30644E-10	0.30644E-09	0.19038E+02

(TCOLOUP): LORCA C-6

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IGUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 5 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.5000E+02 0.1000E+03 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80992E+00	0.10000E+01	0.10000E+02	0.33353E+02
0.17783E+00	0.22347E-03	0.48272E+00	0.59675E+00	0.59675E+01	0.14496E+02
0.31623E+00	0.39738E-03	0.29322E+00	0.36260E+00	0.36260E+01	0.51236E+01
0.56234E+00	0.70666E-03	0.16206E+00	0.20034E+00	0.20034E+01	0.32604E+01
0.10000E+01	0.12566E-02	0.70206E-01	0.86789E-01	0.86789E+00	0.52336E+01
0.17783E+01	0.22347E-02	0.23244E-01	0.28734E-01	0.28734E+00	0.74859E+01
0.31623E+01	0.39738E-02	0.59623E-02	0.73707E-02	0.73707E-01	0.96390E+01
0.56234E+01	0.70666E-02	0.13580E-02	0.16911E-02	0.16911E-01	0.11333E+02
0.10000E+02	0.12566E-01	0.30583E-03	0.37930E-03	0.37930E-02	0.12650E+02
0.17783E+02	0.22347E-01	0.65463E-04	0.80926E-04	0.80926E-03	0.14084E+02
0.31623E+02	0.39738E-01	0.14459E-04	0.17875E-04	0.17875E-03	0.15030E+02
0.56234E+02	0.70666E-01	0.31689E-05	0.39174E-05	0.39174E-04	0.15990E+02
0.10000E+03	0.12566E+00	0.58047E-05	0.84121E-06	0.84121E-05	0.17170E+02
0.17783E+03	0.22347E+00	0.15236E-06	0.18837E-06	0.18837E-05	0.17885E+02
0.31623E+03	0.39738E+00	0.35148E-07	0.43450E-07	0.43450E-06	0.18242E+02
0.56234E+03	0.70666E+00	0.91343E-08	0.10056E-07	0.10056E-06	0.18554E+02
0.10000E+04	0.12566E+01	0.18988E-08	0.23473E-08	0.23473E-07	0.18758E+02
0.17783E+04	0.22347E+01	0.36010E-09	0.44516E-09	0.44516E-08	0.21777E+02
0.31623E+04	0.39738E+01	0.10779E-09	0.13325E-09	0.13325E-08	0.18646E+02
0.56234E+04	0.70666E+01	0.22623E-10	0.35284E-10	0.35284E-09	0.17293E+02

(TCOLGOP): LORC C-7

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.5000E+02 0.1500E+03 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80942E+00	0.10000E+01	0.10000E+02	0.33269E+02
0.17783E+00	0.22347E-03	0.47384E+00	0.58541E+00	0.58541E+01	0.15816E+02
0.31623E+00	0.39738E-03	0.28341E+00	0.35014E+00	0.35014E+01	0.64459E+01
0.56234E+00	0.70666E-03	0.15823E+00	0.19561E+00	0.19561E+01	0.37636E+01
0.10000E+01	0.12566E-02	0.71825E-01	0.88738E-01	0.88738E+00	0.49302E+01
0.17783E+01	0.22347E-02	0.24552E-01	0.30457E-01	0.30457E+00	0.69242E+01
0.31623E+01	0.39738E-02	0.64894E-02	0.80174E-02	0.80174E-01	0.89196E+01
0.56234E+01	0.70666E-02	0.14717E-02	0.18182E-02	0.18182E-01	0.10756E+02
0.10000E+02	0.12566E-01	0.33162E-03	0.40970E-03	0.40970E-02	0.11971E+02
0.17783E+02	0.22347E-01	0.70536E-04	0.87144E-04	0.87144E-03	0.13373E+02
0.31623E+02	0.39738E-01	0.15474E-04	0.19118E-04	0.19118E-03	0.14352E+02
0.56234E+02	0.70666E-01	0.33565E-05	0.41468E-05	0.41468E-04	0.15383E+02
0.10000E+03	0.12566E+00	0.71217E-06	0.87985E-06	0.87985E-05	0.16654E+02
0.17783E+03	0.22347E+00	0.15786E-06	0.19503E-06	0.19503E-05	0.17466E+02
0.31623E+03	0.39738E+00	0.35730E-07	0.44143E-07	0.44143E-06	0.18043E+02
0.56234E+03	0.70666E+00	0.81869E-08	0.10115E-07	0.10115E-06	0.18475E+02
0.10000E+04	0.12566E+01	0.18747E-08	0.23162E-08	0.23162E-07	0.18918E+02
0.17783E+04	0.22347E+01	0.46789E-09	0.57806E-09	0.57806E-08	0.18288E+02
0.31623E+04	0.39738E+01	0.16211E-09	0.20028E-09	0.20028E-08	0.14204E+02
0.56234E+04	0.70666E+01	0.37684E-10	0.46557E-10	0.46557E-09	0.14336E+02

(TCOLOOP): LORCA C-8

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.5000E+02 0.1500E+03 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(TU:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.1000E+00	0.12566E-03	0.30932E+00	0.1000E+01	0.1000E+02	0.33287E+02
0.17783E+00	0.22347E-03	0.48256E+00	0.59626E+00	0.59626E+01	0.14519E+02
0.31623E+00	0.39738E-03	0.29526E+00	0.36495E+00	0.36495E+01	0.48630E+01
0.56234E+00	0.70666E-03	0.16494E+00	0.20380E+00	0.20380E+01	0.28816E+01
0.1000E+01	0.12566E-02	0.71567E-01	0.88429E-01	0.88429E+00	0.49730E+01
0.17783E+01	0.22347E-02	0.22991E-01	0.28408E-01	0.28408E+00	0.75923E+01
0.31623E+01	0.39738E-02	0.55035E-02	0.63002E-02	0.68002E-01	0.10356E+02
0.56234E+01	0.70666E-02	0.11779E-02	0.14554E-02	0.14554E-01	0.12766E+02
0.1000E+02	0.12566E-01	0.26035E-03	0.32169E-03	0.32169E-02	0.14239E+02
0.17783E+02	0.22347E-01	0.56560E-04	0.69886E-04	0.69886E-03	0.15531E+02
0.31623E+02	0.39738E-01	0.12943E-04	0.15993E-04	0.15993E-03	0.16205E+02
0.56234E+02	0.70666E-01	0.28887E-05	0.35693E-05	0.35693E-04	0.17020E+02
0.1000E+03	0.12566E+00	0.63931E-06	0.73994E-06	0.73994E-05	0.17904E+02
0.17783E+03	0.22347E+00	0.14512E-06	0.17932E-06	0.17932E-05	0.18477E+02
0.31623E+03	0.39738E+00	0.33435E-07	0.41313E-07	0.41313E-06	0.18861E+02
0.56234E+03	0.70666E+00	0.77683E-08	0.95992E-08	0.95992E-07	0.19132E+02
0.1000E+04	0.12566E+01	0.17826E-08	0.22039E-08	0.22039E-07	0.19557E+02
0.17783E+04	0.22347E+01	0.44803E-09	0.55359E-09	0.55359E-08	0.19825E+02
0.31623E+04	0.39738E+01	0.87498E-10	0.10811E-09	0.10811E-08	0.21429E+02
0.56234E+04	0.70666E+01	0.17133E-10	0.21250E-10	0.21250E-09	0.24287E+02

(TCOLOOP): LORCA C-9

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 0 S0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.5000E+02 0.2000E+03 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAUCTO:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*NXNORM	APP.RES.
0.10000E+00	0.12566E-02	0.30925E+03	0.10000E+01	0.10000E+02	0.33296E+02
0.17783E+00	0.22347E-03	0.47402E+00	0.53575E+00	0.58575E+01	0.15739E+02
0.31623E+00	0.33738E-03	0.28335E+00	0.35014E+00	0.35014E+01	0.64546E+01
0.56234E+00	0.70606E-02	0.15365E+00	0.19604E+00	0.19604E+01	0.37264E+01
0.10000E+01	0.12566E-02	0.72509E-01	0.89600E-01	0.89600E+00	0.48028E+01
0.17783E+01	0.22347E-02	0.24805E-01	0.30652E-01	0.30652E+00	0.68652E+01
0.31623E+01	0.39738E-02	0.53945E-02	0.79017E-02	0.79017E-01	0.90419E+01
0.56234E+01	0.70666E-02	0.13869E-02	0.17138E-02	0.17138E-01	0.11263E+02
0.10000E+02	0.12566E-01	0.30797E-03	0.38056E-03	0.38056E-02	0.12627E+02
0.17783E+02	0.22347E-01	0.65577E-04	0.81033E-04	0.81033E-03	0.14067E+02
0.31623E+02	0.39738E-01	0.14714E-04	0.18182E-04	0.18182E-03	0.14853E+02
0.56234E+02	0.70666E-01	0.32190E-05	0.39777E-05	0.39777E-04	0.15822E+02
0.10000E+03	0.12566E+00	0.69375E-06	0.85727E-06	0.85727E-05	0.16949E+02
0.17783E+03	0.22347E+00	0.15487E-06	0.19137E-06	0.19137E-05	0.17691E+02
0.31623E+03	0.39738E+00	0.35555E-07	0.43935E-07	0.43935E-06	0.18102E+02
0.56234E+03	0.70606E+00	0.30483E-03	0.99453E-08	0.99453E-07	0.18636E+02
0.10000E+04	0.12566E+01	0.17163E-03	0.21208E-08	0.21208E-07	0.20056E+02
0.17783E+04	0.22347E+01	0.39143E-03	0.48368E-09	0.48368E-08	0.20599E+02
0.31623E+04	0.39738E+01	0.68051E-10	0.84090E-10	0.84091E-09	0.25338E+02
0.56234E+04	0.70606E+01	0.56072E-11	0.69239E-11	0.69239E-10	0.51271E+02

(TCOLQOP): LORCA C-10

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NR = 6 3M= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.5000E+02 0.2000E+03 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM#XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80943E+00	0.10000E+01	0.10000E+02	0.33258E+02
0.17783E+00	0.22347E-03	0.48242E+00	0.59595E+00	0.59595E+01	0.14541E+02
0.31623E+00	0.39738E-03	0.29594E+00	0.36558E+00	0.36558E+01	0.47900E+01
0.56234E+00	0.70666E-03	0.16616E+00	0.20527E+00	0.20527E+01	0.27259E+01
0.10000E+01	0.12566E-02	0.72483E-01	0.89542E-01	0.89542E+00	0.48077E+01
0.17783E+01	0.22347E-02	0.23033E-01	0.28454E-01	0.28454E+00	0.75745E+01
0.31623E+01	0.39738E-02	0.52985E-02	0.65455E-02	0.65455E-01	0.10708E+02
0.56234E+01	0.70666E-02	0.10557E-02	0.13042E-02	0.13042E-01	0.13869E+02
0.10000E+02	0.12566E-01	0.22658E-03	0.27991E-03	0.27991E-02	0.15716E+02
0.17783E+02	0.22347E-01	0.49274E-04	0.60870E-04	0.60870E-03	0.17134E+02
0.31623E+02	0.39738E-01	0.11679E-04	0.14427E-04	0.14427E-03	0.17377E+02
0.56234E+02	0.70666E-01	0.26462E-05	0.32690E-05	0.32690E-04	0.19054E+02
0.10000E+03	0.12566E+00	0.60217E-06	0.74389E-06	0.74389E-05	0.18636E+02
0.17783E+03	0.22347E+00	0.13864E-06	0.17127E-06	0.17127E-05	0.19050E+02
0.31623E+03	0.39738E+00	0.32322E-07	0.39929E-07	0.39929E-06	0.19292E+02
0.56234E+03	0.70666E+00	0.74350E-08	0.92589E-08	0.92589E-07	0.19596E+02
0.10000E+04	0.12566E+01	0.18249E-08	0.22544E-08	0.22544E-07	0.19261E+02
0.17783E+04	0.22347E+01	0.43152E-09	0.53307E-09	0.53307E-08	0.19302E+02
0.31623E+04	0.39738E+01	0.10941E-09	0.13516E-09	0.13516E-08	0.18462E+02
0.56234E+04	0.70666E+01	0.10109E-10	0.12488E-10	0.12488E-09	0.34612E+02

(TCOLOOP): LORCA C-11

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.1000E+03 0.2000E+03 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM* XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80703E+00	0.10000E+01	0.10000E+02	0.33669E+02
0.17783E+00	0.22347E-02	0.45615E+00	0.56521E+00	0.56521E+01	0.18546E+02
0.31623E+00	0.39738E-03	0.24815E+00	0.30748E+00	0.30748E+01	0.11842E+02
0.56234E+00	0.70666E-03	0.13245E+00	0.16412E+00	0.16412E+01	0.79001E+01
0.10000E+01	0.12566E-02	0.59229E-01	0.85781E-01	0.85781E+00	0.54292E+01
0.17783E+01	0.22347E-02	0.30271E-01	0.37506E-01	0.37506E+00	0.50934E+01
0.31623E+01	0.39738E-02	0.10380E-01	0.12862E-01	0.12862E+00	0.55503E+01
0.56234E+01	0.70666E-02	0.25725E-02	0.31888E-02	0.31888E-01	0.68347E+01
0.10000E+02	0.12566E-01	0.56744E-03	0.70312E-03	0.70312E-02	0.80684E+01
0.17783E+02	0.22347E-01	0.10930E-03	0.13544E-03	0.13544E-02	0.98432E+01
0.31623E+02	0.39738E-01	0.22023E-04	0.27302E-04	0.27302E-03	0.11276E+02
0.56234E+02	0.70666E-01	0.45153E-05	0.55949E-05	0.55949E-04	0.12593E+02
0.10000E+03	0.12566E+00	0.87021E-06	0.10783E-05	0.10783E-04	0.14559E+02
0.17783E+03	0.22347E+00	0.18355E-06	0.22744E-06	0.22744E-05	0.15791E+02
0.31623E+03	0.39738E+00	0.40907E-07	0.50689E-07	0.50689E-06	0.16484E+02
0.56234E+03	0.70666E+00	0.88782E-08	0.11001E-07	0.11001E-06	0.17502E+02
0.10000E+04	0.12566E+01	0.19325E-08	0.24566E-08	0.24566E-07	0.18226E+02
0.17783E+04	0.22347E+01	0.43944E-09	0.54327E-09	0.54327E-08	0.19098E+02
0.31623E+04	0.39738E+01	0.14325E-09	0.17751E-09	0.17751E-08	0.15425E+02
0.56234E+04	0.70666E+01	0.51777E-10	0.76548E-10	0.76548E-09	0.10354E+02

(TCOLOOP): LORCA C-12

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.1000E+02 0.1000E+03 0.2000E+03 0.8000E+02 0.0000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.80696E+00	0.10000E+01	0.10000E+02	0.33631E+02
0.17783E+00	0.22347E-03	0.45621E+00	0.56534E+00	0.56534E+01	0.18535E+02
0.31623E+00	0.39738E-03	0.24825E+00	0.30763E+00	0.30763E+01	0.11824E+02
0.56234E+00	0.70666E-03	0.13364E+00	0.16561E+00	0.16561E+01	0.76877E+01
0.10000E+01	0.12566E-02	0.70950E-01	0.87922E-01	0.87922E+00	0.50959E+01
0.17783E+01	0.22347E-02	0.30650E-01	0.37982E-01	0.37982E+00	0.49833E+01
0.31623E+01	0.39738E-02	0.10162E-01	0.12593E-01	0.12593E+00	0.56829E+01
0.56234E+01	0.70666E-02	0.23560E-02	0.29319E-02	0.29319E-01	0.73371E+01
0.10000E+02	0.12566E-01	0.49334E-03	0.61136E-03	0.61136E-02	0.89553E+01
0.17783E+02	0.22347E-01	0.89724E-04	0.11119E-03	0.11119E-02	0.11310E+02
0.31623E+02	0.39738E-01	0.18303E-04	0.22681E-04	0.22681E-03	0.12800E+02
0.56234E+02	0.70666E-01	0.38089E-05	0.47200E-05	0.47200E-04	0.14125E+02
0.10000E+03	0.12566E+00	0.75393E-06	0.93422E-06	0.93422E-05	0.16030E+02
0.17783E+03	0.22347E+00	0.16457E-06	0.20394E-06	0.20394E-05	0.16987E+02
0.31623E+03	0.39738E+00	0.37324E-07	0.46253E-07	0.46253E-06	0.17525E+02
0.56234E+03	0.70666E+00	0.82780E-08	0.10258E-07	0.10258E-06	0.18339E+02
0.10000E+04	0.12566E+01	0.18737E-03	0.23220E-08	0.23220E-07	0.18925E+02
0.17783E+04	0.22347E+01	0.39821E-09	0.49346E-09	0.49346E-08	0.20364E+02
0.31623E+04	0.39738E+01	0.37065E-10	0.10789E-09	0.10789E-08	0.21500E+02
0.56234E+04	0.70666E+01	0.90273E-11	0.11187E-10	0.11187E-09	0.37325E+02
0.10000E+05	0.12566E+02	0.50682E-11	0.62806E-11	0.62806E-10	0.21012E+02

(TCOLOOP): LORCA C-1E

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 3M= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E-01 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.1000E+03 0.1000E+03 0.8000E+02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.12566E-03	0.30493E+00	0.10000E+01	0.10000E+02	0.33679E+02
0.17783E+00	0.22347E-03	0.45619E+00	0.56531E+00	0.56531E+01	0.18539E+02
0.31623E+00	0.39738E-03	0.24326E+00	0.30764E+00	0.30764E+01	0.11823E+02
0.56234E+00	0.70666E-03	0.13364E+00	0.16560E+00	0.16560E+01	0.76882E+01
0.10000E+01	0.12566E-02	0.70953E-01	0.87925E-01	0.87925E+00	0.50953E+01
0.17783E+01	0.22347E-02	0.30723E-01	0.38078E-01	0.38078E+00	0.49670E+01
0.31623E+01	0.39738E-02	0.10210E-01	0.12652E-01	0.12652E+00	0.56532E+01
0.56234E+01	0.70666E-02	0.23672E-02	0.29334E-02	0.29334E-01	0.73339E+01
0.10000E+02	0.12566E-01	0.48196E-03	0.59724E-03	0.59724E-02	0.91114E+01
0.17783E+02	0.22347E-01	0.93927E-04	0.10400E-03	0.10400E-02	0.11850E+02
0.31623E+02	0.39738E-01	0.16647E-04	0.20629E-04	0.20629E-03	0.13655E+02
0.56234E+02	0.70666E-01	0.34723E-05	0.43029E-05	0.43029E-04	0.15035E+02
0.10000E+03	0.12566E+00	0.68654E-05	0.85076E-06	0.85076E-05	0.17068E+02
0.17783E+03	0.22347E+00	0.15377E-05	0.19055E-06	0.19055E-05	0.17776E+02
0.31623E+03	0.39738E+00	0.35413E-07	0.43883E-07	0.43883E-06	0.18151E+02
0.56234E+03	0.70666E+00	0.80341E-08	0.99559E-08	0.99559E-07	0.18708E+02
0.10000E+04	0.12566E+01	0.17885E-08	0.22163E-08	0.22163E-07	0.19522E+02
0.17783E+04	0.22347E+01	0.41990E-09	0.51910E-09	0.51910E-08	0.19688E+02
0.31623E+04	0.39738E+01	0.47782E-10	0.59212E-10	0.59212E-09	0.32075E+02
0.56234E+04	0.70666E+01	0.28239E-10	0.34993E-10	0.34993E-09	0.17450E+02
0.10000E+05	0.12566E+02	0.43115E-11	0.53428E-11	0.53428E-10	0.23404E+02

(TCOLODOP): LORCA C-14

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IGUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IGUT = 6 SG= 0.1000E-02 NB = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E-01 0.5000E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+02 0.1000E+03 0.5000E+02 0.8000E+02 0.0000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*NXNORM	APP.RES.
0.10000E+00	0.12566E-03	0.30704E+00	0.10000E+01	0.10000E+02	0.33669E+02
0.17783E+00	0.22347E-03	0.45510E+00	0.56516E+00	0.56516E+01	0.19553E+02
0.31623E+00	0.39738E-03	0.24930E+00	0.30767E+00	0.30767E+01	0.11815E+02
0.56234E+00	0.70666E-02	0.13360E+00	0.16554E+00	0.16554E+01	0.76953E+01
0.10000E+01	0.12566E-02	0.70730E-01	0.87641E-01	0.37641E+00	0.51380E+01
0.17783E+01	0.22347E-02	0.30584E-01	0.37897E-01	0.37897E+00	0.50065E+01
0.31623E+01	0.39738E-02	0.10194E-01	0.12632E-01	0.12632E+00	0.56630E+01
0.56234E+01	0.70666E-02	0.24011E-02	0.29753E-02	0.29753E-01	0.72469E+01
0.10000E+02	0.12566E-01	0.50064E-03	0.62034E-03	0.62034E-02	0.88583E+01
0.17783E+02	0.22347E-01	0.30053E-04	0.11158E-03	0.11158E-02	0.11232E+02
0.31623E+02	0.39738E-01	0.17933E-04	0.22220E-04	0.22220E-03	0.12980E+02
0.56234E+02	0.70666E-01	0.37183E-05	0.46074E-05	0.46074E-04	0.14357E+02
0.10000E+03	0.12566E+00	0.72937E-06	0.90376E-06	0.90376E-05	0.16390E+02
0.17783E+03	0.22347E+00	0.16079E-06	0.19924E-06	0.19924E-05	0.17253E+02
0.31623E+03	0.39738E+00	0.36566E-07	0.45309E-07	0.45309E-06	0.17766E+02
0.56234E+03	0.70666E+00	0.31626E-08	0.10114E-07	0.10114E-06	0.18511E+02
0.10000E+04	0.12566E+01	0.18318E-06	0.22698E-08	0.22698E-07	0.19213E+02
0.17783E+04	0.22347E+01	0.44512E-09	0.55155E-09	0.55155E-08	0.19907E+02
0.31623E+04	0.39738E+01	0.45841E-10	0.56802E-10	0.56802E-09	0.32975E+02
0.56234E+04	0.70666E+01	0.16613E-10	0.23070E-10	0.23070E-09	0.23035E+02

(TCOLOOP): LORCA D-1

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.2333E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.5000E+02 0.1000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.41972E-04	0.57920E+00	0.10000E+01	0.10000E+02	0.23891E+03
0.17783E+00	0.74637E-04	0.24997E+00	0.43158E+00	0.43158E+01	0.20342E+03
0.31623E+00	0.13273E-03	0.12325E+00	0.21280E+00	0.21280E+01	0.13578E+03
0.56234E+00	0.23602E-03	0.71252E-01	0.12302E+00	0.12302E+01	0.73756E+02
0.10000E+01	0.41972E-03	0.44338E-01	0.76551E-01	0.76551E+00	0.36301E+02
0.17783E+01	0.74637E-03	0.26098E-01	0.45059E-01	0.45059E+00	0.19151E+02
0.31623E+01	0.13273E-02	0.12658E-01	0.21854E-01	0.21854E+00	0.13133E+02
0.56234E+01	0.23602E-02	0.47363E-02	0.81774E-02	0.81774E-01	0.11669E+02
0.10000E+02	0.41972E-02	0.14263E-02	0.24626E-02	0.24626E-01	0.11650E+02
0.17783E+02	0.74637E-02	0.37381E-03	0.64539E-03	0.64539E-02	0.12054E+02
0.31623E+02	0.13273E-01	0.97233E-04	0.15062E-03	0.15062E-02	0.12936E+02
0.56234E+02	0.23602E-01	0.19780E-04	0.34150E-04	0.34150E-03	0.13751E+02
0.10000E+03	0.41972E-01	0.42685E-05	0.73697E-05	0.73697E-04	0.14912E+02
0.17783E+03	0.74637E-01	0.91947E-06	0.15875E-05	0.15875E-04	0.16043E+02
0.31623E+03	0.13273E+00	0.20796E-06	0.35904E-06	0.35904E-05	0.16633E+02
0.56234E+03	0.23602E+00	0.46161E-07	0.79698E-07	0.79698E-06	0.17426E+02
0.10000E+04	0.41972E+00	0.10173E-07	0.17564E-07	0.17564E-06	0.19323E+02
0.17783E+04	0.74637E+00	0.22785E-08	0.39338E-08	0.39338E-07	0.19048E+02
0.31623E+04	0.13273E+01	0.46858E-09	0.80901E-09	0.80901E-08	0.20954E+02
0.56234E+04	0.23602E+01	0.10817E-09	0.18676E-09	0.18676E-08	0.21337E+02
0.10000E+05	0.41972E+01	0.57803E-11	0.99798E-11	0.99798E-10	0.57631E+02

(TCOLOOP): LORCA 0-2

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NP = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.1000E+03 0.1000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.41972E-04	0.58001E+00	0.10000E+01	0.10000E+02	0.23820E+03
0.17783E+00	0.74637E-04	0.24395E+00	0.42922E+00	0.42922E+01	0.20456E+03
0.31623E+00	0.13273E-03	0.12372E+00	0.21331E+00	0.21331E+01	0.13514E+03
0.56234E+00	0.23602E-03	0.69734E-01	0.12023E+00	0.12023E+01	0.75778E+02
0.10000E+01	0.41972E-03	0.39250E-01	0.67673E-01	0.67673E+00	0.42564E+02
0.17783E+01	0.74637E-03	0.21929E-01	0.37808E-01	0.37808E+00	0.24131E+02
0.31623E+01	0.13273E-02	0.11751E-01	0.20259E-01	0.20259E+00	0.14394E+02
0.56234E+01	0.23602E-02	0.55130E-02	0.95051E-02	0.95051E-01	0.99518E+01
0.10000E+02	0.41972E-02	0.19863E-02	0.34247E-02	0.34247E-01	0.87027E+01
0.17783E+02	0.74637E-02	0.58244E-03	0.10042E-02	0.10042E-01	0.85293E+01
0.31623E+02	0.13273E-01	0.13753E-03	0.23712E-03	0.23712E-02	0.93050E+01
0.56234E+02	0.23602E-01	0.30036E-04	0.51786E-04	0.51786E-03	0.10290E+02
0.10000E+03	0.41972E-01	0.62086E-05	0.10704E-04	0.10704E-03	0.11552E+02
0.17783E+03	0.74637E-01	0.12385E-05	0.21353E-05	0.21353E-04	0.13125E+02
0.31623E+03	0.13273E+00	0.26481E-06	0.45656E-06	0.45656E-05	0.14145E+02
0.56234E+03	0.23602E+00	0.5551E-07	0.95714E-07	0.95714E-06	0.15403E+02
0.10000E+04	0.41972E+00	0.11515E-07	0.19855E-07	0.19855E-06	0.16867E+02
0.17783E+04	0.74637E+00	0.25727E-08	0.44356E-08	0.44356E-07	0.17555E+02
0.31623E+04	0.13273E+01	0.59843E-09	0.10325E-08	0.10325E-07	0.17792E+02
0.56234E+04	0.23602E+01	0.10467E-09	0.18735E-09	0.18735E-08	0.21272E+02
0.10000E+05	0.41972E+01	0.26619E-10	0.46240E-10	0.46240E-09	0.20715E+02

(TCOLOOP): LORCA 0-3

M = 6 XNORM=0.10E+02 IFCH= 0 A= 0.2000E+03
IGUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IGUT = 6 B0= 0.1000E+02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.5000E+02 0.5000E+02 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(S=C)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.1000E+00	0.41972E-04	0.57921E+00	0.10000E+01	0.10000E+02	0.23890E+03
0.17783E+00	0.74637E-04	0.24995E+00	0.43153E+00	0.43153E+01	0.20345E+03
0.31623E+00	0.13273E-03	0.12326E+00	0.21281E+00	0.21281E+01	0.13577E+03
0.56234E+00	0.23602E-03	0.71235E-01	0.12299E+00	0.12299E+01	0.73778E+02
0.10000E+01	0.41972E-03	0.43962E-01	0.75900E-01	0.75900E+00	0.36726E+02
0.17783E+01	0.74637E-03	0.25311E-01	0.43699E-01	0.43699E+00	0.19995E+02
0.31623E+01	0.13273E-02	0.12343E-01	0.21309E-01	0.21309E+00	0.13554E+02
0.56234E+01	0.23602E-02	0.48287E-02	0.83366E-02	0.83366E-01	0.11442E+02
0.10000E+02	0.41972E-02	0.15359E-02	0.26517E-02	0.26517E-01	0.10936E+02
0.17783E+02	0.74637E-02	0.41543E-03	0.71731E-03	0.71731E-02	0.11118E+02
0.31623E+02	0.13273E-01	0.96034E-04	0.16580E-03	0.16580E-02	0.12076E+02
0.56234E+02	0.23602E-01	0.21293E-04	0.36770E-04	0.36770E-03	0.13074E+02
0.10000E+03	0.41972E-01	0.45220E-05	0.78071E-05	0.78071E-04	0.14338E+02
0.17783E+03	0.74637E-01	0.35639E-06	0.16512E-05	0.16512E-04	0.15623E+02
0.31623E+03	0.13273E+00	0.21446E-06	0.37026E-06	0.37026E-05	0.16293E+02
0.56234E+03	0.23602E+00	0.47278E-07	0.81624E-07	0.81624E-06	0.17150E+02
0.10000E+04	0.41972E+00	0.10311E-07	0.17801E-07	0.17801E-06	0.18159E+02
0.17783E+04	0.74637E+00	0.23887E-08	0.41241E-08	0.41241E-07	0.19457E+02
0.31623E+04	0.13273E+01	0.52562E-09	0.90747E-09	0.90747E-08	0.19408E+02
0.56234E+04	0.23602E+01	0.15475E-09	0.26718E-09	0.26718E-08	0.16804E+02
0.10000E+05	0.41972E+01	0.42283E-10	0.73009E-10	0.73009E-09	0.15290E+02

(TCOLOOP): LORCA D-4

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IDUTS = 17 TO= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IDUT = 0 SO= 0.1000E-02 NE = 6 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.4000E+02 0.1000E+02 0.1000E+03 0.5000E+02 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(TO:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*NXNORM	APP.RES.
0.10000E+00	0.41972E-04	0.53000E+00	0.10000E+01	0.10000E+02	0.23821E+03
0.17783E+00	0.74637E-04	0.24396E+00	0.42925E+00	0.42925E+01	0.20455E+03
0.31623E+00	0.13273E-03	0.12371E+00	0.21330E+00	0.21330E+01	0.13516E+03
0.56234E+00	0.23602E-03	0.69735E-01	0.12023E+00	0.12023E+01	0.75777E+02
0.10000E+01	0.41972E-03	0.39264E-01	0.67698E-01	0.67698E+00	0.42546E+02
0.17783E+01	0.74637E-03	0.21880E-01	0.37725E-01	0.37725E+00	0.24197E+02
0.31623E+01	0.13273E-02	0.11615E-01	0.20028E-01	0.20028E+00	0.14593E+02
0.56234E+01	0.23602E-02	0.54263E-02	0.93592E-02	0.93592E-01	0.10120E+02
0.10000E+02	0.41972E-02	0.20023E-02	0.34531E-02	0.34531E-01	0.86371E+01
0.17783E+02	0.74637E-02	0.60337E-03	0.10406E-02	0.10406E-01	0.82872E+01
0.31623E+02	0.13273E-01	0.14640E-03	0.25242E-03	0.25242E-02	0.88867E+01
0.56234E+02	0.23602E-01	0.31875E-04	0.54957E-04	0.54957E-03	0.98705E+01
0.10000E+03	0.41972E-01	0.65692E-05	0.11326E-04	0.11326E-03	0.11115E+02
0.17783E+03	0.74637E-01	0.12884E-05	0.22214E-05	0.22214E-04	0.12779E+02
0.31623E+03	0.13273E+00	0.27327E-06	0.47133E-06	0.47133E-05	0.13846E+02
0.56234E+03	0.23602E+00	0.57119E-07	0.98483E-07	0.98483E-06	0.15112E+02
0.10000E+04	0.41972E+00	0.11785E-07	0.20320E-07	0.20320E-06	0.16609E+02
0.17783E+04	0.74637E+00	0.25752E-08	0.44400E-08	0.44400E-07	0.17554E+02
0.31623E+04	0.13273E+01	0.51202E-09	0.10552E-08	0.10552E-07	0.17535E+02
0.56234E+04	0.23602E+01	0.11943E-09	0.20600E-09	0.20600E-08	0.19958E+02
0.10000E+05	0.41972E+01	0.31286E-10	0.53941E-10	0.53941E-09	0.13693E+02

(TCOLGUP): LORCA D-3

M = 6 XNDR4=0.10E+02 IPCH= 0 A= 0.2000E+03
IGUTS = 17 TQ= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 BQ= 0.1000E+02 NE = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.5000E+02 0.5000E+02 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(TQ:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.41972E-04	0.57911E+09	0.10000E+01	0.10000E+02	0.23837E+03
0.17783E+00	0.74637E-04	0.25005E+07	0.43178E+00	0.43178E+01	0.20334E+02
0.31623E+00	0.13273E-03	0.12325E+00	0.21282E+00	0.21282E+01	0.13579E+03
0.56234E+00	0.23602E-03	0.71311E-01	0.12400E+00	0.12400E+01	0.73028E+02
0.10000E+01	0.41972E-03	0.45085E-01	0.77853E-01	0.77853E+00	0.35473E+02
0.17783E+01	0.74637E-03	0.25393E-01	0.44711E-01	0.44711E+00	0.19368E+02
0.31623E+01	0.13273E-02	0.12381E-01	0.21379E-01	0.21379E+00	0.13503E+02
0.56234E+01	0.23602E-02	0.46828E-02	0.80862E-02	0.80862E-01	0.11804E+02
0.10000E+02	0.41972E-02	0.14482E-02	0.25007E-02	0.25007E-01	0.11500E+02
0.17783E+02	0.74637E-02	0.38437E-03	0.66372E-03	0.66372E-02	0.11801E+02
0.31623E+02	0.13273E-01	0.38653E-04	0.15309E-03	0.15309E-02	0.12797E+02
0.56234E+02	0.23602E-01	0.19830E-04	0.34242E-04	0.34242E-03	0.13737E+02
0.10000E+03	0.41972E-01	0.42491E-05	0.73372E-05	0.73372E-04	0.14958E+02
0.17783E+03	0.74637E-01	0.31184E-06	0.15746E-05	0.15746E-04	0.16133E+02
0.31623E+03	0.13273E+00	0.20513E-06	0.35604E-06	0.35604E-05	0.16729E+02
0.56234E+03	0.23602E+00	0.45754E-07	0.79006E-07	0.79006E-06	0.17529E+02
0.10000E+04	0.41972E+00	0.10250E-07	0.17699E-07	0.17699E-06	0.13231E+02
0.17783E+04	0.74637E+00	0.23432E-08	0.40461E-08	0.40461E-07	0.13695E+02
0.31623E+04	0.13273E+01	0.51767E-09	0.89390E-09	0.89390E-08	0.19607E+02
0.56234E+04	0.23602E+01	0.14363E-09	0.25665E-09	0.25665E-08	0.17263E+02
0.10000E+05	0.41972E+01	0.47711E-10	0.82286E-10	0.82286E-09	0.14108E+02

(TCOLOOP): LURCA D-6

M = 6 XNORM=0.10E+02 IFCH= 0 A= 0.2000E+03
IGUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 b0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.5000E+02 0.1000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.41972E-04	0.57594E+00	0.10000E+01	0.10000E+02	0.23901E+03
0.17783E+00	0.74637E-04	0.25028E+00	0.43231E+00	0.43231E+01	0.20308E+03
0.31623E+00	0.13273E-02	0.12314E+00	0.21270E+00	0.21270E+01	0.13593E+03
0.56234E+00	0.23602E-03	0.71951E-01	0.12428E+00	0.12428E+01	0.72847E+02
0.10000E+01	0.41972E-03	0.46047E-01	0.79527E-01	0.79537E+00	0.34439E+02
0.17783E+01	0.74637E-03	0.27051E-01	0.46726E-01	0.46726E+00	0.18181E+02
0.31623E+01	0.13273E-02	0.12753E-01	0.22028E-01	0.22028E+00	0.13008E+02
0.56234E+01	0.23602E-02	0.45172E-02	0.73026E-02	0.78026E-01	0.12238E+02
0.10000E+02	0.41972E-02	0.12889E-02	0.22264E-02	0.22264E-01	0.12635E+02
0.17783E+02	0.74637E-02	0.32389E-03	0.55947E-03	0.55947E-02	0.13433E+02
0.31623E+02	0.13273E-01	0.75052E-04	0.12964E-03	0.12964E-02	0.14399E+02
0.56234E+02	0.23602E-01	0.17262E-04	0.29817E-04	0.29817E-03	0.15118E+02
0.10000E+03	0.41972E-01	0.37823E-05	0.65331E-05	0.65331E-04	0.15138E+02
0.17783E+03	0.74637E-01	0.33848E-06	0.14483E-05	0.14483E-04	0.17070E+02
0.31623E+03	0.13273E+00	0.19259E-06	0.33318E-06	0.33318E-05	0.17493E+02
0.56234E+03	0.23602E+00	0.43603E-07	0.75215E-07	0.75315E-06	0.18103E+02
0.10000E+04	0.41972E+00	0.97069E-08	0.16767E-07	0.16767E-06	0.18906E+02
0.17783E+04	0.74637E+00	0.23028E-08	0.39795E-08	0.39795E-07	0.18909E+02
0.31623E+04	0.13273E+01	0.52374E-09	0.90465E-09	0.90465E-08	0.19435E+02
0.56234E+04	0.23602E+01	0.11637E-09	0.20100E-09	0.20100E-08	0.20322E+02
0.10000E+05	0.41972E+01	0.21712E-10	0.37504E-10	0.37504E-09	0.23848E+02

(TCOLOOP): LORCA D-7

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IQUTS = 17 TQ= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IQUT = 5 BQ= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.5000E+02 0.1500E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(TQ:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.41972E-04	0.57935E+00	0.10000E+01	0.10000E+02	0.23859E+03
0.17783E+00	0.74637E-04	0.24934E+00	0.43124E+00	0.43124E+01	0.20357E+03
0.31623E+00	0.13273E-03	0.12330E+00	0.21283E+00	0.21283E+01	0.13571E+03
0.56234E+00	0.23602E-03	0.71267E-01	0.12301E+00	0.12301E+01	0.73736E+02
0.10000E+01	0.41972E-03	0.44313E-01	0.76487E-01	0.76487E+00	0.36330E+02
0.17783E+01	0.74637E-03	0.25385E-01	0.45542E-01	0.45542E+00	0.18854E+02
0.31623E+01	0.13273E-02	0.12371E-01	0.22217E-01	0.22217E+00	0.12856E+02
0.56234E+01	0.23602E-02	0.47620E-02	0.82196E-02	0.82196E-01	0.11605E+02
0.10000E+02	0.41972E-02	0.13755E-02	0.23742E-02	0.23742E-01	0.12013E+02
0.17783E+02	0.74637E-02	0.34741E-03	0.59966E-03	0.59966E-02	0.12743E+02
0.31623E+02	0.13273E-01	0.50156E-04	0.13835E-03	0.13825E-02	0.13741E+02
0.56234E+02	0.23602E-01	0.18511E-04	0.31950E-04	0.31950E-03	0.14406E+02
0.10000E+03	0.41972E-01	0.40340E-05	0.69630E-05	0.69630E-04	0.15495E+02
0.17783E+03	0.74637E-01	0.38540E-06	0.15283E-05	0.15283E-04	0.16466E+02
0.31623E+03	0.13273E+00	0.20206E-06	0.34877E-06	0.34877E-05	0.16957E+02
0.56234E+03	0.23602E+00	0.45070E-07	0.77794E-07	0.77794E-06	0.17707E+02
0.10000E+04	0.41972E+00	0.10144E-07	0.17509E-07	0.17509E-06	0.18359E+02
0.17783E+04	0.74637E+00	0.23084E-08	0.39845E-08	0.39845E-07	0.18883E+02
0.31623E+04	0.13273E+01	0.51394E-09	0.87744E-09	0.87744E-08	0.19550E+02
0.56234E+04	0.23602E+01	0.12585E-09	0.21895E-09	0.21895E-08	0.19137E+02
0.10000E+05	0.41972E+01	0.35944E-10	0.61869E-10	0.61869E-09	0.17072E+02

(TCOLOOP): LORCA 0-2

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 S0= 0.1000E+02 NS = 6 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1570E-01 0.5000E-01 0.2500E+00 0.1000E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.5000E+02 0.1500E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(S.C)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.41972E-04	0.57301E+00	0.10000E+01	0.10000E+02	0.23895E+03
0.17783E+00	0.74637E-04	0.25027E+00	0.43224E+00	0.43224E+01	0.20308E+03
0.31623E+00	0.13273E-02	0.12312E+00	0.21264E+00	0.21264E+01	0.13596E+03
0.56234E+00	0.23602E-03	0.71964E-01	0.12429E+00	0.12429E+01	0.72830E+02
0.10000E+01	0.41972E-03	0.46283E-01	0.79944E-01	0.79944E+00	0.34134E+02
0.17783E+01	0.74637E-03	0.27587E-01	0.47645E-01	0.47645E+00	0.17657E+02
0.31623E+01	0.13273E-02	0.13033E-01	0.22508E-01	0.22508E+00	0.12652E+02
0.56234E+01	0.23602E-02	0.45050E-02	0.77809E-02	0.77809E-01	0.12270E+02
0.10000E+02	0.41972E-02	0.12073E-02	0.20860E-02	0.20860E-01	0.13336E+02
0.17783E+02	0.74637E-02	0.28531E-03	0.49275E-03	0.49275E-02	0.14768E+02
0.31623E+02	0.13273E-01	0.64647E-04	0.11165E-03	0.11165E-02	0.15002E+02
0.56234E+02	0.23602E-01	0.15227E-04	0.26298E-04	0.26298E-03	0.16431E+02
0.10000E+03	0.41972E-01	0.33327E-05	0.58423E-05	0.58423E-04	0.17451E+02
0.17783E+03	0.74637E-01	0.77187E-06	0.13331E-05	0.13331E-04	0.18048E+02
0.31623E+03	0.13273E+00	0.19063E-06	0.31196E-06	0.31196E-05	0.18230E+02
0.56234E+03	0.23602E+00	0.41406E-07	0.71513E-07	0.71513E-06	0.18739E+02
0.10000E+04	0.41972E+00	0.92688E-08	0.16181E-07	0.16181E-06	0.19359E+02
0.17783E+04	0.74637E+00	0.21549E-08	0.37374E-08	0.37374E-07	0.19714E+02
0.31623E+04	0.13273E+01	0.47929E-09	0.82777E-09	0.82777E-08	0.20641E+02
0.56234E+04	0.23602E+01	0.12312E-09	0.22128E-09	0.22128E-08	0.19059E+02
0.10000E+05	0.41972E+01	0.64477E-10	0.11136E-09	0.11136E-08	0.11542E+02

(TCOLOOP): LORCA 0-9

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IQUTS = 17 TQ= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTD = 0
IOUT = 6 30= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.5000E+02 0.2000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(TQ:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.41972E-04	0.57931E+00	0.10000E+01	0.10000E+02	0.23873E+03
0.17783E+00	0.74637E-04	0.24982E+00	0.43124E+00	0.43124E+01	0.20359E+03
0.31623E+00	0.13273E-03	0.12325E+00	0.21292E+00	0.21292E+01	0.13555E+03
0.56234E+00	0.23602E-03	0.71269E-01	0.12302E+00	0.12302E+01	0.73734E+02
0.10000E+01	0.41972E-03	0.44286E-01	0.76446E-01	0.76446E+00	0.36360E+02
0.17783E+01	0.74637E-03	0.26459E-01	0.45674E-01	0.45674E+00	0.18777E+02
0.31623E+01	0.13273E-02	0.12982E-01	0.22409E-01	0.22409E+00	0.12716E+02
0.56234E+01	0.23602E-02	0.48103E-02	0.83044E-02	0.83044E-01	0.11485E+02
0.10000E+02	0.41972E-02	0.13568E-02	0.23421E-02	0.23421E-01	0.12152E+02
0.17783E+02	0.74637E-02	0.33178E-03	0.57271E-03	0.57271E-02	0.13193E+02
0.31623E+02	0.13273E-01	0.74567E-04	0.12872E-03	0.12872E-02	0.14465E+02
0.56234E+02	0.23602E-01	0.17434E-04	0.30095E-04	0.30095E-03	0.15014E+02
0.10000E+03	0.41972E-01	0.38183E-05	0.65920E-05	0.65920E-04	0.16083E+02
0.17783E+03	0.74637E-01	0.85277E-06	0.14721E-05	0.14721E-04	0.16877E+02
0.31623E+03	0.13273E+00	0.15587E-06	0.33810E-06	0.33810E-05	0.17315E+02
0.56234E+03	0.23602E+00	0.44327E-07	0.76517E-07	0.76517E-06	0.17905E+02
0.10000E+04	0.41972E+00	0.99099E-08	0.17106E-07	0.17106E-06	0.18647E+02
0.17783E+04	0.74637E+00	0.23189E-08	0.40028E-08	0.40028E-07	0.18826E+02
0.31623E+04	0.13273E+01	0.49998E-09	0.86135E-09	0.86135E-08	0.20093E+02
0.56234E+04	0.23602E+01	0.12791E-09	0.22080E-09	0.22080E-08	0.19031E+02
0.10000E+05	0.41972E+01	0.43094E-10	0.74388E-10	0.74388E-09	0.15099E+02

(TCOLOOP): LORCA D-10

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.4000E+02 0.1000E+02 0.5000E+02 0.2000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*NXNORM	APP.RES.
0.10000E+00	0.41972E-04	0.57896E+00	0.10000E+01	0.10000E+02	0.23899E+03
0.17783E+00	0.74637E-04	0.25026E+00	0.43225E+00	0.43225E+01	0.20310E+03
0.31623E+00	0.13273E-03	0.12316E+00	0.21272E+00	0.21272E+01	0.13591E+03
0.56234E+00	0.23602E-03	0.71964E-01	0.12430E+00	0.12430E+01	0.72830E+02
0.10000E+01	0.41972E-03	0.46326E-01	0.80033E-01	0.80033E+00	0.34134E+02
0.17783E+01	0.74637E-03	0.27825E-01	0.48060E-01	0.48060E+00	0.17430E+02
0.31623E+01	0.13273E-02	0.13209E-01	0.22816E-01	0.22816E+00	0.12432E+02
0.56234E+01	0.23602E-02	0.45379E-02	0.78380E-02	0.78380E-01	0.12132E+02
0.10000E+02	0.41972E-02	0.11695E-02	0.20199E-02	0.20199E-01	0.13744E+02
0.17783E+02	0.74637E-02	0.26117E-03	0.45110E-03	0.45110E-02	0.15766E+02
0.31623E+02	0.13273E-01	0.56679E-04	0.97896E-04	0.97896E-03	0.17554E+02
0.56234E+02	0.23602E-01	0.13569E-04	0.23436E-04	0.23436E-03	0.17839E+02
0.10000E+03	0.41972E-01	0.30364E-05	0.52447E-05	0.52447E-04	0.18786E+02
0.17783E+03	0.74637E-01	0.71171E-06	0.12293E-05	0.12293E-04	0.19060E+02
0.31623E+03	0.13273E+00	0.16976E-06	0.29322E-06	0.29322E-05	0.19056E+02
0.56234E+03	0.23602E+00	0.39508E-07	0.68240E-07	0.68240E-06	0.19336E+02
0.10000E+04	0.41972E+00	0.91206E-08	0.15753E-07	0.15753E-06	0.19709E+02
0.17783E+04	0.74637E+00	0.20498E-08	0.35405E-08	0.35405E-07	0.20441E+02
0.31623E+04	0.13273E+01	0.46027E-09	0.79517E-09	0.79517E-08	0.21202E+02
0.56234E+04	0.23602E+01	0.90220E-10	0.15583E-09	0.15583E-08	0.24031E+02
0.10000E+05	0.41972E+01	0.16336E-10	0.28215E-10	0.28215E-09	0.28830E+02

(TCOLOOP): LORCA D-11

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.3330E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.1000E+03 0.2000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.41972E-04	0.57993E+00	0.10000E+01	0.10000E+02	0.23823E+03
0.17783E+00	0.74637E-04	0.24899E+00	0.42930E+00	0.42930E+01	0.20452E+03
0.31623E+00	0.13273E-03	0.12370E+00	0.21328E+00	0.21328E+01	0.13518E+03
0.56234E+00	0.23602E-03	0.69721E-01	0.12023E+00	0.12023E+01	0.75782E+02
0.10000E+01	0.41972E-03	0.39279E-01	0.67725E-01	0.67725E+00	0.42526E+02
0.17783E+01	0.74637E-03	0.21905E-01	0.37768E-01	0.37768E+00	0.24154E+02
0.31623E+01	0.13273E-02	0.11322E-01	0.20384E-01	0.20384E+00	0.14239E+02
0.56234E+01	0.23602E-02	0.55985E-02	0.96529E-02	0.96529E-01	0.97863E+01
0.10000E+02	0.41972E-02	0.19972E-02	0.34436E-02	0.34436E-01	0.86591E+01
0.17783E+02	0.74637E-02	0.56313E-03	0.97957E-03	0.97957E-02	0.87001E+01
0.31623E+02	0.13273E-01	0.12749E-03	0.21982E-03	0.21982E-02	0.98360E+01
0.56234E+02	0.23602E-01	0.27385E-04	0.47218E-04	0.47218E-03	0.10977E+02
0.10000E+03	0.41972E-01	0.36425E-05	0.97288E-05	0.97288E-04	0.12331E+02
0.17783E+03	0.74637E-01	0.11470E-05	0.19777E-05	0.19777E-04	0.13822E+02
0.31623E+03	0.13273E+00	0.25025E-06	0.43148E-06	0.43148E-05	0.14692E+02
0.56234E+03	0.23602E+00	0.52935E-07	0.91270E-07	0.91270E-06	0.15901E+02
0.10000E+04	0.41972E+00	0.11262E-07	0.19452E-07	0.19452E-06	0.17100E+02
0.17783E+04	0.74637E+00	0.25070E-08	0.43226E-08	0.43226E-07	0.17871E+02
0.31623E+04	0.13273E+01	0.54062E-09	0.93213E-09	0.93213E-08	0.19048E+02
0.56234E+04	0.23602E+01	0.11092E-09	0.19125E-09	0.19125E-08	0.20993E+02
0.10000E+05	0.41972E+01	0.83343E-11	0.14370E-10	0.14370E-09	0.45156E+02

(TCOLOOP): LORCA 0-12

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.1000E+03 0.2000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(S:0)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.1000E+00	0.41972E-04	0.58007E+00	0.10000E+01	0.10000E+02	0.23816E+03
0.17783E+00	0.74637E-04	0.24886E+00	0.42902E+00	0.42902E+01	0.20466E+03
0.31623E+00	0.13273E-03	0.12373E+00	0.21338E+00	0.21338E+01	0.13507E+03
0.56234E+00	0.23602E-03	0.59746E-01	0.12024E+00	0.12024E+01	0.75762E+02
0.10000E+01	0.41972E-03	0.39205E-01	0.67587E-01	0.67587E+00	0.42625E+02
0.17783E+01	0.74637E-03	0.22157E-01	0.38196E-01	0.38196E+00	0.23822E+02
0.31623E+01	0.13273E-02	0.12105E-01	0.20869E-01	0.20869E+00	0.13883E+02
0.56234E+01	0.23602E-02	0.57074E-02	0.98392E-02	0.98392E-01	0.95811E+01
0.10000E+02	0.41972E-02	0.19640E-02	0.33858E-02	0.33858E-01	0.87933E+01
0.17783E+02	0.74637E-02	0.53139E-03	0.91608E-03	0.91608E-02	0.91757E+01
0.31623E+02	0.13273E-01	0.11104E-03	0.19143E-03	0.19143E-02	0.10875E+02
0.56234E+02	0.23602E-01	0.23045E-04	0.39728E-04	0.39728E-03	0.12378E+02
0.10000E+03	0.41972E-01	0.46568E-05	0.80280E-05	0.80280E-04	0.14055E+02
0.17783E+03	0.74637E-01	0.96788E-06	0.16686E-05	0.16686E-04	0.15498E+02
0.31623E+03	0.13273E+00	0.21396E-06	0.37748E-06	0.37748E-05	0.16068E+02
0.56234E+03	0.23602E+00	0.47491E-07	0.81871E-07	0.81871E-06	0.17098E+02
0.10000E+04	0.41972E+00	0.10376E-07	0.17888E-07	0.17888E-06	0.18032E+02
0.17783E+04	0.74637E+00	0.23369E-08	0.40287E-08	0.40287E-07	0.18729E+02
0.31623E+04	0.13273E+01	0.50987E-09	0.87897E-09	0.87897E-08	0.19806E+02
0.56234E+04	0.23602E+01	0.12200E-09	0.21032E-09	0.21032E-08	0.19672E+02
0.10000E+05	0.41972E+01	0.16863E-10	0.29070E-10	0.29070E-09	0.28226E+02

(TCOLOOP): LURCA 0-13

M = 6 XNORM=0.10E+02 IFCH= 0 A= 0.2000E+03
IQUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IQUT = 0 BC= 0.1000E+02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.1000E+03 0.1000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.41972E-04	0.58003E+00	0.10000E+01	0.10000E+02	0.23815E+03
0.17783E+00	0.74637E-04	0.24885E+00	0.42900E+00	0.42900E+01	0.20467E+03
0.31623E+00	0.13273E-02	0.12378E+00	0.21239E+00	0.21239E+01	0.13506E+03
0.56234E+00	0.23602E-03	0.69748E-01	0.12024E+00	0.12024E+01	0.75760E+02
0.10000E+01	0.41972E-03	0.39200E-01	0.67577E-01	0.67577E+00	0.42632E+02
0.17783E+01	0.74637E-02	0.22134E-01	0.38157E-01	0.38157E+00	0.23852E+02
0.31623E+01	0.13273E-02	0.11961E-01	0.20620E-01	0.20620E+00	0.14038E+02
0.56234E+01	0.23602E-02	0.55835E-02	0.96254E-02	0.96254E-01	0.98151E+01
0.10000E+02	0.41972E-02	0.19571E-02	0.33738E-02	0.33738E-01	0.88218E+01
0.17783E+02	0.74637E-02	0.55506E-03	0.95638E-03	0.95688E-02	0.88632E+01
0.31623E+02	0.13273E-01	0.12613E-03	0.21744E-03	0.21744E-02	0.99134E+01
0.56234E+02	0.23602E-01	0.27233E-04	0.46948E-04	0.46948E-03	0.11020E+02
0.10000E+03	0.41972E-01	0.56001E-05	0.96540E-05	0.96540E-04	0.12395E+02
0.17783E+03	0.74637E-01	0.11321E-05	0.19516E-05	0.19516E-04	0.13945E+02
0.31623E+03	0.13273E+00	0.24700E-06	0.42581E-06	0.42581E-05	0.14821E+02
0.56234E+03	0.23602E+00	0.52496E-07	0.90498E-07	0.90498E-06	0.15990E+02
0.10000E+04	0.41972E+00	0.11273E-07	0.19433E-07	0.19433E-06	0.17109E+02
0.17783E+04	0.74637E+00	0.25021E-09	0.43134E-08	0.43134E-07	0.17894E+02
0.31623E+04	0.13273E+01	0.53359E-09	0.91987E-09	0.91987E-08	0.19215E+02
0.56234E+04	0.23602E+01	0.12303E-09	0.21209E-09	0.21209E-08	0.19532E+02
0.10000E+05	0.41972E+01	0.24788E-10	0.42732E-10	0.42732E-09	0.21832E+02

(TCOLGROUP): LURCH 5-14

M = 6 XNORM=0.10E+02 IFCH= 0 A= 0.2000E+03
TOUTS = 17 TC= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
ICUT = 5 BC= 0.1000E+02 NF = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.1670E-01 0.5000E-01 0.2000E+00 0.1000E-01 0.1000E+00
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.4000E+02 0.1000E+02 0.1000E+03 0.5000E+02 0.5000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TH)	TIME(C:EC)	THAND	TRANS(NBPM)	NORM*KNORM	APP.RES.
0.10000E+00	0.41972E-04	0.5200E+00	0.10000E+01	0.10000E+02	0.23818E+03
0.17782E+00	0.74637E-04	0.2439E+00	0.42911E+00	0.42911E+01	0.20452E+03
0.31623E+00	0.13272E-03	0.1037E+00	0.21335E+00	0.21335E+01	0.13510E+03
0.56234E+00	0.23692E-03	0.59743E-01	0.12024E+00	0.12024E+01	0.75766E+02
0.10000E+01	0.41972E-03	0.39227E-01	0.67646E-01	0.67646E+00	0.40532E+02
0.17783E+01	0.74637E-03	0.22014E-01	0.37959E-01	0.37959E+00	0.24009E+02
0.31623E+01	0.13272E-02	0.11791E-01	0.20258E-01	0.20258E+00	0.14394E+02
0.56234E+01	0.23692E-02	0.54695E-02	0.94297E-02	0.94297E-01	0.10037E+02
0.10000E+02	0.41972E-02	0.19319E-02	0.34169E-02	0.34169E-01	0.87204E+01
0.17783E+02	0.74637E-02	0.58603E-03	0.10103E-02	0.10103E-01	0.84853E+01
0.31623E+02	0.13272E-01	0.13949E-03	0.24049E-03	0.24049E-02	0.52086E+01
0.56234E+02	0.23692E-01	0.30249E-04	0.52145E-04	0.52145E-03	0.10240E+02
0.10000E+03	0.41972E-01	0.52237E-05	0.10730E-04	0.10730E-03	0.11533E+02
0.17783E+03	0.74637E-01	0.12323E-05	0.21246E-05	0.21246E-04	0.13159E+02
0.31623E+03	0.13272E+00	0.26346E-06	0.45420E-06	0.45420E-05	0.14192E+02
0.56234E+03	0.23692E+00	0.55019E-07	0.94854E-07	0.94854E-06	0.15496E+02
0.10000E+04	0.41972E+00	0.11615E-07	0.20025E-07	0.20025E-06	0.15770E+02
0.17783E+04	0.74637E+00	0.25720E-08	0.44342E-08	0.44342E-07	0.17558E+02
0.31623E+04	0.13272E+01	0.54302E-09	0.94480E-09	0.94480E-08	0.18876E+02
0.56234E+04	0.23692E+01	0.12681E-09	0.21863E-09	0.21863E-08	0.19190E+02
0.10000E+05	0.41972E+01	0.22321E-10	0.39344E-10	0.39344E-09	0.23059E+02

ANEXO N° 2.- CURVAS TEORICAS CORRESPONDIENTES AL AREA
DE OLOT.

AREA DE OLOT

CASO A

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	40
200	-	60
100	-	30
100	-	150
	-	300

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	40
200	-	60
200	-	30
100	-	150
	-	300

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	40
100	-	60
100	-	30
200	-	150
	-	300

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	40
200	-	60
100	-	30
100	-	150
	-	300

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	40
100	-	60
100	-	30
100	-	150
	-	300

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	40
200	-	60
100	-	30
200	-	150
	-	300

CASO B

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	40
200	-	60
100	-	30
100	-	400
100	-	150
	-	300

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	40
200	-	60
100	-	30
40	-	400
100	-	150
	-	300

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>	
100	-	40	
200	-	60	Areniscas
200	-	30	Margas
100	-	400	Evaporitas
100	-	150	Calizas
	-	300	

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	40
100	-	60
200	-	30
100	-	400
200	-	150
	-	300

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	40
100	-	60
200	-	30
50	-	400
200	-	150
	-	300

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	40
100	-	60
100	-	30
100	-	400
200	-	150
	-	300

CASO C

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>
60	-	300
250	-	50
150	-	100
100	-	400
200	-	150
	-	300

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	300
250	-	50
150	-	100
100	-	400
200	-	150
	-	300

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>
60	-	300
250	-	50
150	-	100
200	-	150
	-	300

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	300
250	-	50
150	-	100
200	-	150
	-	300

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>
60		300
250	-	50
250	-	100
100	-	400
200	-	150
	-	300

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	300
250	-	50
250	-	100
100	-	400
200	-	150
	-	300

Nº 7

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	300
250	-	50
150	-	100
	-	300

Nº 8

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	300
250	-	50
150	-	100
	-	300

Nº 9

<u>h (m)</u>		<u>(ohm.m)</u>
60	-	300
250	-	50
250	-	100
100	-	400
100	-	150
	-	300

CASO D

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	50
200	-	100
200	-	150
	-	300

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	50
200	-	100
100	-	150
	-	300

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	50
100	-	100
200	-	150
	-	300

Nº 7

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	50
100	-	100
100	-	150
	-	300

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	50
100	-	100
200	-	150
	-	300

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	50
100	-	100
100	-	150
	-	300

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	50
200	-	100
100	-	150
	-	300

(TCOLOOP): PLOT A-1

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.6660E-02 0.3330E-02
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2000E+03 0.1000E+03 0.1000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.62832E-04	0.89925E+00	0.10000E+01	0.10000E+02	0.39943E+02
0.17783E+00	0.11173E-03	0.45452E+00	0.50544E+00	0.50544E+01	0.37635E+02
0.31623E+00	0.19869E-02	0.21276E+00	0.23660E+00	0.23660E+01	0.36805E+02
0.56234E+00	0.35333E-02	0.86269E-01	0.95935E-01	0.95935E+00	0.37927E+02
0.10000E+01	0.62832E-03	0.28151E-01	0.31305E-01	0.31305E+00	0.41412E+02
0.17783E+01	0.11173E-02	0.30058E-02	0.89027E-02	0.89027E-01	0.43832E+02
0.31623E+01	0.19869E-02	0.20563E-02	0.22872E-02	0.22872E-01	0.46038E+02
0.56234E+01	0.35333E-02	0.53417E-03	0.59402E-03	0.59402E-02	0.45719E+02
0.10000E+02	0.62832E-02	0.11392E-03	0.13224E-03	0.13224E-02	0.49356E+02
0.17783E+02	0.11173E-01	0.23330E-04	0.25943E-04	0.25943E-03	0.57110E+02
0.31623E+02	0.19869E-01	0.41211E-05	0.45828E-05	0.45828E-04	0.70204E+02
0.56234E+02	0.35333E-01	0.70692E-06	0.78612E-06	0.78612E-05	0.87530E+02
0.10000E+03	0.62832E-01	0.10838E-06	0.12052E-06	0.12052E-05	0.11733E+03
0.17783E+03	0.11173E+00	0.17797E-07	0.19791E-07	0.19791E-06	0.15004E+03
0.31623E+03	0.19869E+00	0.35904E-08	0.39926E-08	0.39926E-07	0.16717E+03
0.56234E+03	0.35333E+00	0.76046E-09	0.84565E-09	0.84565E-08	0.18028E+03
0.10000E+04	0.62832E+00	0.11144E-09	0.12392E-09	0.12392E-08	0.24852E+03
0.17783E+04	0.11173E+01	0.33312E-10	0.37044E-10	0.37044E-09	0.21297E+03

(TCOLOOP): OLDT A-2

M = 5 XNORM=0.10E+02 IPCM= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.6660E-02 0.3330E-02
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.1000E+03 0.1000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.62832E-04	0.89860E+00	0.10000E+01	0.10000E+02	0.40122E+02
0.17783E+00	0.11173E-03	0.45532E+00	0.50670E+00	0.50670E+01	0.37368E+02
0.31623E+00	0.19869E-03	0.21189E+00	0.23579E+00	0.23579E+01	0.37167E+02
0.56234E+00	0.35333E-03	0.84713E-01	0.94275E-01	0.94275E+00	0.38957E+02
0.10000E+01	0.62832E-03	0.27755E-01	0.30887E-01	0.30887E+00	0.42024E+02
0.17783E+01	0.11173E-02	0.83831E-02	0.93291E-02	0.93291E-01	0.42146E+02
0.31623E+01	0.19869E-02	0.23083E-02	0.25694E-02	0.25694E-01	0.42148E+02
0.56234E+01	0.35333E-02	0.55920E-03	0.62231E-03	0.62231E-02	0.44239E+02
0.10000E+02	0.62832E-02	0.11502E-03	0.12800E-03	0.12800E-02	0.50509E+02
0.17783E+02	0.11173E-01	0.20246E-04	0.22531E-04	0.22531E-03	0.62877E+02
0.31623E+02	0.19869E-01	0.34579E-05	0.38481E-05	0.38481E-04	0.78991E+02
0.56234E+02	0.35333E-01	0.58385E-06	0.64974E-06	0.64974E-05	0.99430E+02
0.10000E+03	0.62832E-01	0.86447E-07	0.96202E-07	0.96202E-06	0.13645E+03
0.17783E+03	0.11173E+00	0.14836E-07	0.16510E-07	0.16510E-06	0.16941E+03
0.31623E+03	0.19869E+00	0.29400E-08	0.32717E-08	0.32717E-07	0.19101E+03
0.56234E+03	0.35333E+00	0.58941E-09	0.76720E-09	0.76720E-08	0.19247E+03
0.10000E+04	0.62832E+00	0.15396E-09	0.17133E-09	0.17133E-08	0.20034E+03

(TCOLOOP): OLDT A-3

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 3 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.6660E-02 0.3330E-02
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2000E+03 0.2000E+03 0.1000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.62832E-04	0.89921E+00	0.10000E+01	0.10000E+02	0.39954E+02
0.17783E+00	0.11173E-03	0.45458E+00	0.50553E+00	0.50553E+01	0.37615E+02
0.31623E+00	0.19869E-03	0.21273E+00	0.23657E+00	0.23657E+01	0.36819E+02
0.56234E+00	0.35333E-03	0.86262E-01	0.95930E-01	0.95930E+00	0.37932E+02
0.10000E+01	0.62832E-03	0.28157E-01	0.31313E-01	0.31313E+00	0.41404E+02
0.17783E+01	0.11173E-02	0.78555E-02	0.87360E-02	0.87360E-01	0.44541E+02
0.31623E+01	0.19869E-02	0.19803E-02	0.22023E-02	0.22023E-01	0.47378E+02
0.56234E+01	0.35333E-02	0.54555E-03	0.60781E-03	0.60781E-02	0.44973E+02
0.10000E+02	0.62832E-02	0.13903E-03	0.15461E-03	0.15461E-02	0.44281E+02
0.17783E+02	0.11173E-01	0.31563E-04	0.35101E-04	0.35101E-03	0.46439E+02
0.31623E+02	0.19869E-01	0.60277E-05	0.67033E-05	0.67033E-04	0.54348E+02
0.56234E+02	0.35333E-01	0.10624E-05	0.11819E-05	0.11819E-04	0.66617E+02
0.10000E+03	0.62832E-01	0.16833E-06	0.18719E-06	0.18719E-05	0.87439E+02
0.17783E+03	0.11173E+00	0.25672E-07	0.28549E-07	0.28549E-06	0.11750E+03
0.31623E+03	0.19869E+00	0.46853E-08	0.52105E-08	0.52105E-07	0.13998E+03
0.56234E+03	0.35333E+00	0.74394E-09	0.83289E-09	0.83289E-08	0.18213E+03
0.10000E+04	0.62832E+00	0.95690E-10	0.10642E-09	0.10642E-08	0.27509E+03
0.17783E+04	0.11173E+01	0.27816E-10	0.30934E-10	0.30934E-09	0.24018E+03

(TCOLOOP): OLDT A-4

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IQUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IQUT = 6 B0= 0.1000E+02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.6660E-02 0.3330E-02
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.2000E+03 0.1000E+03 0.1000E+03 0.1000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.62832E-04	0.89876E+00	0.10000E+01	0.10000E+02	0.40078E+02
0.17783E+00	0.11173E-03	0.44697E+00	0.49731E+00	0.49731E+01	0.40130E+02
0.31623E+00	0.19869E-03	0.20538E+00	0.22852E+00	0.22852E+01	0.39898E+02
0.56234E+00	0.35333E-03	0.83342E-01	0.93287E-01	0.93287E+00	0.39548E+02
0.10000E+01	0.62832E-03	0.29399E-01	0.32711E-01	0.32711E+00	0.39571E+02
0.17783E+01	0.11173E-02	0.89924E-02	0.10005E-01	0.10005E+00	0.39671E+02
0.31623E+01	0.19869E-02	0.24359E-02	0.27103E-02	0.27103E-01	0.40444E+02
0.56234E+01	0.35333E-02	0.63006E-03	0.70104E-03	0.70104E-02	0.40598E+02
0.10000E+02	0.62832E-02	0.14211E-03	0.15812E-03	0.15812E-02	0.43611E+02
0.17783E+02	0.11173E-01	0.27879E-04	0.31020E-04	0.31020E-03	0.50593E+02
0.31623E+02	0.19869E-01	0.48829E-05	0.54329E-05	0.54329E-04	0.62633E+02
0.56234E+02	0.35333E-01	0.83456E-06	0.92857E-06	0.92857E-05	0.78325E+02
0.10000E+03	0.62832E-01	0.12337E-06	0.13727E-06	0.13727E-05	0.10761E+03
0.17783E+03	0.11173E+00	0.19790E-07	0.22020E-07	0.22020E-06	0.13978E+03
0.31623E+03	0.19869E+00	0.39358E-08	0.43791E-08	0.43791E-07	0.15724E+03
0.56234E+03	0.35333E+00	0.69174E-09	0.76967E-09	0.76967E-08	0.19203E+03
0.10000E+04	0.62832E+00	0.51327E-10	0.57108E-10	0.57108E-09	0.41671E+03
0.17783E+04	0.11173E+01	0.40792E-10	0.45387E-10	0.45387E-09	0.18607E+03
0.31623E+04	0.19869E+01	0.36385E-11	0.96116E-11	0.96116E-10	0.20065E+03

(TCOLOOP): OLJT A-5

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 N2 = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.2330E-01 0.6660E-02 0.3330E-02
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.1000E+03 0.2000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*NXNORM	APP.RES.
0.1000E+00	0.62832E-04	0.39960E+00	0.1000E+01	0.1000E+02	0.40121E+02
0.17783E+00	0.11173E-03	0.45531E+00	0.50669E+00	0.50669E+01	0.37370E+02
0.31623E+00	0.19869E-03	0.21189E+00	0.23580E+00	0.23580E+01	0.37165E+02
0.56234E+00	0.35333E-03	0.34716E-01	0.94276E-01	0.94276E+00	0.38956E+02
0.1000E+01	0.62832E-03	0.27737E-01	0.30867E-01	0.30867E+00	0.42053E+02
0.17783E+01	0.11173E-02	0.83592E-02	0.93024E-02	0.93024E-01	0.42249E+02
0.31623E+01	0.19869E-02	0.23030E-02	0.25629E-02	0.25629E-01	0.42229E+02
0.56234E+01	0.35333E-02	0.56403E-03	0.62768E-03	0.62768E-02	0.43966E+02
0.1000E+02	0.62832E-02	0.11771E-03	0.13099E-03	0.13099E-02	0.49706E+02
0.17783E+02	0.11173E-01	0.21114E-04	0.23496E-04	0.23496E-03	0.61113E+02
0.31623E+02	0.19869E-01	0.36294E-05	0.40390E-05	0.40390E-04	0.76462E+02
0.56234E+02	0.35333E-01	0.61553E-06	0.68498E-06	0.68498E-05	0.96026E+02
0.1000E+03	0.62832E-01	0.91222E-07	0.10153E-06	0.10153E-05	0.13163E+03
0.17783E+03	0.11173E+00	0.15961E-07	0.17762E-07	0.17762E-06	0.16135E+03
0.31623E+03	0.19869E+00	0.28065E-08	0.31232E-08	0.31232E-07	0.19702E+03
0.56234E+03	0.35333E+00	0.52682E-09	0.58627E-09	0.58627E-08	0.23027E+03
0.1000E+04	0.62832E+00	0.10065E-09	0.11201E-09	0.11201E-08	0.26598E+03

(TCOLOOP): OLDT A-6

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 3 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.6660E-02 0.3330E-02
0.5000E-01 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.2000E+03 0.2000E+03 0.1000E+03 0.2000E+03 0.8000E+02
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.62832E-04	0.89863E+00	0.10000E+01	0.10000E+02	0.40114E+02
0.17783E+00	0.11173E-03	0.44715E+00	0.49759E+00	0.49759E+01	0.40117E+02
0.31623E+00	0.19869E-03	0.20528E+00	0.22844E+00	0.22844E+01	0.39942E+02
0.56234E+00	0.35333E-03	0.33853E-01	0.93313E-01	0.93313E+00	0.39541E+02
0.10000E+01	0.62832E-03	0.29676E-01	0.33023E-01	0.33023E+00	0.39190E+02
0.17783E+01	0.11173E-02	0.90213E-02	0.10039E-01	0.10039E+00	0.39560E+02
0.31623E+01	0.19869E-02	0.23727E-02	0.26403E-02	0.26403E-01	0.41273E+02
0.56234E+01	0.35333E-02	0.59551E-03	0.66268E-03	0.66268E-02	0.42278E+02
0.10000E+02	0.62832E-02	0.14125E-03	0.15719E-03	0.15719E-02	0.43793E+02
0.17783E+02	0.11173E-01	0.29991E-04	0.33375E-04	0.33375E-03	0.49137E+02
0.31623E+02	0.19869E-01	0.56559E-05	0.62940E-05	0.62940E-04	0.56730E+02
0.56234E+02	0.35333E-01	0.99017E-06	0.11019E-05	0.11019E-04	0.69851E+02
0.10000E+03	0.62832E-01	0.15468E-06	0.17213E-06	0.17213E-05	0.92520E+02
0.17783E+03	0.11173E+00	0.24403E-07	0.27155E-07	0.27155E-06	0.12155E+03
0.31623E+03	0.19869E+00	0.43357E-08	0.48247E-08	0.48247E-07	0.14741E+03
0.56234E+03	0.35333E+00	0.91722E-09	0.10207E-08	0.10207E-07	0.15910E+03
0.10000E+04	0.62832E+00	0.22573E-09	0.25119E-09	0.25119E-08	0.15523E+03

(TCOLOOP): QLOT E-1

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.2500E-02 0.6660E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2000E+03 0.1000E+03 0.1000E+03 0.1000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NGRM* X NORM	APP.RES.
0.10000E+00	0.62832E-04	0.39925E+00	0.10000E+01	0.10000E+02	0.39943E+02
0.17783E+00	0.11173E-03	0.45452E+00	0.50544E+00	0.50544E+01	0.37635E+02
0.31623E+00	0.19869E-03	0.21276E+00	0.23660E+00	0.23660E+01	0.36806E+02
0.56234E+00	0.35333E-03	0.36263E-01	0.95934E-01	0.95934E+00	0.37927E+02
0.10000E+01	0.62832E-03	0.28160E-01	0.31315E-01	0.31315E+00	0.41398E+02
0.17783E+01	0.11173E-02	0.30233E-02	0.89222E-02	0.89222E-01	0.43751E+02
0.31623E+01	0.19869E-02	0.20511E-02	0.22920E-02	0.22920E-01	0.45965E+02
0.56234E+01	0.35333E-02	0.53023E-03	0.58974E-03	0.58974E-02	0.45956E+02
0.10000E+02	0.62832E-02	0.11706E-03	0.13020E-03	0.13020E-02	0.49891E+02
0.17783E+02	0.11173E-01	0.22816E-04	0.25372E-04	0.25372E-03	0.57980E+02
0.31623E+02	0.19869E-01	0.40401E-05	0.44927E-05	0.44927E-04	0.71147E+02
0.56234E+02	0.35333E-01	0.69499E-06	0.77284E-06	0.77284E-05	0.88534E+02
0.10000E+03	0.62832E-01	0.10593E-06	0.11780E-06	0.11780E-05	0.11913E+03
0.17783E+03	0.11173E+00	0.17324E-07	0.19265E-07	0.19265E-06	0.15276E+03
0.31623E+03	0.19869E+00	0.33435E-08	0.37181E-08	0.37181E-07	0.17531E+03
0.56234E+03	0.35333E+00	0.72921E-09	0.81091E-09	0.81091E-08	0.18540E+03
0.10000E+04	0.62832E+00	0.14277E-09	0.15877E-09	0.15877E-08	0.21068E+03

(TCOLOOP): PLOT 2-2

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IDUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.2500E-02 0.6660E-02
 0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2000E+03 0.1000E+03 0.5000E+02 0.1000E+03
 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM* $\bar{X}$ NORM	APP.RES.
0.10000E+00	0.62832E-04	0.39925E+00	0.10000E+01	0.10000E+02	0.39943E+02
0.17783E+00	0.11173E-03	0.45452E+00	0.50545E+00	0.50545E+01	0.37634E+02
0.31623E+00	0.19869E-03	0.21276E+00	0.23660E+00	0.23660E+01	0.36806E+02
0.56234E+00	0.35333E-03	0.86269E-01	0.95934E-01	0.95934E+00	0.37927E+02
0.10000E+01	0.62832E-03	0.28158E-01	0.31313E-01	0.31313E+00	0.41402E+02
0.17783E+01	0.11173E-02	0.90160E-02	0.89141E-02	0.39141E-01	0.43785E+02
0.31623E+01	0.19869E-02	0.20589E-02	0.22895E-02	0.22895E-01	0.46002E+02
0.56234E+01	0.35333E-02	0.53176E-03	0.59133E-03	0.59133E-02	0.45868E+02
0.10000E+02	0.62832E-02	0.11783E-03	0.13109E-03	0.13109E-02	0.49656E+02
0.17783E+02	0.11173E-01	0.23047E-04	0.25629E-04	0.25629E-03	0.57584E+02
0.31623E+02	0.19869E-01	0.40801E-05	0.45372E-05	0.45372E-04	0.70677E+02
0.56234E+02	0.35333E-01	0.70261E-05	0.78133E-05	0.78133E-05	0.87889E+02
0.10000E+03	0.62832E-01	0.10632E-04	0.11823E-04	0.11823E-05	0.11884E+03
0.17783E+03	0.11173E+00	0.17514E-07	0.19476E-07	0.19476E-06	0.15166E+03
0.31623E+03	0.19869E+00	0.34065E-08	0.37881E-08	0.37881E-07	0.17314E+03
0.56234E+03	0.35333E+00	0.56536E-09	0.62870E-09	0.62370E-08	0.21969E+03
0.10000E+04	0.62832E+00	0.19018E-09	0.21149E-09	0.21149E-08	0.17402E+03

(TCOLOOP): QLOJ 8-3

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 N2 = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.2500E-02 0.6660E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2000E+03 0.2000E+03 0.1000E+03 0.1000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.62832E-04	0.39921E+00	0.10000E+01	0.10000E+02	0.39953E+02
0.17783E+00	0.11173E-03	0.45456E+00	0.50553E+00	0.50553E+01	0.37616E+02
0.31623E+00	0.19869E-03	0.21273E+00	0.23658E+00	0.23658E+01	0.36819E+02
0.56234E+00	0.35333E-03	0.86262E-01	0.95931E-01	0.95931E+00	0.37932E+02
0.10000E+01	0.62832E-03	0.28154E-01	0.31310E-01	0.31310E+00	0.41408E+02
0.17783E+01	0.11173E-02	0.78600E-02	0.87410E-02	0.87410E-01	0.44519E+02
0.31623E+01	0.19869E-02	0.19339E-02	0.22062E-02	0.22062E-01	0.47314E+02
0.56234E+01	0.35333E-02	0.54690E-03	0.60820E-03	0.60820E-02	0.44952E+02
0.10000E+02	0.62832E-02	0.13822E-03	0.15371E-03	0.15371E-02	0.44461E+02
0.17783E+02	0.11173E-01	0.31177E-04	0.34672E-04	0.34672E-03	0.46881E+02
0.31623E+02	0.19869E-01	0.59352E-05	0.66005E-05	0.66005E-04	0.54917E+02
0.56234E+02	0.35333E-01	0.10477E-05	0.11652E-05	0.11652E-04	0.67256E+02
0.10000E+03	0.62832E-01	0.16592E-06	0.18452E-06	0.18452E-05	0.89294E+02
0.17783E+03	0.11173E+00	0.25329E-07	0.28167E-07	0.28167E-05	0.11856E+03
0.31623E+03	0.19869E+00	0.50284E-08	0.55920E-08	0.55920E-07	0.13354E+03
0.56234E+03	0.35333E+00	0.73063E-09	0.81255E-09	0.81255E-08	0.13515E+03
0.10000E+04	0.62832E+00	0.11583E-09	0.12881E-09	0.12881E-08	0.24220E+03
0.17783E+04	0.11173E+01	0.13683E-10	0.15219E-10	0.15219E-09	0.38539E+03

(TCOLOOP): JLOT 8-4

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E+02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.2500E-02 0.6660E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.2000E+03 0.1000E+03 0.2000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.62832E-04	0.89875E+00	0.10000E+01	0.10000E+02	0.40030E+02
0.17783E+00	0.11173E-03	0.45510E+00	0.50637E+00	0.50637E+01	0.37441E+02
0.31623E+00	0.19869E-03	0.21201E+00	0.23590E+00	0.23590E+01	0.37113E+02
0.56234E+00	0.35333E-03	0.84714E-01	0.94257E-01	0.94257E+00	0.38958E+02
0.10000E+01	0.62832E-03	0.27306E-01	0.30382E-01	0.30382E+00	0.42735E+02
0.17783E+01	0.11173E-02	0.80490E-02	0.89558E-02	0.89558E-01	0.43632E+02
0.31623E+01	0.19869E-02	0.22739E-02	0.25290E-02	0.25290E-01	0.42658E+02
0.56234E+01	0.35333E-02	0.64213E-03	0.71447E-03	0.71447E-02	0.40033E+02
0.10000E+02	0.62832E-02	0.15253E-03	0.16972E-03	0.16972E-02	0.41511E+02
0.17783E+02	0.11173E-01	0.31450E-04	0.34993E-04	0.34993E-03	0.46604E+02
0.31623E+02	0.19869E-01	0.56217E-05	0.62550E-05	0.62550E-04	0.56963E+02
0.56234E+02	0.35333E-01	0.96681E-06	0.10757E-05	0.10757E-04	0.70978E+02
0.10000E+03	0.62832E-01	0.14432E-06	0.16058E-06	0.16058E-05	0.96906E+02
0.17783E+03	0.11173E+00	0.22643E-07	0.25193E-07	0.25193E-06	0.12777E+03
0.31623E+03	0.19869E+00	0.43618E-08	0.48532E-08	0.48532E-07	0.14632E+03
0.56234E+03	0.35333E+00	0.63536E-09	0.70694E-09	0.70694E-08	0.20323E+03
0.10000E+04	0.62832E+00	0.24871E-09	0.27673E-09	0.27673E-08	0.14551E+03
0.17783E+04	0.11173E+01	0.11234E-10	0.12500E-10	0.12500E-09	0.43958E+03

(TCOLOOP): OLDT 8-6

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2500E-01 0.1670E-01 0.3330E-01 0.2500E-02 0.6660E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.1000E+03 0.1000E+03 0.2000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.62832E-04	0.39856E+00	0.10000E+01	0.10000E+02	0.40134E+02
0.17783E+00	0.11173E-03	0.45533E+00	0.50679E+00	0.50679E+01	0.37348E+02
0.31623E+00	0.19869E-03	0.21185E+00	0.23577E+00	0.23577E+01	0.37179E+02
0.56234E+00	0.35333E-03	0.34722E-01	0.94286E-01	0.94286E+00	0.38953E+02
0.10000E+01	0.62832E-03	0.27344E-01	0.30988E-01	0.30988E+00	0.41885E+02
0.17783E+01	0.11173E-02	0.33960E-02	0.93438E-02	0.93438E-01	0.42090E+02
0.31623E+01	0.19869E-02	0.22931E-02	0.25520E-02	0.25520E-01	0.42370E+02
0.56234E+01	0.35333E-02	0.54981E-03	0.61188E-03	0.61188E-02	0.44781E+02
0.10000E+02	0.62832E-02	0.11359E-03	0.12642E-03	0.12642E-02	0.50946E+02
0.17783E+02	0.11173E-01	0.20266E-04	0.22554E-04	0.22554E-03	0.62835E+02
0.31623E+02	0.19869E-01	0.35130E-05	0.39096E-05	0.39096E-04	0.78155E+02
0.56234E+02	0.35333E-01	0.59768E-06	0.66516E-06	0.66516E-05	0.97934E+02
0.10000E+03	0.62832E-01	0.30586E-07	0.10081E-06	0.10081E-05	0.13226E+03
0.17783E+03	0.11173E+00	0.15851E-07	0.17640E-07	0.17640E-06	0.16209E+03
0.31623E+03	0.19869E+00	0.32677E-08	0.36366E-08	0.36366E-07	0.17801E+03
0.56234E+03	0.35333E+00	0.54423E-09	0.60568E-09	0.60568E-08	0.22534E+03
0.10000E+04	0.62832E+00	0.65439E-10	0.72827E-10	0.72827E-09	0.35441E+03

(TCOLQOP): OLGT C-1

M = 6 XNORM=0.10E+02 IPCM= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-02 0.2000E-01 0.1000E-01 0.2500E-02 0.6660E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.6000E+02 0.2500E+03 0.1500E+03 0.1000E+03 0.2000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-05	0.75030E+00	0.10000E+01	0.10000E+02	0.65235E+03
0.17783E+00	0.14883E-04	0.31794E+00	0.42375E+00	0.42375E+01	0.70317E+03
0.31623E+00	0.26466E-04	0.14060E+00	0.18766E+00	0.18766E+01	0.57239E+03
0.56234E+00	0.47062E-04	0.70257E-01	0.93639E-01	0.93639E+00	0.37649E+03
0.10000E+01	0.83692E-04	0.35894E-01	0.47840E-01	0.47840E+00	0.23736E+03
0.17783E+01	0.14883E-03	0.17379E-01	0.23162E-01	0.23162E+00	0.15836E+03
0.31623E+01	0.26456E-03	0.76550E-02	0.10216E-01	0.10216E+00	0.11431E+03
0.56234E+01	0.47062E-03	0.30110E-02	0.40131E-02	0.40131E-01	0.89536E+02
0.10000E+02	0.83692E-03	0.10683E-02	0.14238E-02	0.14238E-01	0.74187E+02
0.17783E+02	0.14883E-02	0.33223E-03	0.44285E-03	0.44285E-02	0.66037E+02
0.31623E+02	0.26466E-02	0.87914E-04	0.11717E-03	0.11717E-02	0.64517E+02
0.56234E+02	0.47062E-02	0.19848E-04	0.26453E-04	0.26453E-03	0.68847E+02
0.10000E+03	0.83692E-02	0.40604E-05	0.54116E-05	0.54116E-04	0.77356E+02
0.17783E+03	0.14883E-01	0.73267E-06	0.97650E-06	0.97650E-05	0.93740E+02
0.31623E+03	0.26466E-01	0.13392E-06	0.17849E-06	0.17849E-05	0.11201E+03
0.56234E+03	0.47062E-01	0.23977E-07	0.31957E-07	0.31957E-05	0.13538E+03
0.10000E+04	0.83692E-01	0.40999E-08	0.54644E-08	0.54644E-07	0.16854E+03
0.17783E+04	0.14883E+00	0.79222E-09	0.10559E-08	0.10559E-07	0.19327E+03
0.31623E+04	0.26466E+00	0.15203E-09	0.20263E-09	0.20263E-08	0.22260E+03
0.56234E+04	0.47062E+00	0.36773E-10	0.49017E-10	0.49017E-09	0.21969E+03
0.10000E+05	0.83692E+00	0.99449E-11	0.13255E-10	0.13255E-09	0.20129E+03

(TCOLOOP): OLDT C-2

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 RM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-02 0.2000E-01 0.1000E-01 0.2500E-02 0.6660E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2500E+03 0.1500E+03 0.1000E+03 0.2000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*NXNORM	APP.RES.
0.10000E+00	0.83692E-05	0.89535E+00	0.10000E+01	0.10000E+02	0.30795E+03
0.17783E+00	0.14833E-04	0.41400E+00	0.46239E+00	0.46239E+01	0.38829E+03
0.31623E+00	0.26466E-04	0.16582E+00	0.18521E+00	0.18521E+01	0.44890E+03
0.56234E+00	0.47063E-04	0.50761E-01	0.67863E-01	0.67863E+00	0.44786E+03
0.10000E+01	0.83692E-04	0.25649E-01	0.28647E-01	0.28647E+00	0.34181E+03
0.17783E+01	0.14833E-03	0.11565E-01	0.12917E-01	0.12917E+00	0.23769E+03
0.31623E+01	0.26466E-03	0.51363E-02	0.57367E-02	0.57367E-01	0.16522E+03
0.56234E+01	0.47063E-03	0.20887E-02	0.23328E-02	0.23328E-01	0.12214E+03
0.10000E+02	0.83692E-03	0.78209E-03	0.87351E-03	0.87351E-02	0.94895E+02
0.17783E+02	0.14833E-02	0.25962E-03	0.28997E-03	0.28997E-02	0.79414E+02
0.31623E+02	0.26466E-02	0.73714E-04	0.82331E-04	0.82331E-03	0.73137E+02
0.56234E+02	0.47063E-02	0.17593E-04	0.19657E-04	0.19657E-03	0.74809E+02
0.10000E+03	0.83692E-02	0.37750E-05	0.42162E-05	0.42162E-04	0.81290E+02
0.17783E+03	0.14833E-01	0.70731E-06	0.78998E-06	0.78998E-05	0.95937E+02
0.31623E+03	0.26466E-01	0.12979E-06	0.14496E-06	0.14496E-05	0.11439E+03
0.56234E+03	0.47063E-01	0.23924E-07	0.26720E-07	0.26720E-06	0.13559E+03
0.10000E+04	0.83692E-01	0.40084E-08	0.44769E-08	0.44769E-07	0.17110E+03
0.17783E+04	0.14833E+00	0.70339E-09	0.78561E-09	0.78561E-08	0.20923E+03
0.31623E+04	0.26466E+00	0.14930E-09	0.16563E-09	0.16563E-08	0.22633E+03
0.56234E+04	0.47063E+00	0.64606E-11	0.72158E-11	0.72158E-10	0.70046E+03
0.10000E+05	0.83692E+00	0.48817E-11	0.54523E-11	0.54523E-10	0.32348E+03

(TCOLG0P): OLDT C-3

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IQUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IQUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-02 0.2000E-01 0.1000E-01 0.6660E-02 0.3330E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.6000E+02 0.2500E+03 0.1500E+03 0.2000E+03 0.2000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.83692E-05	0.75030E+00	0.10000E+01	0.10000E+02	0.65236E+03
0.17783E+00	0.14883E-04	0.31795E+00	0.42376E+00	0.42376E+01	0.70316E+03
0.31623E+00	0.26466E-04	0.14080E+00	0.18765E+00	0.18765E+01	0.57240E+03
0.56234E+00	0.47063E-04	0.70258E-01	0.93639E-01	0.93639E+00	0.37649E+03
0.10000E+01	0.83692E-04	0.35896E-01	0.47842E-01	0.47842E+00	0.23785E+03
0.17783E+01	0.14883E-03	0.17376E-01	0.23159E-01	0.23159E+00	0.15839E+03
0.31623E+01	0.26466E-03	0.76661E-02	0.10217E-01	0.10217E+00	0.11429E+03
0.56234E+01	0.47063E-03	0.30104E-02	0.40123E-02	0.40123E-01	0.89602E+02
0.10000E+02	0.83692E-03	0.10642E-02	0.14184E-02	0.14184E-01	0.74415E+02
0.17783E+02	0.14883E-02	0.33123E-03	0.44159E-03	0.44159E-02	0.66229E+02
0.31623E+02	0.26466E-02	0.88424E-04	0.11785E-03	0.11785E-02	0.64251E+02
0.56234E+02	0.47063E-02	0.20308E-04	0.27066E-04	0.27066E-03	0.67765E+02
0.10000E+03	0.83692E-02	0.41861E-05	0.55792E-05	0.55792E-04	0.75780E+02
0.17783E+03	0.14883E-01	0.75958E-06	0.10124E-05	0.10124E-04	0.91493E+02
0.31623E+03	0.26466E-01	0.13733E-06	0.18303E-06	0.18303E-05	0.11014E+03
0.56234E+03	0.47063E-01	0.24574E-07	0.32752E-07	0.32752E-06	0.13318E+03
0.10000E+04	0.83692E-01	0.41684E-08	0.55556E-08	0.55556E-07	0.16669E+03
0.17783E+04	0.14883E+00	0.72896E-09	0.97155E-09	0.97155E-08	0.20430E+03
0.31623E+04	0.26466E+00	0.16187E-09	0.21574E-09	0.21574E-08	0.21349E+03
0.56234E+04	0.47063E+00	0.46844E-10	0.62433E-10	0.62433E-09	0.18696E+03
0.10000E+05	0.83692E+00	0.13217E-11	0.17616E-11	0.17616E-10	0.77294E+03

(TCOLOOP): OL0T C-4

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP =)
IOUT = 6 B0= 0.1000E-02 NE = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-02 0.2000E-01 0.1000E-01 0.6660E-02 0.3330E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.1000E+03 0.2500E+03 0.1500E+03 0.2000E+03 0.2000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-05	0.39534E+00	0.10000E+01	0.10000E+02	0.30735E+03
0.17783E+00	0.14883E-04	0.41400E+00	0.46239E+00	0.46239E+01	0.38829E+03
0.31623E+00	0.26466E-04	0.16562E+00	0.18521E+00	0.18521E+01	0.44891E+03
0.56234E+00	0.47063E-04	0.50761E-01	0.67863E-01	0.67863E+00	0.44737E+03
0.10000E+01	0.83692E-04	0.25650E-01	0.28648E-01	0.28648E+00	0.34179E+03
0.17783E+01	0.14883E-03	0.11563E-01	0.12915E-01	0.12915E+00	0.23772E+03
0.31623E+01	0.26466E-03	0.51372E-02	0.57377E-02	0.57377E-01	0.16520E+03
0.56234E+01	0.47063E-03	0.20884E-02	0.23326E-02	0.23326E-01	0.12215E+03
0.10000E+02	0.83692E-03	0.77915E-03	0.87023E-03	0.87023E-02	0.95172E+02
0.17783E+02	0.14883E-02	0.25872E-03	0.23896E-03	0.23896E-02	0.79618E+02
0.31623E+02	0.26466E-02	0.74909E-04	0.82660E-04	0.82660E-03	0.72930E+02
0.56234E+02	0.47063E-02	0.17964E-04	0.20063E-04	0.20063E-03	0.73759E+02
0.10000E+03	0.83692E-02	0.38329E-05	0.43368E-05	0.43368E-04	0.79749E+02
0.17783E+03	0.14883E-01	0.73067E-06	0.81608E-06	0.81608E-05	0.93912E+02
0.31623E+03	0.26466E-01	0.13294E-06	0.14848E-06	0.14848E-05	0.11257E+03
0.56234E+03	0.47063E-01	0.24333E-07	0.27178E-07	0.27178E-06	0.13406E+03
0.10000E+04	0.83692E-01	0.39996E-08	0.44671E-08	0.44671E-07	0.17135E+03
0.17783E+04	0.14883E+00	0.64555E-09	0.72101E-09	0.72101E-08	0.22155E+03
0.31623E+04	0.26466E+00	0.84402E-10	0.94268E-10	0.94268E-09	0.32957E+03
0.56234E+04	0.47063E+00	0.33078E-10	0.36945E-10	0.36945E-09	0.23578E+03
0.10000E+05	0.83692E+00	0.45709E-11	0.51042E-11	0.51042E-10	0.33803E+03

(TCOLOOP): OLUT C-5

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTCP = 0
IOUT = 6 B0= 0.1000E+02 NE = 6 9M= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-02 0.2000E-01 0.1000E-01 0.2500E-02 0.6660E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.6000E+02 0.2500E+03 0.2500E+03 0.1000E+03 0.2000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.83692E-05	0.75030E+00	0.10000E+01	0.10000E+02	0.65236E+03
0.17783E+00	0.14883E-04	0.31755E+00	0.42376E+00	0.42376E+01	0.70316E+03
0.31623E+00	0.26466E-04	0.14080E+00	0.18765E+00	0.18765E+01	0.57240E+03
0.56234E+00	0.47063E-04	0.70257E-01	0.93639E-01	0.93639E+00	0.37649E+03
0.10000E+01	0.83692E-04	0.35897E-01	0.47843E-01	0.47843E+00	0.23795E+03
0.17783E+01	0.14893E-03	0.17376E-01	0.23158E-01	0.23158E+00	0.15840E+03
0.31623E+01	0.26466E-03	0.76665E-02	0.10218E-01	0.10218E+00	0.11428E+03
0.56234E+01	0.47063E-03	0.30100E-02	0.40117E-02	0.40117E-01	0.89613E+02
0.10000E+02	0.83692E-03	0.10621E-02	0.14156E-02	0.14156E-01	0.74535E+02
0.17783E+02	0.14883E-02	0.33024E-03	0.44014E-03	0.44014E-02	0.66393E+02
0.31623E+02	0.26466E-02	0.88382E-04	0.11780E-03	0.11780E-02	0.64272E+02
0.56234E+02	0.47063E-02	0.20561E-04	0.27430E-04	0.27430E-03	0.67142E+02
0.10000E+03	0.83692E-02	0.43327E-05	0.57746E-05	0.57746E-04	0.74028E+02
0.17783E+03	0.14893E-01	0.80344E-06	0.10775E-05	0.10775E-04	0.87736E+02
0.31623E+03	0.26466E-01	0.14827E-05	0.19762E-06	0.19762E-05	0.10463E+03
0.56234E+03	0.47063E-01	0.26621E-07	0.35480E-07	0.35480E-06	0.12625E+03
0.10000E+04	0.83692E-01	0.44583E-08	0.59427E-08	0.59427E-07	0.15936E+03
0.17783E+04	0.14893E+00	0.73071E-09	0.97388E-09	0.97388E-08	0.20398E+03
0.31623E+04	0.26466E+00	0.99014E-10	0.13197E-09	0.13197E-08	0.29629E+03
0.56234E+04	0.47063E+00	0.18794E-10	0.25048E-10	0.25048E-09	0.34372E+03

{TCOLOOP}: OLDT C-6

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-02 0.2000E-01 0.1000E-01 0.6660E-02 0.3330E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2500E+03 0.2500E+03 0.2000E+03 0.2000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.83692E-05	0.89534E+00	0.10000E+01	0.10000E+02	0.30795E+03
0.17783E+00	0.14883E-04	0.41400E+00	0.46239E+00	0.46239E+01	0.38829E+03
0.31623E+00	0.26466E-04	0.16562E+00	0.18520E+00	0.18520E+01	0.44891E+03
0.56234E+00	0.47063E-04	0.50761E-01	0.67863E-01	0.67863E+00	0.44786E+03
0.10000E+01	0.83692E-04	0.25651E-01	0.28649E-01	0.28649E+00	0.34179E+03
0.17783E+01	0.14883E-03	0.11562E-01	0.12913E-01	0.12913E+00	0.23774E+03
0.31623E+01	0.26466E-03	0.51373E-02	0.57384E-02	0.57384E-01	0.16518E+03
0.56234E+01	0.47063E-03	0.20384E-02	0.23325E-02	0.23325E-01	0.12215E+03
0.10000E+02	0.83692E-03	0.77690E-03	0.86772E-03	0.86772E-02	0.95335E+02
0.17783E+02	0.14883E-02	0.25703E-03	0.28707E-03	0.28707E-02	0.80004E+02
0.31623E+02	0.26466E-02	0.73775E-04	0.82398E-04	0.82398E-03	0.73095E+02
0.56234E+02	0.47063E-02	0.18348E-04	0.20492E-04	0.20492E-03	0.72691E+02
0.10000E+03	0.83692E-02	0.40841E-05	0.45615E-05	0.45615E-04	0.77060E+02
0.17783E+03	0.14883E-01	0.79538E-06	0.88836E-06	0.88836E-05	0.88702E+02
0.31623E+03	0.26466E-01	0.14664E-06	0.16378E-06	0.16378E-05	0.10541E+03
0.56234E+03	0.47063E-01	0.26811E-07	0.29945E-07	0.29945E-06	0.12565E+03
0.10000E+04	0.83692E-01	0.44957E-08	0.50212E-08	0.50212E-07	0.15849E+03
0.17783E+04	0.14883E+00	0.78506E-09	0.87683E-09	0.87683E-08	0.19445E+03
0.31623E+04	0.26466E+00	0.20881E-09	0.23322E-09	0.23322E-08	0.19015E+03
0.56234E+04	0.47063E+00	0.38000E-10	0.42442E-10	0.42442E-09	0.21495E+03

(TCOLOOP): DLDT C-7

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-02 0.2000E-01 0.1000E-01 0.3330E-02 0.3330E-02
 0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2500E+03 0.1500E+03 0.2000E+03 0.2000E+03
 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-05	0.39535E+00	0.10000E+01	0.10000E+02	0.30795E+03
0.17783E+00	0.14883E-04	0.41400E+00	0.46239E+00	0.46239E+01	0.38829E+03
0.31623E+00	0.26466E-04	0.16582E+00	0.18521E+00	0.18521E+01	0.44890E+03
0.56234E+00	0.47063E-04	0.50761E-01	0.67863E-01	0.67863E+00	0.44787E+03
0.10000E+01	0.83692E-04	0.25649E-01	0.28647E-01	0.28647E+00	0.34181E+03
0.17783E+01	0.14883E-03	0.11565E-01	0.12917E-01	0.12917E+00	0.23769E+03
0.31623E+01	0.26466E-03	0.51362E-02	0.57365E-02	0.57365E-01	0.16523E+03
0.56234E+01	0.47063E-03	0.20386E-02	0.23327E-02	0.23327E-01	0.12215E+03
0.10000E+02	0.83692E-03	0.78264E-03	0.87412E-03	0.87412E-02	0.94844E+02
0.17783E+02	0.14883E-02	0.26073E-03	0.29120E-03	0.29120E-02	0.79166E+02
0.31623E+02	0.26466E-02	0.74081E-04	0.82740E-04	0.82740E-03	0.72880E+02
0.56234E+02	0.47063E-02	0.17427E-04	0.19465E-04	0.19465E-03	0.75317E+02
0.10000E+03	0.83692E-02	0.36475E-05	0.40738E-05	0.40738E-04	0.83207E+02
0.17783E+03	0.14883E-01	0.66103E-06	0.73836E-06	0.73836E-05	0.10045E+03
0.31623E+03	0.26466E-01	0.11964E-06	0.13363E-06	0.13363E-05	0.12079E+03
0.56234E+03	0.47063E-01	0.22027E-07	0.24602E-07	0.24602E-06	0.14327E+03
0.10000E+04	0.83692E-01	0.36155E-08	0.40381E-08	0.40381E-07	0.18328E+03
0.17783E+04	0.14883E+00	0.57090E-09	0.74933E-09	0.74933E-08	0.21593E+03
0.31623E+04	0.26466E+00	0.90191E-10	0.10073E-09	0.10073E-08	0.31531E+03
0.56234E+04	0.47063E+00	0.42270E-10	0.47211E-10	0.47211E-09	0.20022E+03
0.10000E+05	0.83692E+00	0.13918E-11	0.15544E-11	0.15544E-10	0.74679E+03

(TCOLOOP): DLOT C-8

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 N2 = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-02 0.2000E-01 0.1000E-01 0.6670E-02 0.3330E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2500E+03 0.1500E+03 0.1000E+03 0.2000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-05	0.89534E+00	0.10000E+01	0.10000E+02	0.30795E+03
0.17783E+00	0.14883E-04	0.41400E+00	0.46239E+00	0.46239E+01	0.38829E+03
0.31623E+00	0.26466E-04	0.16582E+00	0.18521E+00	0.18521E+01	0.44891E+03
0.56234E+00	0.47063E-04	0.60761E-01	0.67863E-01	0.67863E+00	0.44787E+03
0.10000E+01	0.83692E-04	0.25650E-01	0.28648E-01	0.28648E+00	0.34180E+03
0.17783E+01	0.14883E-03	0.11563E-01	0.12915E-01	0.12915E+00	0.23771E+03
0.31623E+01	0.26466E-03	0.51370E-02	0.57374E-02	0.57374E-01	0.16520E+03
0.56234E+01	0.47063E-03	0.20884E-02	0.23325E-02	0.23325E-01	0.12215E+03
0.10000E+02	0.83692E-03	0.77994E-03	0.87110E-03	0.87110E-02	0.95098E+02
0.17783E+02	0.14883E-02	0.25956E-03	0.28990E-03	0.28990E-02	0.79426E+02
0.31623E+02	0.26466E-02	0.74187E-04	0.82859E-04	0.82859E-03	0.72806E+02
0.56234E+02	0.47063E-02	0.17790E-04	0.19870E-04	0.19870E-03	0.74255E+02
0.10000E+03	0.83692E-02	0.37873E-05	0.42306E-05	0.42306E-04	0.81103E+02
0.17783E+03	0.14883E-01	0.69928E-06	0.78113E-06	0.78113E-05	0.96717E+02
0.31623E+03	0.26466E-01	0.12674E-06	0.14155E-06	0.14155E-05	0.11622E+03
0.56234E+03	0.47063E-01	0.23085E-07	0.25783E-07	0.25783E-06	0.13836E+03
0.10000E+04	0.83692E-01	0.39649E-08	0.44284E-08	0.44284E-07	0.17234E+03
0.17783E+04	0.14883E+00	0.72792E-09	0.81301E-09	0.81301E-08	0.20450E+03
0.31623E+04	0.26466E+00	0.13083E-09	0.14612E-09	0.14612E-08	0.24606E+03
0.56234E+04	0.47063E+00	0.22089E-10	0.24671E-10	0.24671E-09	0.30862E+03

{TCOLOOP}: QLOOT C-9

M = 6 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IQUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP =)
IQUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-02 0.2000E-01 0.1000E-01 0.2500E-02 0.6670E-02
0.3330E-02 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.6000E+02 0.2500E+03 0.2500E+03 0.1000E+03 0.1000E+03
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*NXNORM	APP.RES.
0.10000E+00	0.83692E-05	0.75030E+00	0.10000E+01	0.10000E+02	0.65236E+03
0.17783E+00	0.14883E-04	0.31795E+00	0.42376E+00	0.42376E+01	0.70315E+03
0.31623E+00	0.26466E-04	0.14080E+00	0.18765E+00	0.18765E+01	0.57240E+03
0.56234E+00	0.47063E-04	0.70257E-01	0.93639E-01	0.93639E+00	0.37649E+03
0.10000E+01	0.83692E-04	0.35397E-01	0.47843E-01	0.47843E+00	0.23735E+03
0.17783E+01	0.14883E-03	0.17375E-01	0.23158E-01	0.23158E+00	0.15840E+03
0.31623E+01	0.26466E-03	0.76666E-02	0.10218E-01	0.10218E+00	0.11428E+03
0.56234E+01	0.47063E-03	0.30100E-02	0.40117E-02	0.40117E-01	0.89613E+02
0.10000E+02	0.83692E-02	0.10620E-02	0.14155E-02	0.14155E-01	0.74538E+02
0.17783E+02	0.14883E-02	0.33059E-03	0.44061E-03	0.44061E-02	0.66340E+02
0.31623E+02	0.26466E-02	0.88583E-04	0.11806E-03	0.11806E-02	0.64168E+02
0.56234E+02	0.47063E-02	0.20567E-04	0.27411E-04	0.27411E-03	0.67173E+02
0.10000E+03	0.83692E-02	0.42359E-05	0.57122E-05	0.57122E-04	0.74576E+02
0.17783E+03	0.14883E-01	0.78630E-06	0.10480E-05	0.10480E-04	0.89390E+02
0.31623E+03	0.26466E-01	0.14270E-06	0.19019E-06	0.19019E-05	0.10735E+03
0.56234E+03	0.47063E-01	0.25578E-07	0.34090E-07	0.34090E-06	0.12966E+03
0.10000E+04	0.83692E-01	0.43200E-08	0.57577E-08	0.57577E-07	0.16276E+03
0.17783E+04	0.14883E+00	0.78186E-09	0.10421E-08	0.10421E-07	0.19498E+03
0.31623E+04	0.26466E+00	0.14173E-09	0.18896E-09	0.18896E-09	0.23322E+03
0.56234E+04	0.47063E+00	0.38938E-10	0.51897E-10	0.51897E-09	0.21148E+03

(TCOLOOP): JLDOT 0-1

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2000E-01 0.1000E-01 0.6670E-02 0.3330E-02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+03 0.2000E+03 0.2000E+03 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.50265E-04	0.89845E+00	0.10000E+01	0.10000E+02	0.50202E+02
0.17783E+00	0.89386E-04	0.44729E+00	0.49785E+00	0.49785E+01	0.50087E+02
0.31623E+00	0.15895E-03	0.20503E+00	0.22826E+00	0.22826E+01	0.50033E+02
0.56234E+00	0.28266E-03	0.33226E-01	0.92633E-01	0.92633E+00	0.49964E+02
0.10000E+01	0.50265E-03	0.29217E-01	0.32519E-01	0.32519E+00	0.49791E+02
0.17783E+01	0.89386E-03	0.31634E-02	0.10199E-01	0.10199E+00	0.49782E+02
0.31623E+01	0.15895E-02	0.25385E-02	0.28254E-02	0.28254E-01	0.48964E+02
0.56234E+01	0.28266E-02	0.62919E-03	0.70030E-03	0.70030E-02	0.50786E+02
0.10000E+02	0.50265E-02	0.13934E-03	0.15509E-03	0.15509E-02	0.55265E+02
0.17783E+02	0.89386E-02	0.27182E-04	0.30255E-04	0.30255E-03	0.64340E+02
0.31623E+02	0.15895E-01	0.49854E-05	0.55489E-05	0.55489E-04	0.77203E+02
0.56234E+02	0.28266E-01	0.37865E-06	0.97796E-06	0.97796E-05	0.94589E+02
0.10000E+03	0.50265E-01	0.13854E-06	0.15420E-06	0.15420E-05	0.12448E+03
0.17783E+03	0.89336E-01	0.24041E-07	0.26758E-07	0.26758E-06	0.15346E+03
0.31623E+03	0.15895E+00	0.44591E-08	0.49631E-08	0.49631E-07	0.18085E+03
0.56234E+03	0.28266E+00	0.63774E-09	0.70981E-09	0.70981E-08	0.25341E+03
0.10000E+04	0.50265E+00	0.51167E-10	0.56950E-10	0.56950E-09	0.52197E+03

(TCOLOOP): OLDT 0-2

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2000E-01 0.1000E-01 0.6670E-02 0.3330E-02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+03 0.1000E+03 0.2000E+03 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(S:E:C)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.50265E-04	0.89386E+00	0.10000E+01	0.10000E+02	0.50200E+02
0.17783E+00	0.89386E-04	0.44728E+00	0.49783E+00	0.49783E+01	0.50090E+02
0.31623E+00	0.15895E-03	0.20509E+00	0.22826E+00	0.22826E+01	0.50032E+02
0.56234E+00	0.28266E-03	0.93227E-01	0.92633E-01	0.92633E+00	0.49964E+02
0.10000E+01	0.50265E-03	0.29221E-01	0.32524E-01	0.32524E+00	0.49783E+02
0.17783E+01	0.89386E-03	0.91923E-02	0.10232E-01	0.10232E+00	0.48646E+02
0.31623E+01	0.15895E-02	0.25528E-02	0.28413E-02	0.28413E-01	0.48752E+02
0.56234E+01	0.28266E-02	0.62687E-03	0.69772E-03	0.69772E-02	0.50922E+02
0.10000E+02	0.50265E-02	0.13549E-03	0.15080E-03	0.15080E-02	0.56354E+02
0.17783E+02	0.89386E-02	0.25515E-04	0.28398E-04	0.28398E-03	0.67172E+02
0.31623E+02	0.15895E-01	0.45601E-05	0.50754E-05	0.50754E-04	0.81979E+02
0.56234E+02	0.28266E-01	0.80031E-05	0.89075E-06	0.89075E-05	0.10069E+03
0.10000E+03	0.50265E-01	0.12439E-06	0.13844E-06	0.13844E-05	0.13378E+03
0.17783E+03	0.89386E-01	0.21117E-07	0.23504E-07	0.23504E-06	0.16732E+03
0.31623E+03	0.15895E+00	0.41003E-08	0.45637E-08	0.45637E-07	0.19125E+03
0.56234E+03	0.28266E+00	0.63565E-09	0.70749E-09	0.70749E-08	0.25397E+03
0.10000E+04	0.50265E+00	0.71468E-10	0.79545E-10	0.79545E-09	0.41773E+03
0.17783E+04	0.89386E+00	0.50185E-10	0.55857E-10	0.55857E-09	0.20257E+03

(TCOLOOP): OLOT 0-3

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2000E-01 0.1000E-01 0.6670E-02 0.3330E-02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+03 0.2000E+03 0.1000E+03 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.50265E-04	0.89846E+00	0.10000E+01	0.10000E+02	0.50201E+02
0.17783E+00	0.89386E-04	0.44729E+00	0.49784E+00	0.49784E+01	0.50038E+02
0.31623E+00	0.15895E-03	0.20509E+00	0.22826E+00	0.22826E+01	0.50032E+02
0.56234E+00	0.28266E-03	0.83227E-01	0.92633E-01	0.92633E+00	0.49964E+02
0.10000E+01	0.50265E-03	0.29215E-01	0.32517E-01	0.32517E+00	0.49794E+02
0.17783E+01	0.89386E-03	0.91669E-02	0.10203E-01	0.10203E+00	0.48766E+02
0.31623E+01	0.15895E-02	0.25427E-02	0.28300E-02	0.28300E-01	0.48902E+02
0.56234E+01	0.28266E-02	0.63057E-03	0.70184E-03	0.70184E-02	0.50705E+02
0.10000E+02	0.50265E-02	0.13860E-03	0.15426E-03	0.15426E-02	0.55471E+02
0.17783E+02	0.89386E-02	0.26658E-04	0.29671E-04	0.29671E-03	0.65199E+02
0.31623E+02	0.15895E-01	0.48070E-05	0.53503E-05	0.53503E-04	0.79121E+02
0.56234E+02	0.28266E-01	0.34404E-06	0.93943E-06	0.93943E-05	0.97159E+02
0.10000E+03	0.50265E-01	0.13315E-06	0.14820E-06	0.14820E-05	0.12732E+03
0.17783E+03	0.89386E-01	0.23558E-07	0.26220E-07	0.26220E-06	0.15555E+03
0.31623E+03	0.15895E+00	0.46364E-08	0.51605E-08	0.51605E-07	0.17621E+03
0.56234E+03	0.28266E+00	0.61783E-09	0.68765E-09	0.68765E-08	0.25883E+03
0.10000E+04	0.50265E+00	0.12696E-09	0.14131E-09	0.14131E-08	0.28479E+03
0.17783E+04	0.89386E+00	0.74155E-10	0.82536E-10	0.82536E-09	0.15615E+03

(TCOLOUP): OLST C-4

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2000E-01 0.1000E-01 0.6670E-02 0.3330E-02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+03 0.1000E+03 0.1000E+03 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XXNORM	APP.RES.
0.10000E+00	0.50265E-04	0.39846E+00	0.10000E+01	0.10000E+02	0.50199E+02
0.17783E+00	0.89386E-04	0.44728E+00	0.49782E+00	0.49782E+01	0.50093E+02
0.31623E+00	0.15895E-03	0.20509E+00	0.22827E+00	0.22827E+01	0.50029E+02
0.56234E+00	0.28266E-03	0.83228E-01	0.92634E-01	0.92634E+00	0.49963E+02
0.10000E+01	0.50265E-03	0.29218E-01	0.32520E-01	0.32520E+00	0.49789E+02
0.17783E+01	0.89386E-03	0.32050E-02	0.10245E-01	0.10245E+00	0.48590E+02
0.31623E+01	0.15895E-02	0.25601E-02	0.28494E-02	0.28494E-01	0.48643E+02
0.56234E+01	0.28266E-02	0.62653E-03	0.69734E-03	0.69734E-02	0.50942E+02
0.10000E+02	0.50265E-02	0.13376E-03	0.14887E-03	0.14887E-02	0.56859E+02
0.17783E+02	0.89386E-02	0.24729E-04	0.27523E-04	0.27523E-03	0.68617E+02
0.31623E+02	0.15895E-01	0.43628E-05	0.48559E-05	0.48559E-04	0.84454E+02
0.56234E+02	0.28266E-01	0.75649E-06	0.84198E-06	0.84198E-05	0.10456E+03
0.10000E+03	0.50265E-01	0.11851E-06	0.13190E-06	0.13190E-05	0.13817E+03
0.17783E+03	0.89386E-01	0.20900E-07	0.23262E-07	0.23262E-06	0.16848E+03
0.31623E+03	0.15895E+00	0.40586E-08	0.45172E-08	0.45172E-07	0.19256E+03
0.56234E+03	0.28266E+00	0.69123E-09	0.76941E-09	0.76941E-08	0.24015E+03
0.10000E+04	0.50265E+00	0.11347E-09	0.12630E-09	0.12630E-08	0.30693E+03
0.17783E+04	0.89386E+00	0.52824E-10	0.58805E-10	0.58805E-09	0.19574E+03

(TCOLOOP): QLOD D-5

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2000E-01 0.1000E-01 0.6670E-02 0.3330E-02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.2000E+03 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NJRM)	NORM*XXNORM	APP.RES.
0.10000E+00	0.50265E-04	0.89961E+00	0.10000E+01	0.10000E+02	0.49806E+02
0.17783E+00	0.89386E-04	0.45953E+00	0.51087E+00	0.51087E+01	0.45014E+02
0.31623E+00	0.15895E-03	0.21796E+00	0.24228E+00	0.24228E+01	0.43396E+02
0.56234E+00	0.28266E-03	0.88874E-01	0.98792E-01	0.98792E+00	0.45327E+02
0.10000E+01	0.50265E-03	0.28454E-01	0.31629E-01	0.31629E+00	0.51192E+02
0.17783E+01	0.89386E-03	0.75294E-02	0.83697E-02	0.83697E-01	0.57698E+02
0.31623E+01	0.15895E-02	0.16141E-02	0.17942E-02	0.17942E-01	0.69033E+02
0.56234E+01	0.28266E-02	0.32332E-03	0.35940E-03	0.35940E-02	0.81599E+02
0.10000E+02	0.50265E-02	0.58614E-04	0.65155E-04	0.65155E-03	0.10033E+03
0.17783E+02	0.89386E-02	0.10056E-04	0.11178E-04	0.11178E-03	0.12612E+03
0.31623E+02	0.15895E-01	0.19597E-05	0.21784E-05	0.21784E-04	0.14452E+03
0.56234E+02	0.28266E-01	0.36153E-06	0.40187E-06	0.40187E-05	0.17133E+03
0.10000E+03	0.50265E-01	0.65761E-07	0.73100E-07	0.73100E-06	0.20473E+03
0.17783E+03	0.89386E-01	0.13154E-07	0.14621E-07	0.14621E-06	0.22946E+03
0.31623E+03	0.15895E+00	0.26732E-08	0.29715E-08	0.29715E-07	0.25440E+03
0.56234E+03	0.28266E+00	0.48933E-09	0.54393E-09	0.54393E-08	0.30237E+03
0.10000E+04	0.50265E+00	0.15063E-09	0.16744E-09	0.16744E-08	0.25410E+03

{TCOLOOP}: OLDT 0-0

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.2000E-01 0.1000E-01 0.6570E-02 0.3330E-02 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2000E+03 0.1000E+03 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.50265E-04	0.39932E+00	0.10000E+01	0.10000E+02	0.49906E+02
0.17783E+00	0.89386E-04	0.45988E+00	0.51136E+00	0.51136E+01	0.44900E+02
0.31623E+00	0.15895E-03	0.21740E+00	0.24174E+00	0.24174E+01	0.43673E+02
0.56234E+00	0.28266E-03	0.38083E-01	0.97944E-01	0.97944E+00	0.45950E+02
0.10000E+01	0.50265E-03	0.28272E-01	0.31437E-01	0.31437E+00	0.51536E+02
0.17783E+01	0.89386E-03	0.76396E-02	0.84949E-02	0.84949E-01	0.56999E+02
0.31623E+01	0.15895E-02	0.17127E-02	0.19045E-02	0.19045E-01	0.66049E+02
0.56234E+01	0.28266E-02	0.35385E-03	0.39346E-03	0.39346E-02	0.76582E+02
0.10000E+02	0.50265E-02	0.55842E-04	0.73214E-04	0.73214E-03	0.92664E+02
0.17783E+02	0.89386E-02	0.11352E-04	0.12623E-04	0.12623E-03	0.11622E+03
0.31623E+02	0.15895E-01	0.21640E-05	0.24062E-05	0.24062E-04	0.13523E+03
0.56234E+02	0.28266E-01	0.39392E-06	0.43802E-06	0.43802E-05	0.16178E+03
0.10000E+03	0.50265E-01	0.71054E-07	0.79009E-07	0.79009E-06	0.19442E+03
0.17783E+03	0.89386E-01	0.13671E-07	0.15201E-07	0.15201E-06	0.22364E+03
0.31623E+03	0.15895E+00	0.30468E-08	0.33879E-08	0.33879E-07	0.23315E+03
0.56234E+03	0.28266E+00	0.52059E-09	0.57887E-09	0.57887E-08	0.29014E+03
0.10000E+04	0.50265E+00	0.81342E-10	0.91005E-10	0.91005E-09	0.38164E+03
0.17783E+04	0.89386E+00	0.55204E-10	0.61385E-10	0.61385E-09	0.19010E+03

(TCOLOOP): PLUT C-7

M = 4 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 IT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 N2 = 6 BM= 0.1000E+06 EPS= 0.10E-03

SIG = 0.2000E-01 0.1000E-01 0.6570E-02 0.3330E-02 0.0000E+00
 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.1000E+03 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.50265E-04	0.89963E+00	0.10000E+01	0.10000E+02	0.49739E+02
0.17783E+00	0.89386E-04	0.45955E+00	0.51082E+00	0.51082E+01	0.45029E+02
0.31623E+00	0.15895E-03	0.21799E+00	0.24231E+00	0.24231E+01	0.43379E+02
0.56234E+00	0.28266E-03	0.99047E-01	0.98982E-01	0.98982E+00	0.45193E+02
0.10000E+01	0.50265E-03	0.23632E-01	0.31826E-01	0.31826E+00	0.50860E+02
0.17783E+01	0.89386E-03	0.75350E-02	0.83757E-02	0.83757E-01	0.57662E+02
0.31623E+01	0.15895E-02	0.15773E-02	0.17533E-02	0.17533E-01	0.70223E+02
0.56234E+01	0.28266E-02	0.30512E-03	0.33916E-03	0.33916E-02	0.84934E+02
0.10000E+02	0.50265E-02	0.53701E-04	0.59692E-04	0.59692E-03	0.10650E+03
0.17783E+02	0.89386E-02	0.90320E-05	0.10040E-04	0.10040E-03	0.13558E+03
0.31623E+02	0.15895E-01	0.17895E-05	0.19891E-05	0.19891E-04	0.15360E+03
0.56234E+02	0.28266E-01	0.33123E-06	0.36825E-06	0.36825E-05	0.18163E+03
0.10000E+03	0.50265E-01	0.63404E-07	0.70478E-07	0.70478E-06	0.20978E+03
0.17783E+03	0.89386E-01	0.12523E-07	0.13920E-07	0.13920E-06	0.23711E+03
0.31623E+03	0.15895E+00	0.25103E-08	0.27904E-08	0.27904E-07	0.26529E+03
0.56234E+03	0.28266E+00	0.52577E-09	0.58444E-09	0.58443E-08	0.28822E+03
0.10000E+04	0.50265E+00	0.10429E-09	0.11592E-09	0.11592E-08	0.32470E+03

ANEXO N° 3.- CURVAS TEORICAS CORRESPONDIENTES A UNA ZONA
DE COMPLEJIDAD ESTRUCTURAL.

ZONA DE COMPLEJIDAD ESTRUCTURAL

CASO A

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	30
150	-	200
200	-	50
150	-	200
	-	60

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>
50	-	30
150	-	200
200	-	50
150	-	200
	-	60

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	30
150	-	200
200	-	50
150	-	200
	-	60

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	30
100	-	200
200	-	50
100	-	200
	-	60

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>
50	-	30
100	-	200
200	-	50
100	-	200
	-	60

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	30
100	-	200
200	-	50
100	-	200
	-	60

№ 7

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	30
100	-	200
50	-	50
100	-	200
	-	60

№ 9

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	30
100	-	200
50	-	50
100	-	200
	-	60

№ 8

<u>h (m)</u>		<u>(ohm.m)</u>
50	-	30
100	-	200
50	-	50
100	-	200
	-	60

CASO B

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	30
100	-	200
	-	60

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	30
200	-	200
	-	60

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	30
50	-	200
	-	60

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	30
100	-	200
	-	60

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	30
200	-	200
	-	60

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	30
50	-	200
	-	60

Nº 7

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	30
100	-	200
	-	60

Nº 8

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	30
200	-	200
	-	60

Nº 9

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	30
200	-	200
	-	60

CASO C

Nº 1

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	30
100	-	100
	-	60

Nº 2

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	30
200	-	100
	-	60

Nº 3

<u>h (m)</u>		<u>(ohm.m)</u>
200	-	30
50	-	100
	-	60

Nº 4

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	30
200	-	100
	-	60

Nº 5

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	30
200	-	100
	-	60

Nº 6

<u>h (m)</u>		<u>(ohm.m)</u>
100	-	30
50	-	100
	-	60

Nº 7

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	30
200	-	100
	-	60

Nº 8

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	30
200	-	100
	-	60

Nº 9

<u>h (m)</u>		<u>(ohm.m)</u>
300	-	30
200	-	100
	-	60

(TCOLOOP): EC A-1

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IQUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IQUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.2000E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1500E+03 0.2000E+03 0.1500E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.30024E+00	0.10000E+01	0.10000E+02	0.29733E+02
0.17783E+00	0.14883E-03	0.47713E+00	0.53000E+00	0.53000E+01	0.23008E+02
0.31623E+00	0.26466E-03	0.22952E+00	0.25495E+00	0.25495E+01	0.22742E+02
0.56234E+00	0.47063E-03	0.89393E-01	0.99305E-01	0.99305E+00	0.26979E+02
0.10000E+01	0.83692E-03	0.25329E-01	0.28136E-01	0.28136E+00	0.34612E+02
0.17783E+01	0.14883E-02	0.60140E-02	0.66804E-02	0.66804E-01	0.41631E+02
0.31623E+01	0.26466E-02	0.12425E-02	0.13802E-02	0.13802E-01	0.50262E+02
0.56234E+01	0.47063E-02	0.27767E-03	0.30844E-03	0.30844E-02	0.54520E+02
0.10000E+02	0.83692E-02	0.58157E-04	0.64601E-04	0.64601E-03	0.60530E+02
0.17783E+02	0.14883E-01	0.12946E-04	0.14380E-04	0.14380E-03	0.63833E+02
0.31623E+02	0.26466E-01	0.31702E-05	0.35214E-05	0.35214E-04	0.62865E+02
0.56234E+02	0.47063E-01	0.74773E-06	0.83058E-06	0.83058E-05	0.63291E+02
0.10000E+03	0.83692E-01	0.17871E-06	0.19852E-06	0.19852E-05	0.63070E+02
0.17783E+03	0.14883E+00	0.43799E-07	0.48652E-07	0.48652E-06	0.61760E+02
0.31623E+03	0.26466E+00	0.10640E-07	0.11819E-07	0.11819E-06	0.60808E+02
0.56234E+03	0.47063E+00	0.29232E-08	0.32471E-08	0.32471E-07	0.55141E+02
0.10000E+04	0.83692E+00	0.11536E-08	0.12815E-08	0.12815E-07	0.39268E+02

(TCOLOOP): EC A-2

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.2000E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.5000E+02 0.1500E+03 0.2000E+03 0.1500E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.10820E+01	0.10000E+01	0.10000E+02	0.30030E+02
0.17783E+00	0.14883E-03	0.53826E+00	0.49754E+00	0.49754E+01	0.10577E+02
0.31623E+00	0.26466E-03	0.21037E+00	0.19442E+00	0.19442E+01	0.28372E+02
0.56234E+00	0.47063E-03	0.59316E-01	0.54818E-01	0.54818E+00	0.46027E+02
0.10000E+01	0.83692E-03	0.14527E-01	0.13425E-01	0.13425E+00	0.57524E+02
0.17783E+01	0.14883E-02	0.33809E-02	0.31245E-02	0.31245E-01	0.65229E+02
0.31623E+01	0.26466E-02	0.84434E-03	0.78032E-03	0.78032E-02	0.66405E+02
0.56234E+01	0.47063E-02	0.19807E-03	0.18306E-03	0.18306E-02	0.68945E+02
0.10000E+02	0.83692E-02	0.46426E-04	0.42906E-04	0.42906E-03	0.70630E+02
0.17783E+02	0.14883E-01	0.11098E-04	0.10256E-04	0.10256E-03	0.70877E+02
0.31623E+02	0.26466E-01	0.27977E-05	0.25855E-05	0.25855E-04	0.68367E+02
0.56234E+02	0.47063E-01	0.69231E-06	0.63982E-06	0.63982E-05	0.66638E+02
0.10000E+03	0.83692E-01	0.16803E-06	0.15529E-06	0.15529E-05	0.65722E+02
0.17783E+03	0.14883E+00	0.42233E-07	0.39031E-07	0.39031E-06	0.63279E+02
0.31623E+03	0.26466E+00	0.10201E-07	0.94276E-08	0.94276E-07	0.62541E+02
0.56234E+03	0.47063E+00	0.24711E-08	0.22837E-08	0.22837E-07	0.61679E+02
0.10000E+04	0.83692E+00	0.91380E-09	0.84451E-09	0.84451E-08	0.45872E+02

(TCOLOOP):

EC A-2

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.2000E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.2000E+03 0.1500E+03 0.2000E+03 0.1500E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.89907E+00	0.10000E+01	0.10000E+02	0.30024E+02
0.17783E+00	0.14883E-03	0.44646E+00	0.49658E+00	0.49658E+01	0.30294E+02
0.31623E+00	0.26466E-03	0.20592E+00	0.22904E+00	0.22904E+01	0.29781E+02
0.56234E+00	0.47063E-03	0.85496E-01	0.95093E-01	0.95093E+00	0.28856E+02
0.10000E+01	0.83692E-03	0.30750E-01	0.34202E-01	0.34202E+00	0.28314E+02
0.17783E+01	0.14883E-02	0.90759E-02	0.10095E-01	0.10095E+00	0.29545E+02
0.31623E+01	0.26466E-02	0.21484E-02	0.23896E-02	0.23896E-01	0.33435E+02
0.56234E+01	0.47063E-02	0.45508E-03	0.50616E-03	0.50616E-02	0.38489E+02
0.10000E+02	0.83692E-02	0.92482E-04	0.10286E-03	0.10286E-02	0.44080E+02
0.17783E+02	0.14883E-01	0.18270E-04	0.20321E-04	0.20321E-03	0.50607E+02
0.31623E+02	0.26466E-01	0.40522E-05	0.45070E-05	0.45070E-04	0.53306E+02
0.56234E+02	0.47063E-01	0.39952E-06	0.10005E-05	0.10005E-04	0.55924E+02
0.10000E+03	0.83692E-01	0.20012E-06	0.22258E-06	0.22258E-05	0.58478E+02
0.17783E+03	0.14883E+00	0.46331E-07	0.52089E-07	0.52089E-06	0.59060E+02
0.31623E+03	0.26466E+00	0.11110E-07	0.12358E-07	0.12358E-06	0.59078E+02
0.56234E+03	0.47063E+00	0.27003E-08	0.30035E-08	0.30035E-07	0.58136E+02
0.10000E+04	0.83692E+00	0.42064E-09	0.46786E-09	0.46786E-08	0.76953E+02
0.17783E+04	0.14883E+01	0.56365E-10	0.62692E-10	0.62692E-09	0.11260E+03
0.31623E+04	0.26466E+01	0.37543E-10	0.41869E-10	0.41869E-09	0.56462E+02
0.56234E+04	0.47063E+01	0.64562E-11	0.71809E-11	0.71809E-10	0.70078E+02
0.10000E+05	0.83692E+01	0.23671E-11	0.26328E-11	0.26328E-10	0.52411E+02

(TCOLOOP): EC A-4

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IQUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IDUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.2000E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.2000E+03 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.83692E-04	0.30056E+00	0.10000E+01	0.10000E+02	0.29717E+02
0.17783E+00	0.14883E-03	0.47513E+00	0.52870E+00	0.52870E+01	0.23233E+02
0.31623E+00	0.26466E-03	0.22748E+00	0.25259E+00	0.25259E+01	0.23313E+02
0.56234E+00	0.47063E-03	0.38214E-01	0.97954E-01	0.97954E+00	0.27535E+02
0.10000E+01	0.83692E-03	0.25540E-01	0.28360E-01	0.28360E+00	0.34327E+02
0.17783E+01	0.14883E-02	0.63087E-02	0.70053E-02	0.70053E-01	0.40097E+02
0.31623E+01	0.26466E-02	0.13739E-02	0.15256E-02	0.15256E-01	0.46699E+02
0.56234E+01	0.47063E-02	0.30951E-03	0.34368E-03	0.34368E-02	0.50533E+02
0.10000E+02	0.83692E-02	0.66384E-04	0.73714E-04	0.73714E-03	0.55343E+02
0.17783E+02	0.14883E-01	0.14749E-04	0.16378E-04	0.16378E-03	0.58495E+02
0.31623E+02	0.26466E-01	0.35449E-05	0.39363E-05	0.39363E-04	0.58320E+02
0.56234E+02	0.47063E-01	0.32234E-06	0.91314E-06	0.91314E-05	0.59337E+02
0.10000E+03	0.83692E-01	0.19450E-06	0.21598E-06	0.21598E-05	0.59602E+02
0.17783E+03	0.14883E+00	0.45292E-07	0.50293E-07	0.50293E-06	0.60393E+02
0.31623E+03	0.26466E+00	0.10646E-07	0.11821E-07	0.11821E-06	0.60787E+02
0.56234E+03	0.47063E+00	0.26089E-08	0.28969E-08	0.28969E-07	0.59498E+02
0.10000E+04	0.83692E+00	0.46647E-09	0.51798E-09	0.51798E-08	0.71825E+02
0.17783E+04	0.14883E+01	0.68087E-10	0.75605E-10	0.75605E-09	0.99274E+02
0.31623E+04	0.26466E+01	0.22245E-10	0.24702E-10	0.24702E-09	0.30179E+02

(TCOLOOP): EC A-5

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTGP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.2000E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.5000E+02 0.1000E+03 0.2000E+03 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM#XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.10760E+01	0.10000E+01	0.10000E+02	0.30030E+02
0.17783E+00	0.14883E-03	0.52787E+00	0.49060E+00	0.49060E+01	0.12436E+02
0.31623E+00	0.26466E-03	0.20604E+00	0.19149E+00	0.19149E+01	0.29743E+02
0.56234E+00	0.47063E-03	0.60300E-01	0.56043E-01	0.56043E+00	0.45177E+02
0.10000E+01	0.83692E-03	0.15990E-01	0.14861E-01	0.14861E+00	0.52965E+02
0.17783E+01	0.14883E-02	0.39714E-02	0.36911E-02	0.36911E-01	0.57723E+02
0.31623E+01	0.26466E-02	0.98636E-03	0.91673E-03	0.91673E-02	0.59407E+02
0.56234E+01	0.47063E-02	0.23094E-03	0.21464E-03	0.21464E-02	0.61936E+02
0.10000E+02	0.83692E-02	0.54189E-04	0.50363E-04	0.50363E-03	0.63572E+02
0.17783E+02	0.14883E-01	0.12810E-04	0.11905E-04	0.11905E-03	0.64340E+02
0.31623E+02	0.26466E-01	0.31561E-05	0.29333E-05	0.29333E-04	0.63052E+02
0.56234E+02	0.47063E-01	0.76205E-06	0.70825E-06	0.70825E-05	0.62432E+02
0.10000E+03	0.83692E-01	0.18171E-06	0.16888E-06	0.16888E-05	0.62374E+02
0.17783E+03	0.14883E+00	0.43315E-07	0.40723E-07	0.40723E-06	0.61743E+02
0.31623E+03	0.26466E+00	0.10502E-07	0.97602E-08	0.97602E-07	0.61342E+02
0.56234E+03	0.47063E+00	0.28027E-08	0.26048E-08	0.26048E-07	0.55711E+02
0.10000E+04	0.83692E+00	0.12081E-08	0.11228E-08	0.11228E-07	0.38079E+02

(TCOLOOP): EC A-6

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.2000E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.2000E+03 0.1000E+03 0.2000E+03 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.39909E+00	0.10000E+01	0.10000E+02	0.30021E+02
0.17783E+00	0.14883E-03	0.44646E+00	0.49657E+00	0.49657E+01	0.30294E+02
0.31623E+00	0.26466E-03	0.20591E+00	0.22902E+00	0.22902E+01	0.29784E+02
0.56234E+00	0.47063E-03	0.85344E-01	0.94923E-01	0.94923E+00	0.28932E+02
0.10000E+01	0.83692E-03	0.30541E-01	0.33969E-01	0.33969E+00	0.28524E+02
0.17783E+01	0.14883E-02	0.90533E-02	0.10070E-01	0.10070E+00	0.29609E+02
0.31623E+01	0.26466E-02	0.21829E-02	0.24279E-02	0.24279E-01	0.33032E+02
0.56234E+01	0.47063E-02	0.47557E-03	0.52894E-03	0.52894E-02	0.37300E+02
0.10000E+02	0.83692E-02	0.39987E-04	0.11021E-03	0.11021E-02	0.42034E+02
0.17783E+02	0.14883E-01	0.20913E-04	0.22260E-04	0.22260E-03	0.47577E+02
0.31623E+02	0.26466E-01	0.44424E-05	0.49410E-05	0.49410E-04	0.50110E+02
0.56234E+02	0.47063E-01	0.37820E-05	0.10880E-05	0.10880E-04	0.52870E+02
0.10000E+03	0.83692E-01	0.21525E-06	0.23941E-06	0.23941E-05	0.55698E+02
0.17783E+03	0.14883E+00	0.49884E-07	0.55483E-07	0.55483E-06	0.56622E+02
0.31623E+03	0.26466E+00	0.11455E-07	0.12741E-07	0.12741E-06	0.57886E+02
0.56234E+03	0.47063E+00	0.25924E-08	0.28834E-08	0.28834E-07	0.59739E+02
0.10000E+04	0.83692E+00	0.44645E-09	0.49656E-09	0.49656E-08	0.73957E+02
0.17783E+04	0.14883E+01	0.75436E-10	0.83903E-10	0.83903E-09	0.92716E+02
0.31623E+04	0.26466E+01	0.49737E-10	0.55320E-10	0.55320E-09	0.46890E+02

(TCOLOOP):

EC A-7

M = 5 XNORM=0.10E+02 IPCM= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 N8 = 6 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.2000E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.30100E+00	0.10000E+01	0.10000E+02	0.29627E+02
0.17783E+00	0.14883E-03	0.47566E+00	0.52792E+00	0.52792E+01	0.23338E+02
0.31623E+00	0.26466E-03	0.22822E+00	0.25329E+00	0.25329E+01	0.23106E+02
0.56234E+00	0.47063E-03	0.39376E-01	0.99196E-01	0.99196E+00	0.26939E+02
0.10000E+01	0.83692E-03	0.25871E-01	0.28713E-01	0.28713E+00	0.33838E+02
0.17783E+01	0.14883E-02	0.61359E-02	0.68101E-02	0.68101E-01	0.41011E+02
0.31623E+01	0.26466E-02	0.12151E-02	0.13486E-02	0.13486E-01	0.51035E+02
0.56234E+01	0.47063E-02	0.26586E-03	0.29508E-03	0.29508E-02	0.56199E+02
0.10000E+02	0.83692E-02	0.57140E-04	0.63425E-04	0.63425E-03	0.61309E+02
0.17783E+02	0.14883E-01	0.13292E-04	0.14752E-04	0.14752E-03	0.62755E+02
0.31623E+02	0.26466E-01	0.32982E-05	0.36606E-05	0.36606E-04	0.61216E+02
0.56234E+02	0.47063E-01	0.77809E-06	0.86359E-06	0.86359E-05	0.61627E+02
0.10000E+03	0.83692E-01	0.18693E-06	0.20747E-06	0.20747E-05	0.61205E+02
0.17783E+03	0.14883E+00	0.44410E-07	0.49290E-07	0.49290E-06	0.61191E+02
0.31623E+03	0.26466E+00	0.10224E-07	0.11348E-07	0.11348E-06	0.62447E+02
0.56234E+03	0.47063E+00	0.24315E-08	0.26987E-08	0.26987E-07	0.62347E+02
0.10000E+04	0.83692E+00	0.54117E-09	0.60063E-09	0.60063E-08	0.65052E+02
0.17783E+04	0.14883E+01	0.17970E-09	0.19945E-09	0.19945E-08	0.51976E+02
0.31623E+04	0.26466E+01	0.15885E-10	0.17630E-10	0.17630E-09	0.10036E+03

(TCOLOOP):

EC A-E

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.2000E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.5000E+02 0.1000E+03 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM#XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.10755E+01	0.10000E+01	0.10000E+02	0.30030E+02
0.17783E+00	0.14883E-03	0.53003E+00	0.49283E+00	0.49283E+01	0.12034E+02
0.31623E+00	0.26466E-03	0.20995E+00	0.19522E+00	0.19522E+01	0.28502E+02
0.56234E+00	0.47063E-03	0.62335E-01	0.57960E-01	0.57960E+00	0.43437E+02
0.10000E+01	0.83692E-03	0.15367E-01	0.14289E-01	0.14289E+00	0.54817E+02
0.17783E+01	0.14883E-02	0.33788E-02	0.31417E-02	0.31417E-01	0.65260E+02
0.31623E+01	0.26466E-02	0.76477E-03	0.71110E-03	0.71110E-02	0.71252E+02
0.56234E+01	0.47063E-02	0.18967E-03	0.17636E-03	0.17636E-02	0.71043E+02
0.10000E+02	0.83692E-02	0.46149E-04	0.42910E-04	0.42910E-03	0.70920E+02
0.17783E+02	0.14883E-01	0.11595E-04	0.10781E-04	0.10781E-03	0.68814E+02
0.31623E+02	0.26466E-01	0.29351E-05	0.27291E-05	0.27291E-04	0.66202E+02
0.56234E+02	0.47063E-01	0.72038E-06	0.66982E-06	0.66982E-05	0.64889E+02
0.10000E+03	0.83692E-01	0.17584E-06	0.16350E-06	0.16350E-05	0.63757E+02
0.17783E+03	0.14883E+00	0.42331E-07	0.39360E-07	0.39360E-06	0.63182E+02
0.31623E+03	0.26466E+00	0.10037E-07	0.93327E-08	0.93327E-07	0.63221E+02
0.56234E+03	0.47063E+00	0.22403E-08	0.20831E-08	0.20831E-07	0.65848E+02
0.10000E+04	0.83692E+00	0.46760E-09	0.43479E-09	0.43479E-08	0.71709E+02
0.17783E+04	0.14883E+01	0.77766E-10	0.72308E-10	0.72308E-09	0.90855E+02
0.31623E+04	0.26466E+01	0.68410E-11	0.63609E-11	0.63609E-10	0.17599E+03

{TCOLOOP}: EC 4-9

M = 5 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTDP =)
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.2000E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.2000E+03 0.1000E+03 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NJRM)	NORM*XNORM	APP.RES.
0.1000E+00	0.83692E-04	0.39901E+00	0.10000E+01	0.10000E+02	0.30038E+02
0.17783E+00	0.14883E-03	0.44656E+00	0.49673E+00	0.49673E+01	0.30268E+02
0.31623E+00	0.26466E-03	0.20586E+00	0.22898E+00	0.22898E+01	0.29801E+02
0.56234E+00	0.47063E-03	0.85370E-01	0.94961E-01	0.94961E+00	0.28919E+02
0.1000E+01	0.83692E-03	0.30741E-01	0.34195E-01	0.34195E+00	0.23323E+02
0.17783E+01	0.14883E-02	0.91193E-02	0.10144E-01	0.10144E+00	0.29421E+02
0.31623E+01	0.26466E-02	0.21641E-02	0.24072E-02	0.24072E-01	0.33250E+02
0.56234E+01	0.47063E-02	0.44936E-03	0.49984E-03	0.49984E-02	0.38837E+02
0.1000E+02	0.83692E-02	0.91202E-04	0.10145E-03	0.10145E-02	0.44505E+02
0.17783E+02	0.14883E-01	0.18260E-04	0.20311E-04	0.20311E-03	0.50627E+02
0.31623E+02	0.26466E-01	0.41680E-05	0.46362E-05	0.46362E-04	0.52306E+02
0.56234E+02	0.47063E-01	0.93143E-06	0.10361E-05	0.10361E-04	0.54634E+02
0.1000E+03	0.83692E-01	0.20886E-05	0.23232E-06	0.23232E-05	0.56831E+02
0.17783E+03	0.14883E+00	0.48560E-07	0.54015E-07	0.54015E-06	0.57649E+02
0.31623E+03	0.26466E+00	0.11024E-07	0.12263E-07	0.12263E-06	0.59336E+02
0.56234E+03	0.47063E+00	0.23190E-08	0.25795E-08	0.25795E-07	0.64350E+02
0.1000E+04	0.83692E+00	0.52305E-09	0.58737E-09	0.58737E-08	0.66126E+02
0.17783E+04	0.14883E+01	0.16760E-09	0.18643E-09	0.18643E-08	0.54450E+02
0.31623E+04	0.26466E+01	0.14582E-10	0.16220E-10	0.16220E-09	0.10626E+02

(TCOLOOP): EC 9-3

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.1670E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.2000E+03 0.5000E+02 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.39897E+00	0.10000E+01	0.10000E+02	0.30044E+02
0.17783E+00	0.14883E-03	0.44661E+00	0.49690E+00	0.49680E+01	0.30255E+02
0.31623E+00	0.26466E-03	0.20580E+00	0.22892E+00	0.22892E+01	0.29821E+02
0.56234E+00	0.47063E-03	0.85049E-01	0.94607E-01	0.94607E+00	0.29079E+02
0.10000E+01	0.83692E-03	0.30380E-01	0.33794E-01	0.33794E+00	0.28636E+02
0.17783E+01	0.14883E-02	0.90672E-02	0.10086E-01	0.10086E+00	0.29569E+02
0.31623E+01	0.26466E-02	0.22222E-02	0.24719E-02	0.24719E-01	0.32585E+02
0.56234E+01	0.47063E-02	0.49173E-03	0.54699E-03	0.54699E-02	0.36420E+02
0.10000E+02	0.83692E-02	0.10505E-03	0.11685E-03	0.11685E-02	0.40373E+02
0.17783E+02	0.14883E-01	0.21726E-04	0.24168E-04	0.24168E-03	0.44999E+02
0.31623E+02	0.26466E-01	0.48346E-05	0.53779E-05	0.53779E-04	0.47337E+02
0.56234E+02	0.47063E-01	0.10593E-05	0.11790E-05	0.11790E-04	0.50104E+02
0.10000E+03	0.83692E-01	0.23110E-06	0.25707E-06	0.25707E-05	0.53115E+02
0.17783E+03	0.14883E+00	0.51720E-07	0.57532E-07	0.57532E-06	0.55273E+02
0.31623E+03	0.26466E+00	0.11961E-07	0.13305E-07	0.13305E-06	0.56242E+02
0.56234E+03	0.47063E+00	0.27666E-08	0.30775E-08	0.30775E-07	0.57204E+02
0.10000E+04	0.83692E+00	0.59500E-09	0.66187E-09	0.66187E-08	0.61066E+02
0.17783E+04	0.14883E+01	0.17572E-09	0.19547E-09	0.19547E-08	0.52759E+02
0.31623E+04	0.26466E+01	0.18393E-10	0.20460E-10	0.20460E-09	0.91018E+02

(TCOLOOP): EC E-2

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 TO= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 SO= 0.1000E-02 NB = 6 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.1670E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.2000E+03 0.2000E+03 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(TO:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.39903E+00	0.10000E+01	0.10000E+02	0.30034E+02
0.17783E+00	0.14883E-03	0.44652E+00	0.49667E+00	0.49667E+01	0.30279E+02
0.31623E+00	0.26466E-03	0.20589E+00	0.22902E+00	0.22902E+01	0.29790E+02
0.56234E+00	0.47063E-03	0.85552E-01	0.95160E-01	0.95160E+00	0.28828E+02
0.10000E+01	0.83692E-03	0.30917E-01	0.34389E-01	0.34389E+00	0.28149E+02
0.17783E+01	0.14883E-02	0.91127E-02	0.10136E-01	0.10136E+00	0.29441E+02
0.31623E+01	0.26466E-02	0.21230E-02	0.23614E-02	0.23614E-01	0.33741E+02
0.56234E+01	0.47063E-02	0.43326E-03	0.48193E-03	0.48193E-02	0.39858E+02
0.10000E+02	0.83692E-02	0.87488E-04	0.97314E-04	0.97314E-03	0.45797E+02
0.17783E+02	0.14883E-01	0.17626E-04	0.19605E-04	0.19605E-03	0.51853E+02
0.31623E+02	0.26466E-01	0.40717E-05	0.45290E-05	0.45290E-04	0.53135E+02
0.56234E+02	0.47063E-01	0.91165E-06	0.10140E-05	0.10140E-04	0.55425E+02
0.10000E+03	0.83692E-01	0.20644E-06	0.22962E-06	0.22962E-05	0.57276E+02
0.17783E+03	0.14883E+00	0.47492E-07	0.52826E-07	0.52826E-06	0.58511E+02
0.31623E+03	0.26466E+00	0.10752E-07	0.11959E-07	0.11959E-06	0.60335E+02
0.56234E+03	0.47063E+00	0.24574E-08	0.27334E-08	0.27334E-07	0.61999E+02
0.10000E+04	0.83692E+00	0.52425E-09	0.58313E-09	0.58313E-08	0.66445E+02
0.17783E+04	0.14883E+01	0.15727E-09	0.17493E-09	0.17493E-08	0.56809E+02
0.31623E+04	0.26466E+01	0.38341E-10	0.43203E-10	0.43203E-09	0.55295E+02

(TCOLOOP): EC 8-1

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.1670E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.2000E+03 0.1000E+03 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.89906E+00	0.10000E+01	0.10000E+02	0.30027E+02
0.17783E+00	0.14883E-03	0.44649E+00	0.49662E+00	0.49662E+01	0.30286E+02
0.31623E+00	0.26466E-03	0.20589E+00	0.22901E+00	0.22901E+01	0.29739E+02
0.56234E+00	0.47063E-03	0.85375E-01	0.94961E-01	0.94961E+00	0.28916E+02
0.10000E+01	0.83692E-03	0.30631E-01	0.34070E-01	0.34070E+00	0.28433E+02
0.17783E+01	0.14883E-02	0.30620E-02	0.10079E-01	0.10079E+00	0.29584E+02
0.31623E+01	0.26466E-02	0.21641E-02	0.24071E-02	0.24071E-01	0.33251E+02
0.56234E+01	0.47063E-02	0.46515E-03	0.51737E-03	0.51737E-02	0.37834E+02
0.10000E+02	0.83692E-02	0.97745E-04	0.10872E-03	0.10872E-02	0.42431E+02
0.17783E+02	0.14883E-01	0.20149E-04	0.22411E-04	0.22411E-03	0.47359E+02
0.31623E+02	0.26466E-01	0.45523E-05	0.50640E-05	0.50640E-04	0.49299E+02
0.56234E+02	0.47063E-01	0.10083E-05	0.11215E-05	0.11215E-04	0.51807E+02
0.10000E+03	0.83692E-01	0.22269E-06	0.24770E-06	0.24770E-05	0.54446E+02
0.17783E+03	0.14883E+00	0.50425E-07	0.56086E-07	0.56086E-06	0.56217E+02
0.31623E+03	0.26466E+00	0.12006E-07	0.13354E-07	0.13354E-06	0.56102E+02
0.56234E+03	0.47063E+00	0.25020E-08	0.27829E-08	0.27829E-07	0.61170E+02
0.10000E+04	0.83692E+00	0.34662E-09	0.60799E-09	0.60799E-08	0.64619E+02
0.17783E+04	0.14883E+01	0.13235E-09	0.14721E-09	0.14721E-08	0.63736E+02
0.31623E+04	0.26466E+01	0.12394E-10	0.13786E-10	0.13786E-09	0.11842E+03

(TCOLLOOP): EC 5-4

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.1670E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.90063E+00	0.10000E+01	0.10000E+02	0.29702E+02
0.17783E+00	0.14883E-03	0.47515E+00	0.52869E+00	0.52869E+01	0.23228E+02
0.31623E+00	0.26466E-03	0.22803E+00	0.25319E+00	0.25319E+01	0.23158E+02
0.56234E+00	0.47063E-03	0.38724E-01	0.93513E-01	0.98513E+00	0.27234E+02
0.10000E+01	0.83692E-03	0.25553E-01	0.28372E-01	0.28372E+00	0.34309E+02
0.17783E+01	0.14883E-02	0.61798E-02	0.68616E-02	0.68616E-01	0.40775E+02
0.31623E+01	0.26466E-02	0.13045E-02	0.14484E-02	0.14484E-01	0.48507E+02
0.56234E+01	0.47063E-02	0.30014E-03	0.33325E-03	0.33325E-02	0.51633E+02
0.10000E+02	0.83692E-02	0.56234E-04	0.73542E-04	0.73542E-03	0.55428E+02
0.17783E+02	0.14883E-01	0.15240E-04	0.16921E-04	0.16921E-03	0.57215E+02
0.31623E+02	0.26466E-01	0.36660E-05	0.40705E-05	0.40705E-04	0.57018E+02
0.56234E+02	0.47063E-01	0.55242E-06	0.94647E-06	0.94647E-05	0.57975E+02
0.10000E+03	0.83692E-01	0.19300E-06	0.22095E-06	0.22095E-05	0.58698E+02
0.17783E+03	0.14883E+00	0.46031E-07	0.51109E-07	0.51109E-06	0.59744E+02
0.31623E+03	0.26466E+00	0.10580E-07	0.11747E-07	0.11747E-06	0.61039E+02
0.56234E+03	0.47063E+00	0.23899E-03	0.26536E-08	0.26536E-07	0.63070E+02
0.10000E+04	0.83692E+00	0.48963E-09	0.54365E-09	0.54365E-08	0.69542E+02
0.17783E+04	0.14883E+01	0.73370E-10	0.81465E-10	0.81465E-09	0.94449E+02

(TCOLOOP):

EC 6-5

M = 3 XNORM=0.100E+02 IPCH= 0 A= 0.2000E+03
IQUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IQUT = 6 B0= 0.1000E-02 NB = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.1670E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.2000E+03 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.90036E+00	0.10000E+01	0.10000E+02	0.29740E+02
0.17783E+00	0.14883E-03	0.47714E+00	0.52995E+00	0.52995E+01	0.23006E+02
0.31623E+00	0.26466E-03	0.23046E+00	0.25597E+00	0.25597E+01	0.22480E+02
0.56234E+00	0.47063E-03	0.90329E-01	0.10034E+00	0.10034E+01	0.26545E+02
0.10000E+01	0.83692E-03	0.25443E-01	0.28259E-01	0.28259E+00	0.34457E+02
0.17783E+01	0.14883E-02	0.58193E-02	0.64638E-02	0.64638E-01	0.42797E+02
0.31623E+01	0.26466E-02	0.11120E-02	0.12362E-02	0.12362E-01	0.54449E+02
0.56234E+01	0.47063E-02	0.24352E-03	0.27602E-03	0.27602E-02	0.58904E+02
0.10000E+02	0.83692E-02	0.54003E-04	0.59985E-04	0.59985E-03	0.63717E+02
0.17783E+02	0.14883E-01	0.12459E-04	0.14282E-04	0.14282E-03	0.64173E+02
0.31623E+02	0.26466E-01	0.32212E-05	0.35777E-05	0.35777E-04	0.62194E+02
0.56234E+02	0.47063E-01	0.76316E-06	0.84762E-06	0.84762E-05	0.62431E+02
0.10000E+03	0.83692E-01	0.18348E-06	0.20379E-06	0.20379E-05	0.61970E+02
0.17783E+03	0.14883E+00	0.43841E-07	0.48693E-07	0.48693E-06	0.61720E+02
0.31623E+03	0.26466E+00	0.10482E-07	0.11642E-07	0.11642E-06	0.61419E+02
0.56234E+03	0.47063E+00	0.26988E-08	0.29975E-08	0.29975E-07	0.58157E+02
0.10000E+04	0.83692E+00	0.55171E-09	0.61277E-09	0.61277E-08	0.64221E+02
0.17783E+04	0.14883E+01	0.16227E-09	0.18034E-09	0.18034E-08	0.55613E+02
0.31623E+04	0.26466E+01	0.18486E-10	0.20532E-10	0.20532E-09	0.90712E+02

(TCOLOOP): EC 6-6

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IDUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IDUT = 0 B0= 0.1000E+02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.1670E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.5000E+02 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XXNORM	APP.RES.
0.10000E+00	0.83692E-04	0.90152E+00	0.10000E+01	0.10000E+02	0.29520E+02
0.17783E+00	0.14883E-03	0.47226E+00	0.52385E+00	0.52385E+01	0.24106E+02
0.31623E+00	0.26466E-03	0.22433E+00	0.24883E+00	0.24883E+01	0.24206E+02
0.56234E+00	0.47063E-03	0.37717E-01	0.97298E-01	0.97298E+00	0.27772E+02
0.10000E+01	0.83692E-03	0.26216E-01	0.29079E-01	0.29079E+00	0.33440E+02
0.17783E+01	0.14883E-02	0.66504E-02	0.73769E-02	0.73769E-01	0.38408E+02
0.31623E+01	0.26466E-02	0.14703E-02	0.16310E-02	0.16310E-01	0.44425E+02
0.56234E+01	0.47063E-02	0.33703E-03	0.37390E-03	0.37390E-02	0.47594E+02
0.10000E+02	0.83692E-02	0.74171E-04	0.82273E-04	0.82273E-03	0.51295E+02
0.17783E+02	0.14883E-01	0.16543E-04	0.18461E-04	0.18461E-03	0.53906E+02
0.31623E+02	0.26466E-01	0.39309E-05	0.43603E-05	0.43603E-04	0.54406E+02
0.56234E+02	0.47063E-01	0.39315E-05	0.99626E-06	0.99626E-05	0.55931E+02
0.10000E+03	0.83692E-01	0.20573E-06	0.22820E-06	0.22820E-05	0.57408E+02
0.17783E+03	0.14883E+00	0.48409E-07	0.53697E-07	0.53697E-06	0.57768E+02
0.31623E+03	0.26466E+00	0.11375E-07	0.12617E-07	0.12617E-06	0.58159E+02
0.56234E+03	0.47063E+00	0.26080E-08	0.28929E-08	0.28929E-07	0.59501E+02
0.10000E+04	0.83692E+00	0.50395E-09	0.55900E-09	0.55900E-08	0.68218E+02
0.17783E+04	0.14883E+01	0.38765E-10	0.98462E-10	0.98462E-09	0.83134E+02

(TCOLQOP): EC B-7

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.1670E-01 0.5000E-02 0.1670E-01
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+03 0.1000E+03 0.5000E+02 0.1000E+03 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.89844E+00	0.10000E+01	0.10000E+02	0.30155E+02
0.17783E+00	0.14883E-03	0.44742E+00	0.49800E+00	0.49800E+01	0.30050E+02
0.31623E+00	0.26466E-03	0.20501E+00	0.22819E+00	0.22819E+01	0.30072E+02
0.56234E+00	0.47063E-03	0.33232E-01	0.92640E-01	0.92640E+00	0.30006E+02
0.10000E+01	0.83692E-03	0.29409E-01	0.32733E-01	0.32733E+00	0.29698E+02
0.17783E+01	0.14883E-02	0.92483E-02	0.10294E-01	0.10294E+00	0.29063E+02
0.31623E+01	0.26466E-02	0.25198E-02	0.28047E-02	0.28047E-01	0.29577E+02
0.56234E+01	0.47063E-02	0.59251E-03	0.65949E-03	0.65949E-02	0.31856E+02
0.10000E+02	0.83692E-02	0.12870E-03	0.14325E-03	0.14325E-02	0.35077E+02
0.17783E+02	0.14883E-01	0.25955E-04	0.28890E-04	0.28890E-03	0.39877E+02
0.31623E+02	0.26466E-01	0.35187E-05	0.61425E-05	0.61425E-04	0.43301E+02
0.56234E+02	0.47063E-01	0.11821E-05	0.13158E-05	0.13158E-04	0.46570E+02
0.10000E+03	0.83692E-01	0.24646E-06	0.27432E-06	0.27432E-05	0.50878E+02
0.17783E+03	0.14883E+00	0.54169E-07	0.60293E-07	0.60293E-06	0.53591E+02
0.31623E+03	0.26466E+00	0.12456E-07	0.13865E-07	0.13865E-06	0.54739E+02
0.56234E+03	0.47063E+00	0.30158E-08	0.33568E-08	0.33568E-07	0.54005E+02
0.10000E+04	0.83692E+00	0.47113E-09	0.52438E-09	0.52438E-08	0.71351E+02
0.17783E+04	0.14883E+01	0.15785E-09	0.17569E-09	0.17569E-08	0.56671E+02

(TCOLOOP): EC 5-9

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 5 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.5000E-02 0.1670E-01 0.5000E-02 0.1670E-01
 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+03 0.2000E+03 0.5000E+02 0.1000E+03 0.0000E+00
 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.89843E+00	0.10000E+01	0.10000E+02	0.30157E+02
0.17783E+00	0.14883E-03	0.44743E+00	0.49801E+00	0.49801E+01	0.30047E+02
0.31623E+00	0.26466E-03	0.20501E+00	0.22818E+00	0.22818E+01	0.30075E+02
0.56234E+00	0.47063E-03	0.33230E-01	0.92639E-01	0.92639E+00	0.30007E+02
0.10000E+01	0.83692E-03	0.29450E-01	0.32779E-01	0.32779E+00	0.29655E+02
0.17783E+01	0.14883E-02	0.93010E-02	0.10353E-01	0.10353E+00	0.28919E+02
0.31623E+01	0.26466E-02	0.25339E-02	0.28204E-02	0.28204E-01	0.29449E+02
0.56234E+01	0.47063E-02	0.58298E-03	0.64889E-03	0.64889E-02	0.32231E+02
0.10000E+02	0.83692E-02	0.12262E-03	0.13649E-03	0.13649E-02	0.36274E+02
0.17783E+02	0.14883E-01	0.23832E-04	0.26527E-04	0.26527E-03	0.42258E+02
0.31623E+02	0.26466E-01	0.50444E-05	0.56147E-05	0.56147E-04	0.46003E+02
0.56234E+02	0.47063E-01	0.10367E-05	0.12095E-05	0.12095E-04	0.49273E+02
0.10000E+03	0.83692E-01	0.22953E-06	0.25548E-06	0.25548E-05	0.53357E+02
0.17783E+03	0.14883E+00	0.52840E-07	0.58814E-07	0.58814E-06	0.54488E+02
0.31623E+03	0.26466E+00	0.11997E-07	0.13354E-07	0.13354E-06	0.56127E+02
0.56234E+03	0.47063E+00	0.25984E-08	0.28922E-08	0.28922E-07	0.59647E+02
0.10000E+04	0.83692E+00	0.54327E-09	0.60468E-09	0.60468E-08	0.64885E+02
0.17783E+04	0.14883E+01	0.18423E-09	0.20505E-09	0.20505E-08	0.51122E+02
0.31623E+04	0.26466E+01	0.37497E-10	0.41736E-10	0.41736E-09	0.56608E+02

(TCOLOOP): EC C-1

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.1000E-01 0.1670E-01 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.2000E+03 0.1000E+03 0.0000E+00 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM#XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.39884E+00	0.10000E+01	0.10000E+02	0.30071E+02
0.17783E+00	0.14883E-03	0.44675E+00	0.49703E+00	0.49703E+01	0.30219E+02
0.31623E+00	0.26466E-03	0.20565E+00	0.22879E+00	0.22879E+01	0.29867E+02
0.56234E+00	0.47063E-02	0.34853E-01	0.94408E-01	0.94408E+00	0.29175E+02
0.10000E+01	0.83692E-03	0.30405E-01	0.33827E-01	0.33827E+00	0.28661E+02
0.17783E+01	0.14883E-02	0.91091E-02	0.10134E-01	0.10134E+00	0.29451E+02
0.31623E+01	0.26466E-02	0.22374E-02	0.24892E-02	0.24892E-01	0.32415E+02
0.56234E+01	0.47063E-02	0.47201E-03	0.54739E-03	0.54739E-02	0.36405E+02
0.10000E+02	0.83692E-02	0.10469E-03	0.11647E-03	0.11647E-02	0.40469E+02
0.17783E+02	0.14883E-01	0.21560E-04	0.23986E-04	0.23986E-03	0.45234E+02
0.31623E+02	0.26466E-01	0.47988E-05	0.53388E-05	0.53388E-04	0.47575E+02
0.56234E+02	0.47063E-01	0.10511E-05	0.11694E-05	0.11694E-04	0.50384E+02
0.10000E+03	0.83692E-01	0.22993E-06	0.25586E-06	0.25586E-05	0.53237E+02
0.17783E+03	0.14883E+00	0.51820E-07	0.57652E-07	0.57652E-06	0.55201E+02
0.31623E+03	0.26466E+00	0.11942E-07	0.13286E-07	0.13286E-06	0.56302E+02
0.56234E+03	0.47063E+00	0.27660E-08	0.30772E-08	0.30772E-07	0.57212E+02
0.10000E+04	0.83692E+00	0.50989E-09	0.56727E-09	0.56727E-08	0.67687E+02
0.17783E+04	0.14883E+01	0.15488E-09	0.17231E-09	0.17231E-08	0.57392E+02
0.31623E+04	0.26466E+01	0.50564E-10	0.56254E-10	0.56254E-09	0.46378E+02

(TCOLOOP): EC C-2

M = 3 XNJRM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.1000E-01 0.1670E-01 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.2000E+03 0.2000E+03 0.0000E+00 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XXNORM	APP.RES.
0.10000E+00	0.83692E-04	0.89480E+00	0.10000E+01	0.10000E+02	0.30030E+02
0.17783E+00	0.14883E-02	0.44680E+00	0.49711E+00	0.49711E+01	0.30206E+02
0.31623E+00	0.26466E-03	0.20563E+00	0.22878E+00	0.22878E+01	0.29875E+02
0.56234E+00	0.47063E-03	0.34915E-01	0.94476E-01	0.94476E+00	0.29147E+02
0.10000E+01	0.83692E-03	0.30561E-01	0.34002E-01	0.34002E+00	0.28503E+02
0.17783E+01	0.14883E-02	0.91484E-02	0.10178E-01	0.10178E+00	0.29340E+02
0.31623E+01	0.26466E-02	0.22198E-02	0.24697E-02	0.24697E-01	0.32612E+02
0.56234E+01	0.47063E-02	0.47404E-03	0.52742E-03	0.52742E-02	0.37385E+02
0.10000E+02	0.83692E-02	0.98643E-04	0.10975E-03	0.10975E-02	0.42162E+02
0.17783E+02	0.14883E-01	0.20041E-04	0.22297E-04	0.22297E-03	0.47532E+02
0.31623E+02	0.26466E-01	0.45063E-05	0.50136E-05	0.50136E-04	0.49631E+02
0.56234E+02	0.47063E-01	0.99427E-06	0.11062E-05	0.11062E-04	0.52296E+02
0.10000E+03	0.83692E-01	0.21887E-06	0.24352E-06	0.24352E-05	0.55030E+02
0.17783E+03	0.14883E+00	0.50236E-07	0.55892E-07	0.55892E-06	0.56357E+02
0.31623E+03	0.26466E+00	0.11853E-07	0.13193E-07	0.13193E-06	0.56568E+02
0.56234E+03	0.47063E+00	0.27085E-08	0.30135E-08	0.30135E-07	0.58019E+02
0.10000E+04	0.83692E+00	0.58915E-09	0.65549E-09	0.65549E-08	0.61470E+02
0.17783E+04	0.14883E+01	0.33075E-10	0.92428E-10	0.92428E-09	0.86942E+02

(TCOLOOP): EC C-3

M = 3 XNDRM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.1000E-01 0.1670E-01 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.2000E+03 0.5000E+02 0.0000E+00 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*NXNORM	APP.RES.
0.10000E+00	0.83692E-04	0.89382E+00	0.10000E+01	0.10000E+02	0.30076E+02
0.17783E+00	0.14833E-03	0.44679E+00	0.49709E+00	0.49709E+01	0.30209E+02
0.31623E+00	0.26466E-03	0.20562E+00	0.22876E+00	0.22876E+01	0.29878E+02
0.56234E+00	0.47063E-03	0.34702E-01	0.94237E-01	0.94237E+00	0.29254E+02
0.10000E+01	0.83692E-03	0.30256E-01	0.33662E-01	0.33662E+00	0.28813E+02
0.17783E+01	0.14833E-02	0.31056E-02	0.10131E-01	0.10131E+00	0.29461E+02
0.31623E+01	0.26466E-02	0.22686E-02	0.25240E-02	0.25240E-01	0.32072E+02
0.56234E+01	0.47063E-02	0.50725E-03	0.56447E-03	0.56447E-02	0.35614E+02
0.10000E+02	0.83692E-02	0.10995E-03	0.12122E-03	0.12122E-02	0.39367E+02
0.17783E+02	0.14833E-01	0.22498E-04	0.25031E-04	0.25031E-03	0.43945E+02
0.31623E+02	0.26466E-01	0.49676E-05	0.55268E-05	0.55268E-04	0.46480E+02
0.56234E+02	0.47063E-01	0.10311E-05	0.12028E-05	0.12028E-04	0.49444E+02
0.10000E+03	0.83692E-01	0.23459E-06	0.26099E-06	0.26099E-05	0.52585E+02
0.17783E+03	0.14833E+00	0.53154E-07	0.59137E-07	0.59137E-06	0.54273E+02
0.31623E+03	0.26466E+00	0.12008E-07	0.13359E-07	0.13359E-06	0.56095E+02
0.56234E+03	0.47063E+00	0.26603E-08	0.29598E-08	0.29598E-07	0.58718E+02
0.10000E+04	0.83692E+00	0.58052E-09	0.64588E-09	0.64588E-08	0.62077E+02
0.17783E+04	0.14833E+01	0.17646E-09	0.19633E-09	0.19633E-08	0.52611E+02
0.31623E+04	0.26466E+01	0.30597E-10	0.34041E-10	0.34041E-09	0.64828E+02

(TCOLOOP): EC C-4

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.1000E-01 0.1670E-01 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.1000E+03 0.0000E+00 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.39963E+00	0.10000E+01	0.10000E+02	0.29909E+02
0.17783E+00	0.14883E-03	0.46813E+00	0.52035E+00	0.52035E+01	0.25051E+02
0.31623E+00	0.26466E-03	0.22333E+00	0.24825E+00	0.24825E+01	0.24493E+02
0.56234E+00	0.47063E-03	0.88732E-01	0.98631E-01	0.98631E+00	0.27291E+02
0.10000E+01	0.83692E-03	0.26703E-01	0.29688E-01	0.29688E+00	0.32816E+02
0.17783E+01	0.14883E-02	0.67580E-02	0.75119E-02	0.75119E-01	0.37905E+02
0.31623E+01	0.26466E-02	0.14699E-02	0.16339E-02	0.16339E-01	0.44436E+02
0.56234E+01	0.47063E-02	0.33467E-03	0.37201E-03	0.37201E-02	0.47835E+02
0.10000E+02	0.83692E-02	0.73246E-04	0.81418E-04	0.81418E-03	0.51738E+02
0.17783E+02	0.14883E-01	0.16455E-04	0.18292E-04	0.18292E-03	0.54321E+02
0.31623E+02	0.26466E-01	0.38969E-05	0.43317E-05	0.43317E-04	0.54725E+02
0.56234E+02	0.47063E-01	0.99025E-06	0.98957E-06	0.98957E-05	0.56314E+02
0.10000E+03	0.83692E-01	0.20551E-06	0.22844E-06	0.22844E-05	0.57448E+02
0.17783E+03	0.14883E+00	0.47541E-07	0.52845E-07	0.52845E-06	0.58470E+02
0.31623E+03	0.26466E+00	0.11372E-07	0.12641E-07	0.12641E-06	0.58167E+02
0.56234E+03	0.47063E+00	0.26231E-08	0.29157E-08	0.29157E-07	0.59273E+02
0.10000E+04	0.83692E+00	0.52692E-09	0.58571E-09	0.58571E-08	0.66220E+02
0.17783E+04	0.14883E+01	0.13247E-09	0.14725E-09	0.14725E-08	0.63696E+02

(TCOLOOP): EC C-5

M = 3 XNORM=0.10E+02 IPCM= 0 A= 0.2000E+03
ICUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.1000E-01 0.1670E-01 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

M = 0.1000E+03 0.2000E+03 0.0000E+00 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.39982E+00	0.10000E+01	0.10000E+02	0.29869E+02
0.17783E+00	0.14883E-03	0.46806E+00	0.52017E+00	0.52017E+01	0.25066E+02
0.31623E+00	0.26466E-02	0.22431E+00	0.24928E+00	0.24923E+01	0.24212E+02
0.56234E+00	0.47063E-03	0.89704E-01	0.99690E-01	0.99690E+00	0.26837E+02
0.10000E+01	0.83692E-03	0.26783E-01	0.29764E-01	0.29764E+00	0.32723E+02
0.17783E+01	0.14883E-02	0.65919E-02	0.73257E-02	0.73257E-01	0.38637E+02
0.31623E+01	0.26466E-02	0.13593E-02	0.15112E-02	0.15112E-01	0.47054E+02
0.56234E+01	0.47063E-02	0.30293E-03	0.33666E-03	0.33666E-02	0.51209E+02
0.10000E+02	0.83692E-02	0.65543E-04	0.72840E-04	0.72340E-03	0.55828E+02
0.17783E+02	0.14883E-01	0.14945E-04	0.16608E-04	0.16608E-03	0.57977E+02
0.31623E+02	0.26466E-01	0.36164E-05	0.40191E-05	0.40191E-04	0.57542E+02
0.56234E+02	0.47063E-01	0.84160E-06	0.93530E-06	0.93530E-05	0.58473E+02
0.10000E+03	0.83692E-01	0.19752E-06	0.21951E-06	0.21951E-05	0.58990E+02
0.17783E+03	0.14883E+00	0.45747E-07	0.50839E-07	0.50839E-06	0.59992E+02
0.31623E+03	0.26466E+00	0.10781E-07	0.11981E-07	0.11981E-06	0.60277E+02
0.56234E+03	0.47063E+00	0.25343E-08	0.28170E-08	0.28170E-07	0.60642E+02
0.10000E+04	0.83692E+00	0.49425E-09	0.54927E-09	0.54927E-08	0.69108E+02
0.17783E+04	0.14883E+01	0.73892E-10	0.82119E-10	0.82119E-09	0.94003E+02

(TCOLOOP): =C C-6

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IQUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IQUT = 5 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.1000E-01 0.1070E-01 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.1000E+03 0.5000E+02 0.0000E+00 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*KNORM	APP.RES.
0.10000E+00	0.83692E-04	0.90017E+00	0.10000E+01	0.10000E+02	0.29798E+02
0.17783E+00	0.14883E-03	0.46655E+00	0.51829E+00	0.51829E+01	0.25413E+02
0.31623E+00	0.26466E-03	0.22139E+00	0.24593E+00	0.24593E+01	0.25038E+02
0.56234E+00	0.47063E-03	0.37971E-01	0.97727E-01	0.97727E+00	0.27651E+02
0.10000E+01	0.83692E-03	0.27013E-01	0.30011E-01	0.30011E+00	0.32437E+02
0.17783E+01	0.14883E-02	0.70176E-02	0.77959E-02	0.77959E-01	0.36745E+02
0.31623E+01	0.26466E-02	0.15682E-02	0.17422E-02	0.17422E-01	0.42357E+02
0.56234E+01	0.47063E-02	0.35699E-03	0.39659E-03	0.39659E-02	0.45709E+02
0.10000E+02	0.83692E-02	0.78091E-04	0.86732E-04	0.86732E-03	0.49515E+02
0.17783E+02	0.14883E-01	0.17316E-04	0.19236E-04	0.19236E-03	0.52479E+02
0.31623E+02	0.26466E-01	0.40519E-05	0.45013E-05	0.45013E-04	0.53309E+02
0.56234E+02	0.47063E-01	0.92235E-06	0.10246E-05	0.10246E-04	0.54993E+02
0.10000E+03	0.83692E-01	0.20986E-06	0.23314E-06	0.23314E-05	0.56649E+02
0.17783E+03	0.14883E+00	0.49715E-07	0.55228E-07	0.55228E-06	0.56751E+02
0.31623E+03	0.26466E+00	0.11489E-07	0.12763E-07	0.12763E-06	0.57772E+02
0.56234E+03	0.47063E+00	0.30201E-08	0.33550E-08	0.33550E-07	0.53954E+02
0.10000E+04	0.83692E+00	0.32754E-09	0.10304E-08	0.10304E-07	0.45417E+02

(TCOLOOP): =C C-7

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NE = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.1000E-01 0.1670E-01 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+03 0.1000E+03 0.0000E+00 0.0000E+00 0.0000E+00
 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.89847E+00	0.10000E+01	0.10000E+02	0.30148E+02
0.17783E+00	0.14883E-03	0.44737E+00	0.49792E+00	0.49792E+01	0.30063E+02
0.31623E+00	0.26466E-03	0.20504E+00	0.22821E+00	0.22821E+01	0.30063E+02
0.56234E+00	0.47063E-03	0.83223E-01	0.92633E-01	0.92633E+00	0.30008E+02
0.10000E+01	0.83692E-03	0.27322E-01	0.32635E-01	0.32635E+00	0.29791E+02
0.17783E+01	0.14883E-02	0.92082E-02	0.10249E-01	0.10249E+00	0.29174E+02
0.31623E+01	0.26466E-02	0.25225E-02	0.28076E-02	0.28076E-01	0.29553E+02
0.56234E+01	0.47063E-02	0.60465E-03	0.67298E-03	0.67298E-02	0.31333E+02
0.10000E+02	0.83692E-02	0.13335E-03	0.14842E-03	0.14842E-02	0.34223E+02
0.17783E+02	0.14883E-01	0.27241E-04	0.30319E-04	0.30319E-03	0.38597E+02
0.31623E+02	0.26466E-01	0.57771E-05	0.64300E-05	0.64300E-04	0.41936E+02
0.56234E+02	0.47063E-01	0.12309E-05	0.13699E-05	0.13699E-04	0.45325E+02
0.10000E+03	0.83692E-01	0.25526E-06	0.28411E-06	0.28411E-05	0.49698E+02
0.17783E+03	0.14883E+00	0.56957E-07	0.63394E-07	0.63394E-06	0.51825E+02
0.31623E+03	0.26466E+00	0.12693E-07	0.14127E-07	0.14127E-06	0.54055E+02
0.56234E+03	0.47063E+00	0.28383E-08	0.32146E-08	0.32146E-07	0.55585E+02
0.10000E+04	0.83692E+00	0.54973E-09	0.60184E-09	0.60184E-08	0.65037E+02
0.17783E+04	0.14883E+01	0.16778E-09	0.18674E-09	0.18674E-08	0.54411E+02
0.31623E+04	0.26466E+01	0.25448E-10	0.28323E-10	0.28323E-09	0.73303E+02

(TCOLOOP):

EC C-8

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUITS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOJT = 6 B0= 0.1000E-02 NB = 6 BM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.1000E-01 0.1570E-01 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+03 0.2000E+03 0.0000E+00 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM=NXNORM	APP.RES.
0.10000E+00	0.83612E-04	0.89847E+00	0.10000E+01	0.10000E+02	0.30148E+02
0.17783E+00	0.14883E-02	0.44737E+00	0.49792E+00	0.49792E+01	0.30063E+02
0.31623E+00	0.26466E-03	0.20304E+00	0.22821E+00	0.22821E+01	0.30064E+02
0.56234E+00	0.47063E-02	0.83228E-01	0.92632E-01	0.92632E+00	0.30008E+02
0.10000E+01	0.83692E-03	0.29337E-01	0.32652E-01	0.32652E+00	0.29775E+02
0.17783E+01	0.14883E-02	0.92375E-02	0.10281E-01	0.10281E+00	0.29093E+02
0.31623E+01	0.26466E-02	0.25322E-02	0.28183E-02	0.28183E-01	0.29465E+02
0.56234E+01	0.47063E-02	0.50000E-03	0.66780E-03	0.66780E-02	0.31568E+02
0.10000E+02	0.83692E-02	0.12992E-03	0.14460E-03	0.14460E-02	0.34847E+02
0.17783E+02	0.14883E-01	0.25999E-04	0.28927E-04	0.28927E-03	0.39840E+02
0.31623E+02	0.26466E-01	0.54364E-05	0.61064E-05	0.61064E-04	0.43473E+02
0.56234E+02	0.47063E-01	0.11718E-05	0.13042E-05	0.13042E-04	0.46844E+02
0.10000E+03	0.83692E-01	0.24326E-06	0.27075E-06	0.27075E-05	0.51324E+02
0.17783E+03	0.14883E+00	0.53781E-07	0.59859E-07	0.59859E-06	0.53849E+02
0.31623E+03	0.26466E+00	0.12659E-07	0.14089E-07	0.14089E-06	0.54153E+02
0.56234E+03	0.47063E+00	0.27435E-08	0.30536E-08	0.30536E-07	0.57524E+02
0.10000E+04	0.83692E+00	0.59782E-09	0.66537E-09	0.66537E-08	0.60874E+02
0.17783E+04	0.14883E+01	0.92019E-10	0.10242E-09	0.10242E-09	0.81211E+02

(TCOLOOP): =C C-9

M = 3 XNORM=0.10E+02 IPCH= 0 A= 0.2000E+03
IOUTS = 17 T0= 0.1000E+00 NT = 4 TM= 0.1000E+05 ISTOP = 0
IOUT = 6 B0= 0.1000E-02 NB = 6 SM= 0.1000E+06 EPS= 0.10E-09

SIG = 0.3330E-01 0.1000E-01 0.1670E-01 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

H = 0.3000E+03 0.2000E+03 0.0000E+00 0.0000E+00 0.0000E+00
0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00 0.0000E+00

TAU(T0:TM)	TIME(SEC)	TRANS	TRANS(NORM)	NORM*XNORM	APP.RES.
0.10000E+00	0.83692E-04	0.89847E+00	0.10000E+01	0.10000E+02	0.30148E+02
0.17783E+00	0.14883E-03	0.44737E+00	0.49792E+00	0.49792E+01	0.30063E+02
0.31623E+00	0.26466E-03	0.20504E+00	0.22821E+00	0.22821E+01	0.30064E+02
0.56234E+00	0.47063E-03	0.83228E-01	0.92632E-01	0.92632E+00	0.30008E+02
0.10000E+01	0.83692E-03	0.29337E-01	0.32652E-01	0.32652E+00	0.29775E+02
0.17783E+01	0.14883E-02	0.92375E-02	0.10281E-01	0.10281E+00	0.29093E+02
0.31623E+01	0.26466E-02	0.25322E-02	0.28183E-02	0.28183E-01	0.29465E+02
0.56234E+01	0.47063E-02	0.60000E-03	0.66780E-03	0.66780E-02	0.31568E+02
0.10000E+02	0.83692E-02	0.12992E-03	0.14460E-03	0.14460E-02	0.34847E+02
0.17783E+02	0.14883E-01	0.25990E-04	0.28927E-04	0.28927E-03	0.39840E+02
0.31623E+02	0.26466E-01	0.54364E-05	0.61064E-05	0.61064E-04	0.43473E+02
0.56234E+02	0.47063E-01	0.11718E-05	0.13042E-05	0.13042E-04	0.46844E+02
0.10000E+03	0.83692E-01	0.24326E-06	0.27075E-06	0.27075E-05	0.51324E+02
0.17783E+03	0.14883E+00	0.53781E-07	0.59859E-07	0.59859E-06	0.53849E+02
0.31623E+03	0.26466E+00	0.12659E-07	0.14089E-07	0.14089E-06	0.54153E+02
0.56234E+03	0.47063E+00	0.27435E-08	0.30536E-08	0.30536E-07	0.57524E+02
0.10000E+04	0.83692E+00	0.59782E-09	0.66537E-09	0.66537E-08	0.60874E+02
0.17783E+04	0.14883E+01	0.92019E-10	0.10242E-09	0.10242E-08	0.81211E+02

ANEXO N° 4.- PROGRAMAS DE TRATAMIENTO DE SEDT.

U.S. Department of the Interior
Geological Survey

Calculation of transient soundings for a
coincident loop system
(Program TCOLOOP)

by

Walter L. Anderson

Open-File Report 82-378

1982

DISCLAIMER

This program was written in FORTRAN-77 for a VAX-11/780 system*. Although program tests have been made, no guarantee (expressed or implied) is made by the author regarding program correctness, accuracy, or proper execution on all computer systems.

* Any use of trade names in this report is for descriptive purposes only and does not imply endorsement by the U.S. Geological Survey. This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards.

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INTRODUCTION

Program TCOLOOP is designed to compute transient (time-domain) decay sounding curves over layered earth models for a coincident (CO) loop system, assuming the quasi-static case (i.e., neglecting displacement currents). A transient derivative response (TDR) is defined as the time-derivative of the tangential electric field $E(r)$, which is measured with a receiving loop coincident with the transmitting loop and of equal radius $a \gg 0$. Several geometric variations may exist; e.g., two-distinct but slightly offset loops, a single-loop (used both as transmitter and receiver), or a two-wire single-cable system, etc. In any case, the coincident loop system is assumed to be placed on the earth's surface in this program. The TDR-sounding is evaluated rapidly and accurately using Fourier and squared-Hankel transform digital filters developed by Anderson (1975, 1982). We assume the measurement system is driven by an "on-off" step current source of arbitrary magnitude. The CO transient voltage is computed during the off-time over any defined time range ($t > 0$ sec.).

Background material on computing transient soundings for finite-wire sources using digital filters may be found in Kauahikaua and Anderson (1977). Program TCOLOOP is similar in design to the methods used by Anderson (1979) to compute transient soundings for horizontal coplanar loops or wire-loop systems over a stratified earth. However, some

notable differences have been programmed in the CO program (e.g., improved frequency-domain approximations and late-time asymptote approximations). But for practical fields situations, the earlier techniques used by Anderson (1979) are usually satisfactory, when considering the currently available time-domain electromagnetic (TDEM) hardware accuracy and dynamic range.

Program TCOLOOP also follows quite closely the method used by Anderson (1981) for computing transient soundings for a central-induction loop system (program TCILoop). However, in the frequency-domain, program TCILoop used the vertical magnetic field (Hz) and a J1-filter, whereas program TCOLOOP uses the tangential electric field $E(r)$ and a $J1^{**2}$ -filter (Anderson, 1982).

A summary of the general computations is given, followed by a detailed description of the program parameters and VAX operating instructions. Appendix 1 offers some suggestions in converting the VAX program to other computer systems; Appendix 2 lists a simple input/output test example; Appendix 3 provides several families of transient soundings computed by varying certain model parameters; and Appendix 4 gives a source listing.

SUMMARY OF CALCULATIONS

The transient decay voltage $V(t)$ induced in a receiving circular loop of radius $a > 0$ (coincident with a transmitting circular loop of the same radius), placed on a horizontally stratified earth, and driven by a step (on-off) current source, can be expressed (see Anderson, 1974, p.18) as the real (Re) cosine integral,

$$V(t) = \frac{4}{\pi} C \int_0^{\infty} B \operatorname{Re}[E(B)/E_0] \cos(B^2 T) dB, \quad (1)$$

where

C = any constant (usually $C = 4C_2\pi/\sigma_1 a$; see C_2 below),
 a = transmitting or receiving loop radius ($a > 0$ m.; note that a square loop of area L^2 can be used, where $L^2 = \pi a^2$),

B = induction number = a/δ ,

δ = $[2/(\sigma_1 \mu_0 \omega)]^{1/2}$ = skin depth in layer 1,

μ_0 = $4\pi \times 10^{-7}$ = permeability of free-space,

σ_1 = conductivity of layer 1,

ω = $2\pi f$ = angular frequency ($f > 0$ Hertz),

T = $2t/(\sigma_1 \mu_0 a^2)$ = normalized time ($T > 0$),

t = real time ($t > 0$ seconds),

$E(\omega)$ = frequency-domain response function for a CO-loop on a layered halfspace [see eq. (2) below, and also Morrison and others (1969), p.87, eq. (22) with $r=a$ and $h \rightarrow 0$],

E_0 = limit of $E(\omega)$ in free-space (i.e. as $\sigma_1 \rightarrow 0$):

$E_0 = -i\omega\mu_0 IC_2$, where $C_2 = (a/2) \int_0^{\infty} \exp(-hx) J_1^2(ax) dx$, which is constant for a sufficiently small $h > 0$, and

for any radius $a > 0$ [$C_2 = 0.73092$ has been evaluated for $h < 10^{-5}$ using subprogram SQJ1 (Anderson, 1982) in Appendix 4],
 $i = (-1)^{1/2}$, and
 $I =$ driving current given as $I_0 \exp(i\omega t)$, $I_0 \geq 0$ amps.

For computational ease, equation (1) may be transformed to a conventional Fourier cosine integral using the substitution $B^2 = b$,

$$V(t) = \frac{2}{\pi} C \int_0^{\infty} \text{Re}[E(\sqrt{b})/E_0] \cos(bT) db. \quad (1.1)$$

Without loss of generality, we may consider $V(t)/C$ in eq. (1.1) to be a scaled (or amplitude shifted) TDR-function, since any constant (C) normalization will not change the transient shape. (For simplicity, the program always uses $C=1$; however, one may use the input parameter XNORM to apply any desired shift factor.)

Because this forward solution may be used as the basis for future inverse solutions, we seek a rapid and accurate method of evaluating the theoretical transient sounding for any desired layered model.

The method of evaluating the transient $V(t)$ in eq. (1.1) for any time-range is by fast "lagged convolution" (Anderson, 1975) using a Fourier cosine digital filter. The squared-Hankel transform of order-1 giving $E(w)$ is of the form (see Morrison and others, 1969, p.87, eq. (22) with $r=a$ and $h \rightarrow 0$),

$$E(w) = -i w \mu_0 a I \int_0^{\infty} e(x) J_1^2(ax) dx, \quad (2)$$

where $w = 2B^2 / (\sigma_1 \mu_0 a^2)$, $i = (-1)^{1/2}$, and

the complex kernel $e(x)$ depends on the layer parameters (conductivities and thicknesses for M-layers and $M > 0$), and the angular frequency $w > 0$. To insure convergence of the integral in eq. (2), it is convenient to subtract the limit $1/2$ from $e(x)$, and add an equivalent integral outside, which becomes,

$$E(w) = -i w \mu_0 a I \left\{ \int_0^{\infty} [e(x) - 1/2] J_1^2(ax) dx + (1/2) \int_0^{\infty} J_1^2(ax) dx \right\}. \quad (2.1)$$

The last term in eq. (2.1) has the limiting value C_2/a , as determined in E_0 . Thus, the final normalized frequency function can be expressed as,

$$E(w)/E_0 = (a/C_2) \left\{ \int_0^{\infty} [e(x) - 1/2] J_1^2(ax) dx \right\} + 1. \quad (2.2)$$

Instead of evaluating eq. (2.2) directly during the lagged convolution in eq. (1.1), we can easily replace the normalized real function $\text{Re}[E/E_0]$ by a suitable cubic spline function with sufficient knots per decade in w (or equivalently B) to adequately define E/E_0 from some initial induction number $B_0 = a/\delta_{\max}$ to $B_m = a/\delta_{\min}$, where δ is the skin depth in layer 1. In fact, the asymptotic values as $w \rightarrow 0$ and $w \rightarrow \infty$ can be easily incorporated into the splined-frequency response by observing the limits,

$$\lim_{w \rightarrow 0} \text{Re}[E(w)/E_0] = 1, \text{ and } \lim_{w \rightarrow \infty} \text{Re}[E(w)/E_0] = 0.$$

In practice, it has been observed that most frequency-domain curve calculations are nearly identical after $B \geq 1$ (e.g., see the normalized frequency response plots in Appendix 3 for models A-D, and I-L). This suggests that a recomputation savings of approximately one-half or more is possible following an initial frequency curve. Therefore, in program TCOLOOP, we have included a "threshold test" to use the rest of a previous (OLD) curve whenever a new point NEW(B) is such that

$$|[\text{NEW}(B) - \text{OLD}(B)] / \text{OLD}(B)| < \text{THRESH},$$

where $B \geq 1$ and $\text{THRESH} = 1.E-7$.

The above procedure for computing eq. (2.2) works very fast, since we are convolving a J_1^{**2} -filter (Anderson, 1982) with a cubic spline function, which is sufficiently accurate, provided B_0 and B_m (and NB =number of B-points per decade) are adequately chosen. In practice, the input parameter default values ($B_0 = 10^{-3}$, $NB = 6$, $B_m = 10^5$) are usually quite satisfactory for most field situations. A choice is generally not necessary, mainly because a dimensionless induction number range (B_0, B_m) is used instead of frequency. However, one can change several program control parameters (see B_0, NB, BM, EPS below) to vary the accuracy--and of course the execution speed. For example, if only moderate accuracy (but fast execution) is desired, then one may set $NB < 6$ (it is not recommended that $NB < 4$ be generally used); if greater accuracy (but slower execution) is desired, then one may set $NB = 0$ (or 12) to select a "direct convolution" mode to evaluate the entire frequency function in eq. (2.2), but as

controlled by the "lagged convolution" procedure for eq. (1.1). [It should be observed that a normalized transform parameter, $a/H_{\max}$, a =loop radius, $H_{\max}$ =maximum layer thickness, is used; this transformation results in using moderate Hankel transform parameters, instead of using $a \gg 0$ directly as given in eq. (2.2); for a halfspace model, $H_{\max}=a$ is used.]

The relationship between normalized time T and real time t (sec.) in this program are given by the formulas,

$$T = 2t / \sigma_1 \mu_0 a^2, \text{ and } t = \sigma_1 \mu_0 a^2 T / 2.$$

The solution is now complete, except for discussing the CO asymptotic limits of $V(t)$. It can be shown that

$$\lim_{t \rightarrow 0} [V(t)/C] = \infty, \text{ and } \lim_{t \rightarrow \infty} [V(t)/C] = 0,$$

for any horizontally layered earth model. It turns out that the non-existence of the limit at $t=0$ is not important for coincident loops, inasmuch as it is impossible to electronically switch at $t=0$ to measure the transient decay. For large (finite) times, the decay represents the transient in the semi-infinite basement (i.e., bottom layer of constant conductivity and with infinite thickness). For a one-dimensional model, the transient $V(t)/C$ will be perturbed from a half-space response only by introduction of conductive or resistive layers over the half-space layer. However, in this case, the curves will change shape and be

shifted in time, depending on the assigned layer conductivities and thicknesses (see Appendix 3 for several album-type curves for 1,2, and 3-layer models). It should also be observed that the probing depth is directly related to the loop radius $a > 0$. Simply stated, to achieve a large probing depth, the dynamic range of the transient data must be increased for a small radius, but this range can be reduced if the radius is also increased proportional to the maximum probing depth. Of course, field logistics may prohibit very large-sized loops. Also, instrumental signal-to-noise ratios may further constrain the effective loop radius.

After considering these practical field and instrumental problems, it would probably not be worth the computational expense to try to rigorously evaluate the very late-time transient exactly whenever the dynamic range is many orders of magnitude lower than $V(t_0)/C$ for an initial switch time $t = t_0 > 0$. Heuristically, we determined that it is usually safe to spline-interpolate the very late-time asymptote after $V(t)/C < 10^{-7}$ to the true transient limit $V(\infty)/C = 0$, as long as a log-log transformation is performed first. This approach is of course very fast, and avoids "noisy" perturbations in the very late-time approximation. Generally, the transient at very late times cannot be observed accurately with present-day TDEM equipment, and therefore, do not warrant additional computational expense for practical solutions. In addition, the 10^{-7} cut-off is appropriate, since this is about the best relative error

possible in the Fourier and Hankel transform digital filters (see Anderson, 1975, 1982) while using single-precision arithmetic with 32 or 36-bit floating-point words. No approximation is needed for the early-time transient, as long as parameters NB and BM are sufficiently large.

Test results using the current algorithm in program TCOLOOP have been compared with a completely different coincident (CO) program (Raiche, 1981, written communication; details are given in Raiche and Spies, 1981), and has produced stable transients that agreed to about 3-significant figures (except for the very late asymptote, which agreed to about 1-figure, but had the correct order of magnitude). We observed the new TCOLOOP algorithm ran about 10-to-30 (or more) times faster than Raiche's CO-algorithm. Raiche and Spies (1981, p.54-55) also gave a useful transformation for converting V/I transient curves into apparent conductivity (or reciprocal apparent resistivity) curves by assuming the earth to be a homogeneous halfspace. This same inverse transformation has been included in program TCOLOOP as additional output (see Appendix 2 and 3 for several examples).

PARAMETERS REQUIRED

Parameters required by program TCOLOOP are read using a FORTRAN NAMELIST simulator on the VAX (currently, VAX FORTRAN-77 Version 2.4 does not contain NAMELIST I/O; see subroutine NAMELIST in Appendix 4 for more details). The namelist name used is \$PARMS. Default values are assumed whenever any parameter is omitted, except as noted otherwise. Preceding the \$PARMS statement is an 80-character title.

The general input order read by program TCOLOOP is as follows:

1. Title record (always required, maximum of 80-characters).
2. \$PARMS --nondefault parameters--\$END. Note that \$PARMS may begin in column 1 but cannot exceed column 72; records may be continued to succeeding records until the final \$ or \$END is encountered, where the "END" is optional.
3. Optionally, subsequent runs using changed \$PARMS may be given by repeating steps 1-2, provided parameter ISTOP=0 was previously specified.

The above general input order is required whether the job is being run in time-sharing or batch modes (see VAX operating instructions below).

PROGRAM FILES

FOR005-- Title and \$PARMS input parameters.

FOR006-- Output on-line terminal file (if default IOUT=6 is assumed).

FOR010-- Output solution disk file (only written if IPCH $\geq$ 1).

FOR011-- Output frequency-domain solution disk plot file (only written if IPCH $\geq$ 1).

FOR012-- Output apparent resistivity solution disk plot file (only written if IPCH $\geq$ 1).

FOR013-- Output time-domain solution disk plot file (only written if IPCH $\geq$ 1).

FOR016-- Output disk print-file (if default IOUTS=16 is assumed).

DETAILED PARAMETER DEFINITIONS

\$PARMS parameters (nondefault parameters must always be given):

M= Number of layers in the model ($1 \leq M \leq 10$; default M=1 for a homogeneous half-space).

SIG()= Array of M-layer conductivities (in mhos/m.), where SIG(1) >0 and SIG(I) ≥ 0 , for I=2,3,...,M.

H()= Array of M-1 layer thicknesses (in m.), where H(I) >0 , for I=1,2,...,M-1. Array H is ignored if M=1.

A= Radius (in m.) of circular loop, where A >0 must be

given. [For a square loop of side L (m.), use $A=L/1.77245$.]

EPS= Requested convolution integration tolerance used to compute all Fourier and Hankel transforms by digital filtering (default EPS=0.1E-9).

BO=1E-3 (default) is the lower induction number for which the E/E0 frequency response approaches 1.0 for $B < B_0$. B_0 must be given (or assumed 1E-3 by default) as a power of 10^{**n} . The default value is usually adequate for most models; for more accuracy in the late-time transient, $B_0 < 1E-3$ can be used.

BM=1E5 (default) is the upper induction number for which the E/E0 frequency response approaches 0.0 for $B > B_M$. B_M must be given (or assumed 1E5 by default) as a power of 10^{**n} . The default value is usually quite adequate for most models; for more accuracy in the early-time transient, $B_M > 1E5$ can be used.

NB=6 (default) represents the number of induction number points per decade (log-cycle) to evaluate the pre-splined frequency response function $E(B)/E_0$. In general, $4 \leq NB \leq 11$ is usually adequate for most applications ($NB < 4$ is not recommended for accuracy reasons). If $NB=0$ (or $NB > 11$) is specified, then a direct mode of evaluating the frequency function is used but as controlled by the outer time-integral via lagged convolution (i.e., the cosine filter using subroutine RLAGO. Note that $NB=0$ (or $NB > 11$)

is more accurate, but much more time-consuming than using NB<12.

T0= Initial normalized time to compute the transient, where $T0 > 0$ must be specified as a power of 10^{**+n} . The normalized time T (called TAU in output files) and actual time (in sec.) are related by the formula: $T = (2 * \text{time}) / (\text{SIG}(1) * 4 * \pi * 10^{**-7} * a * a)$.

TM= Maximum normalized time to compute the transient, where $TM > T0$ must be specified as a power of 10^{**+n} .

NT= Number of normalized time points to compute per time decade (log-cycle) between T0 and TM, where $NT > 0$ must be specified.

XNORM= Normalization factor (default 10.0) to use to shift the transient at T0. Note: both the normalized and unnormalized transient response will be printed along with a normalization of 1.0 at T0 (see Appendix 2 for an example output listing).

IOUT=6 (default) is the primary print file unit number, which defaults to the users terminal (if on-line). To suppress the IOUT file output, set IOUT=0.

IOUTS=16 (default) is the secondary print-type disk file unit number. To suppress the IOUTS file output, set IOUTS=0.

IPCH= 0 (default) to ignore this output option.

IPCH= 1 to write FOR010 with the unnormalized transient response (TRANS), time (in sec.), and the apparent resistivity (APPRES) in the format (3E16.8). This option may be used to produce input data for other

programs (e.g., test data for inversion routines, etc.).

IPCH=2 to write FOR010 (as in IPCH=1 above), and in addition, write files FOR011, FOR012, and FOR013 for possible plotting purposes--see the formats as used in Appendix 4 source listing, if interested.

ISTOP=1 (default) to end the run after the current problem.

ISTOP=0 to continue the run with a new title line and changed \$PARMS on FOR005. The program will continue until ISTOP=1 is set on the last \$PARMS or an end-of-file is encountered on FOR005.

\$END [end of \$PARMS parameters; the "END" in \$END may be omitted, if desired.]

EXAMPLES OF INPUT PARAMETERS

EXAMPLE TITLE
\$PARMS M=2,SIG=.02,2,H=200, A=200,
TO=.1,NT=6,TM=100,NB=5,ISTOP=0\$
MODIFIED EXAMPLE
\$PARMS NB=11,A=1000,ISTOP=1\$END

(See Appendix 2 for a complete input/output example.)

VAX OPERATING INSTRUCTIONS

Assuming program TCOLOOP (and all associated subprograms) was previously compiled and linked using the VAX/VMS operating system, the following steps are general execution guidelines (note that many variations are possible using VMS

in either time-sharing or batch modes):

1. Either assign (via \$ASSIGN command) an input parameter file name to the logical name FOR005, or let FOR005 default to the users terminal input (if logged-in on-line). The order of the parameters on FOR005 must be given exactly as defined in the section PARAMETERS REQUIRED above. To assign FOR005, use the DCL command:

```
$ASSIGN parameterfilename FOR005
```

2. If $IPCH \geq 1$ is selected, then a specific file name may be assigned to FOR010 (as in step 1); otherwise, the system will assume FOR010.DAT as a file name for FOR010 (similarly, if $IPCH > 1$, FOR011.DAT, FOR012.DAT, and FOR013.DAT will be assumed for FOR011, FOR012, and FOR013, respectively). When $IPCH = 0$ (default), this step may be ignored.

3. Program TCOLOOP may be executed with the DCL command:

```
$RUN TCOLOOP
```

On the USGS system, use the command:

```
$RUN [WANDERSON]TCOLOOP
```

The above execution steps could also be submitted (via a \$SUBMIT command) to be run in batch mode. For this reason, it was convenient to exclude any prompting messages and user

responses in program TCOLOOP; also, VAX system-dependent commands and calls have been minimized in TCOLOOP for ease of program conversion to other systems (see Appendix 1 for information on conversion problems).

Note that FOR016 is a duplicate (print) disk file (normally called FOR016.DAT, unless assigned otherwise), and file FOR006 is usually the on-line terminal print file (or LOG file if \$SUBMIT was used).

ERROR MESSAGES

Most \$PARMS syntactical errors are flagged and printed on files FOR006 and FOR016 by the VAX-NAMELIST simulator subroutine (see Appendix 4), and the job is aborted. If FOR005 was assigned to a disk parameter file, then correct the parameter file using any VAX editor and rerun the job (e.g., use \$RUN or \$SUBMIT). Other parameter errors (or omissions) are also flagged by program TCOLOOP, and the job is terminated.

REFERENCES

- Anderson, W.L., 1974, Electromagnetic fields about a finite electric wire source: USGS Rept. GD-74-041, 205 p. (also available as NTIS Rept. PB-238-199).
- , 1975, Improved digital filters for evaluating Fourier and Hankel transform integrals: USGS Rept. GD-75-012, 223 p. (also available as NTIS Rept. PB-242-800.)

Anderson, W.L., 1979, Programs TRANS_HCLOOP and TRANS_HZWIRE-- Calculation of transient horizontal coplanar loop soundings and transient wire-loop soundings: USGS Open-File Rept. 79-590, 46 p.

-----, 1981, Calculation of transient soundings for a central induction loop system (Program TCILoop): USGS Open-File Rept. 81-1309, 80 p.

-----, 1982, Fast evaluation of squared-Hankel transforms of order-1 by linear digital filtering (Subprogram SQJ1): USGS Open-File Rept. 82-224, 13 p.

Kauahikaua, J., and Anderson, W.L., 1977, Calculation of standard transient and frequency sounding curves for a horizontal wire source of arbitrary length: USGS Rept. GD-77-007, 61 p. (also available as NTIS Rept. PB-274-119).

Morrison, H.F., Phillips, R.J., and O'Brien, D.P., 1969, Quantitative interpretation of transient electromagnetic fields over a layered halfspace: Geophys. Prosp., v. 17, p. 82-101.

Raiche, A.P., and Spies, B.R., 1981, Coincident loop transient electromagnetic master curves for interpretation of two-layer earths: Geophysics, v. 46, n. 1, p. 53-64.

Appendix 1.-- Conversion to other systems

This program (and associated subprograms) was written in ANSI-standard FORTRAN-77 for the VAX-11/780 system. Conversion to systems without an ANSI-FORTRAN-77 compiler would necessitate extensive changes, particularly for all CHARACTER-type variables, IF-THEN-ELSE phrases, etc.

Since the FORTRAN-77 ANSI-standard presently does not provide for a NAMELIST I/O capability, a VAX-11 NAMELIST simulator subprogram is included in this program package. For most large main-frame systems (e.g., IBM/370, CYBER, etc.), a NAMELIST READ/WRITE is usually available; in this case, the VAX NAMELIST subprogram and associated routines (DECODEIX, DECODEX) can be eliminated; also, appropriate changes can be made where COMMON/NAME_LIST/ and CALL NAMELIST is used in the source program.

Other changes for non-VAX systems might include some (or all) of the following:

- (1) Variables with more than 6-characters.
- (2) Use of the underscore character or dollar character in some variables and/or COMMON names.
- (3) Character strings delimited by single-quote characters (e.g., 'STRING'); also, character string concatenation (e.g., 'STRING1'//'STRING2').
- (4) Passing variable-length character strings in subroutine calls; e.g., CHARACTER*(*) passed length character arguments.

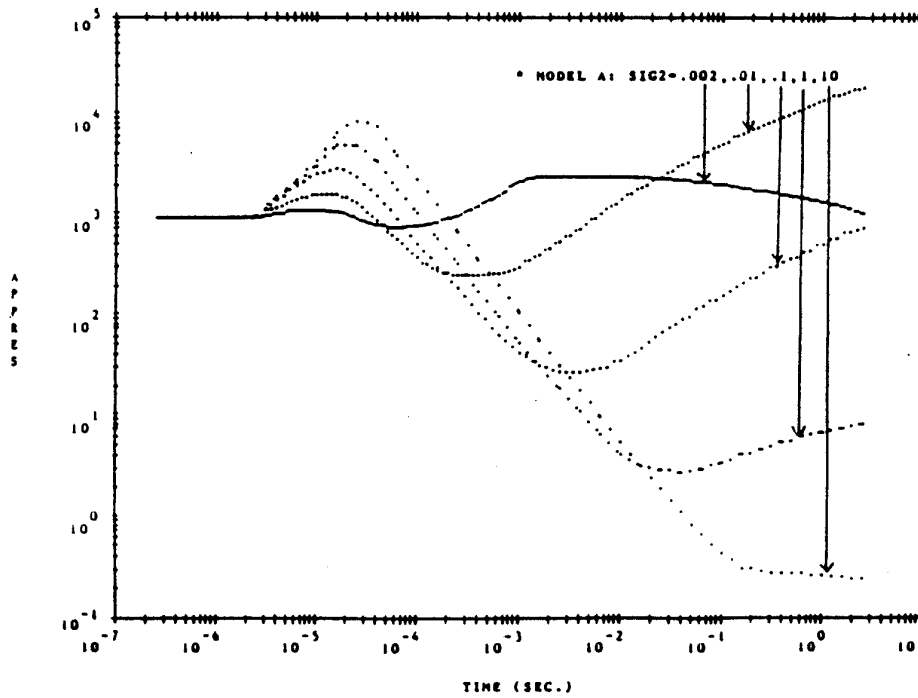
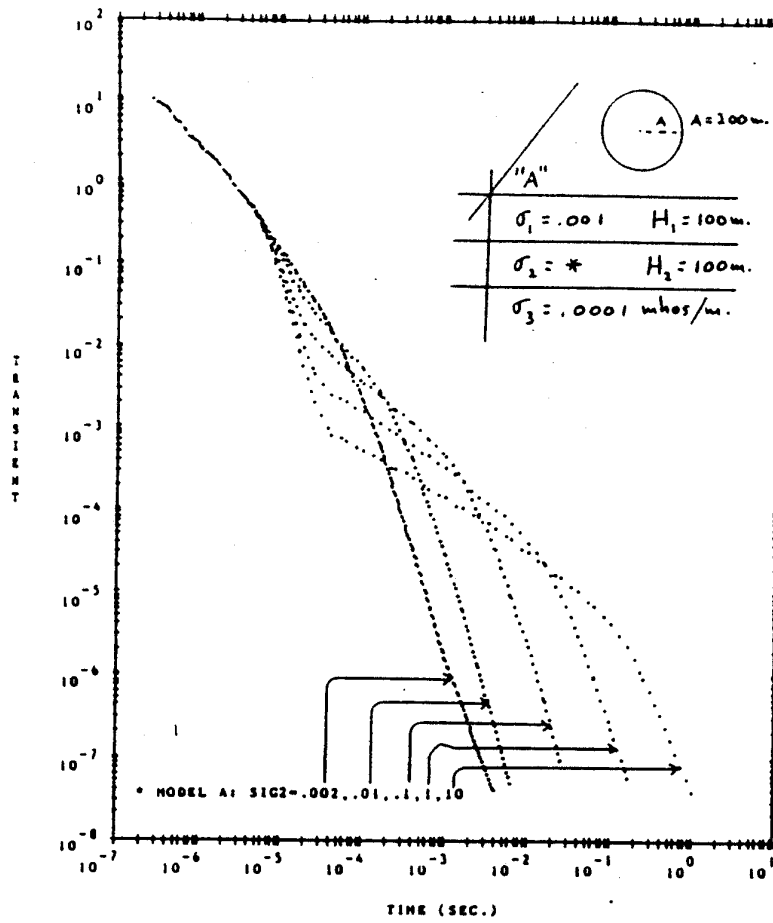
- (5) Need to suppress arithmetic or exponential underflow messages (note that a VAX-11 result is automatically set to 0.0 after any underflow--which is assumed for this program package); if the target system does not set underflows to 0.0 (and suppress warning messages), then a suitable conversion procedure must be used for proper operation of this program package.
- (6) Replacement of any special VAX-dependent CALLS or statements (e.g., CALL LIB\$INDEX, ACCEPT, TYPE, CALL SYS\$anyname, etc.--note that we have minimized machine-dependent calls, where possible).
- (7) Hexidecimal constants (e.g., '4A'X) if used in any DATA statements.
- (8) Virtual-sized arrays, if any (i.e., DIMENSION statements greater than physical memory).

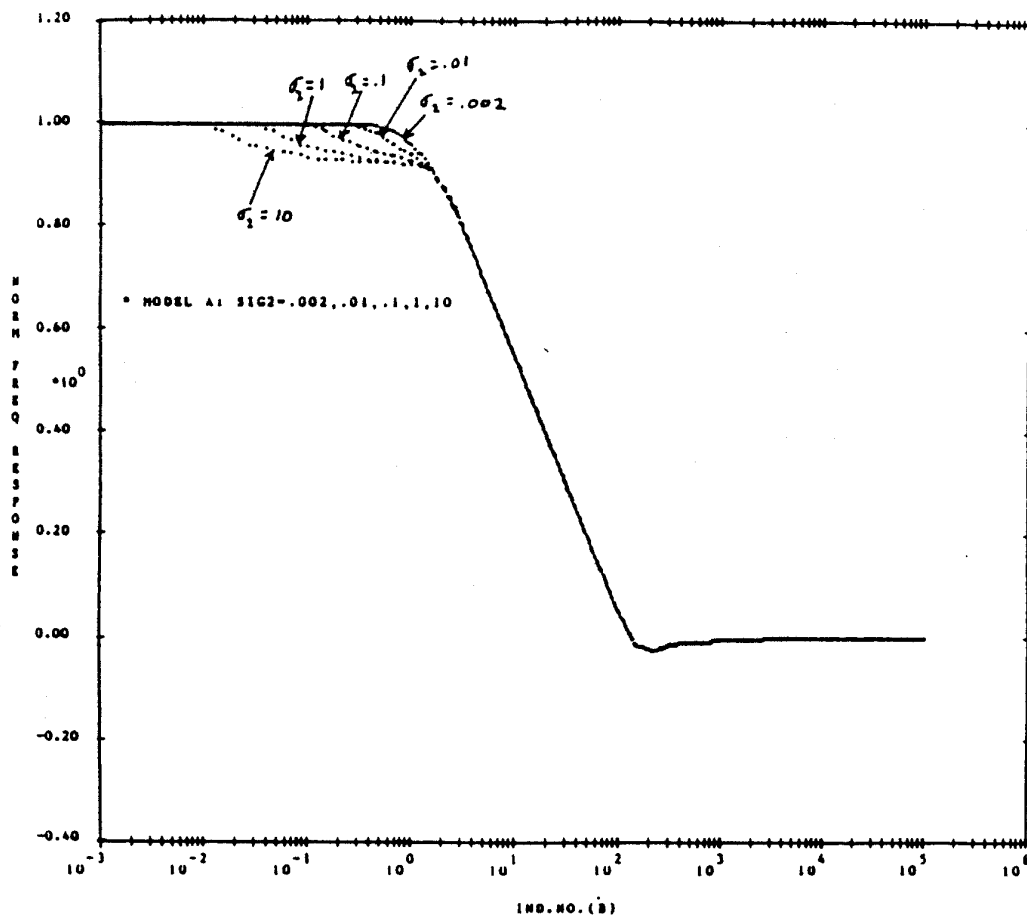
Appendix 3.-- Some sounding curve example plots

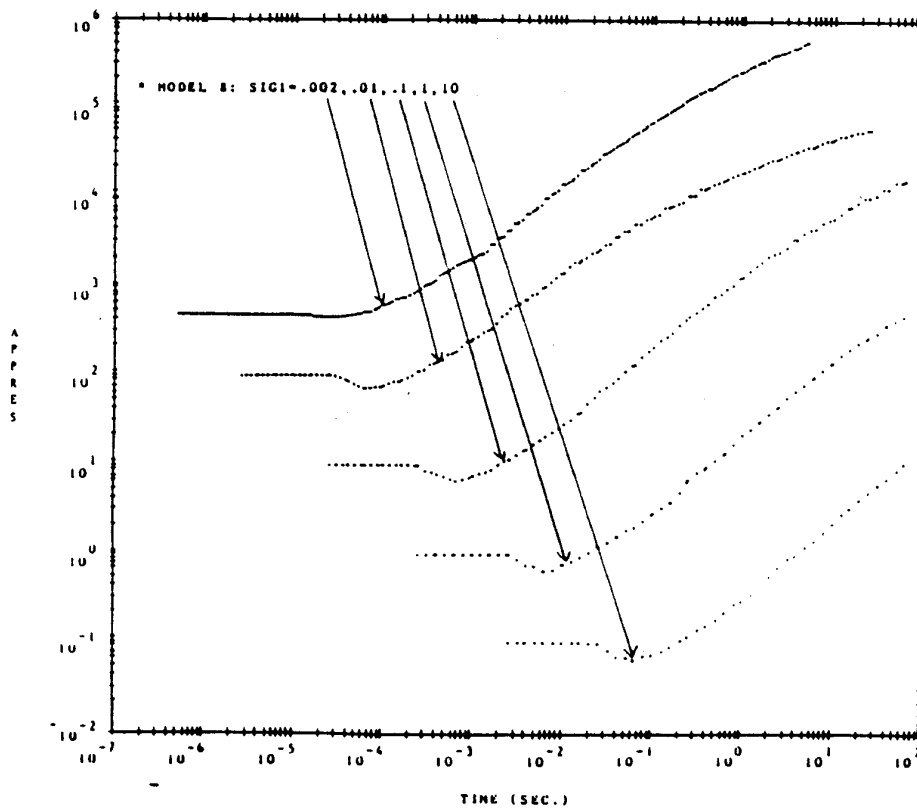
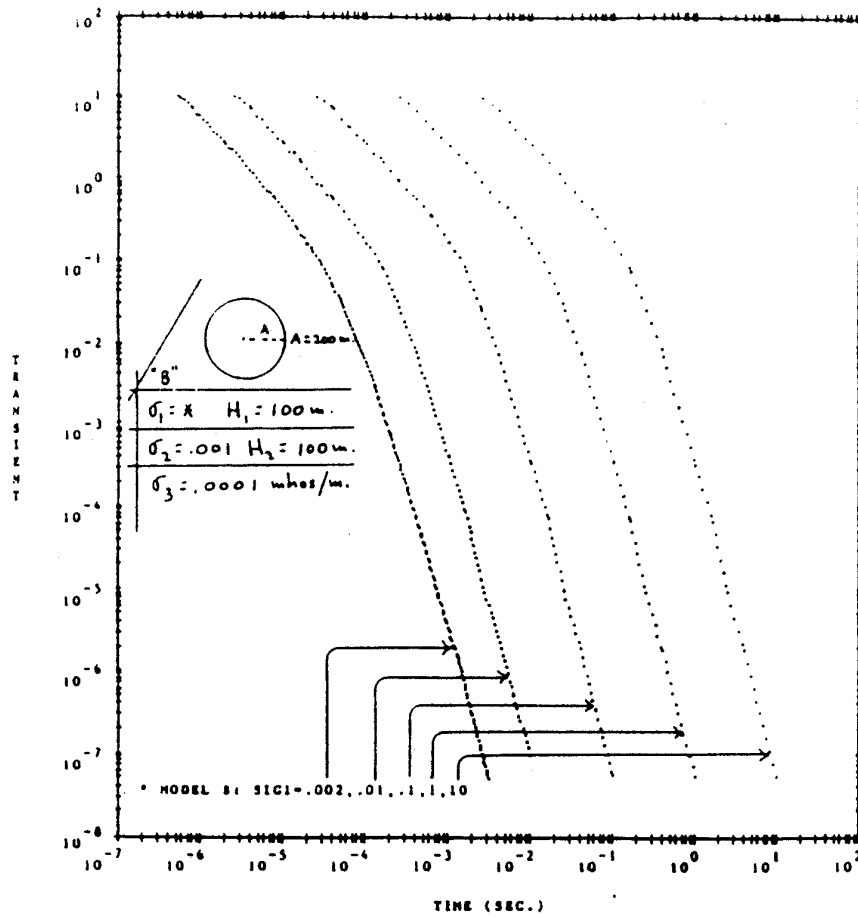
The attached plots were produced (after using `IPCH>1`) on an AJ-832 terminal for several layered models, and curve families, by varying certain model parameters. The beginning of each model (denoted "A", "B", ...) is indicated by a "model-figure insert" drawn on the unnormalized TRANSIENT* and apparent resistivity (APPRES in ohm-m.) plots, followed on a successive page with the corresponding normalized FREQUENCY response for the given model. The notation used is, hopefully, self-explanatory. [Note that the TCOLOOP models A-D and I-L are the same models as used in the TCILoop program examples (see Anderson, 1981, p.24-39).]

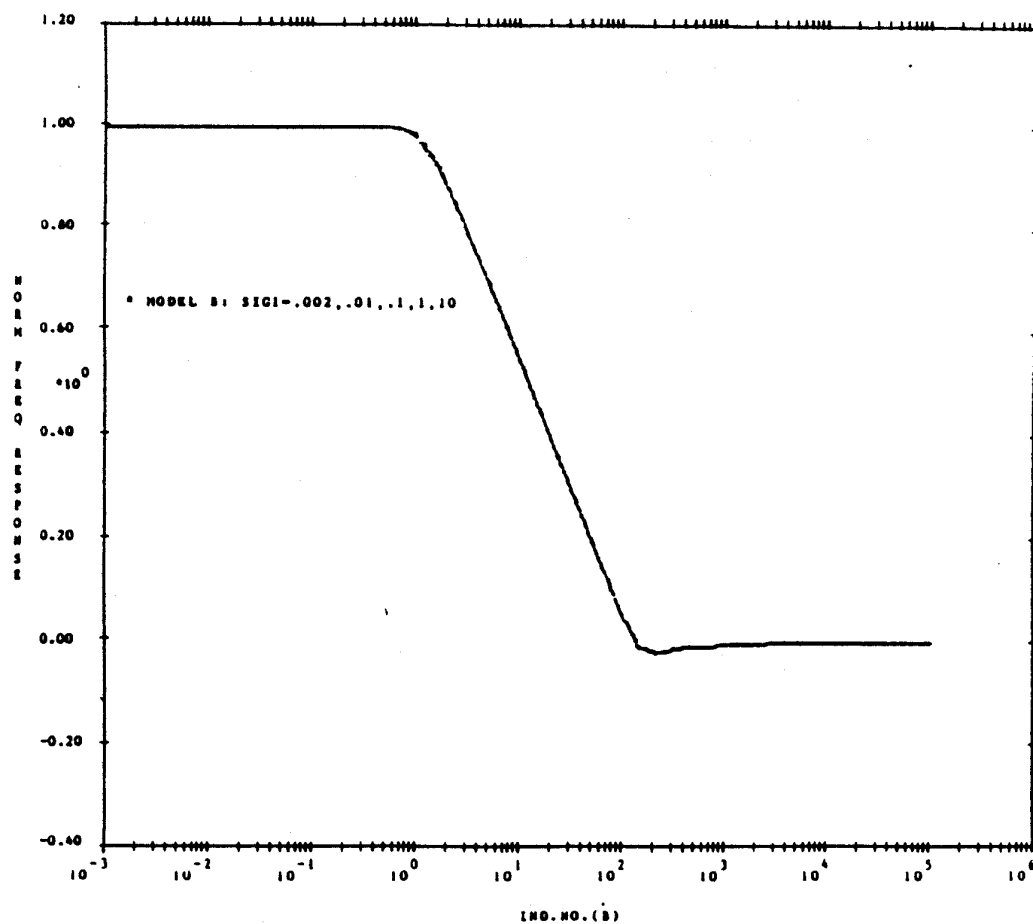
Much of the discussion in the INTRODUCTION and SUMMARY OF CALCULATIONS sections are illustrated in these plots. For example, referring to model "K", we observe that as the radius A decreases, the first deflection in each transient curve becomes progressively lower in magnitude at about 0.1 seconds. In fact, for A=100, the transient mostly "sees" the 1000m upper layer. This shows the relative importance of dynamic range versus loop radius in detecting the deeper layer interfaces.

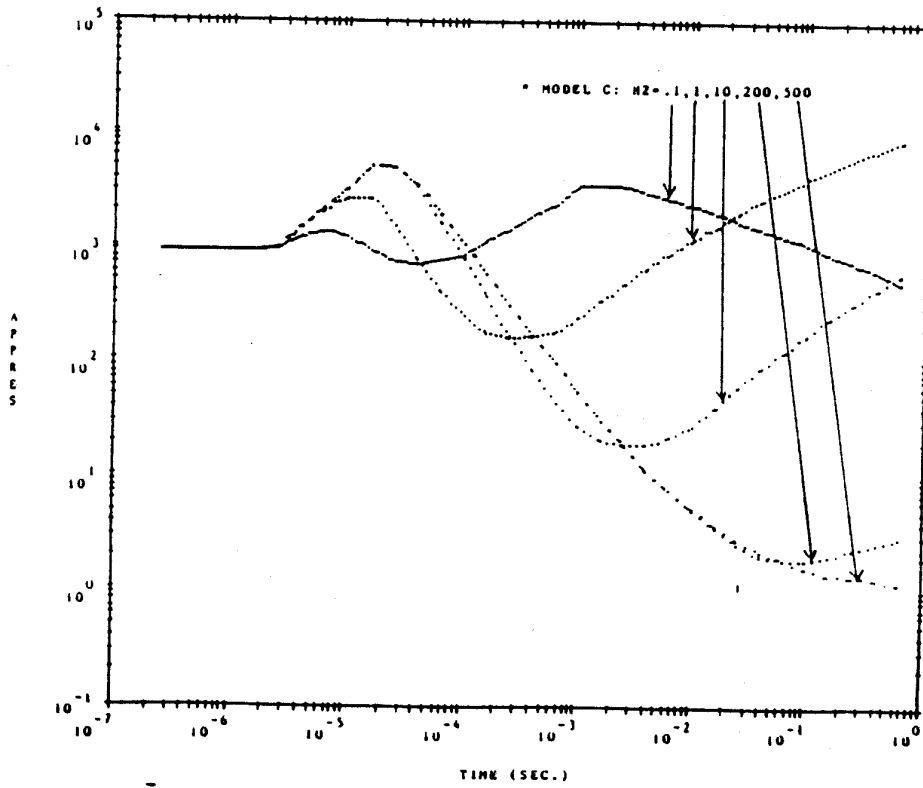
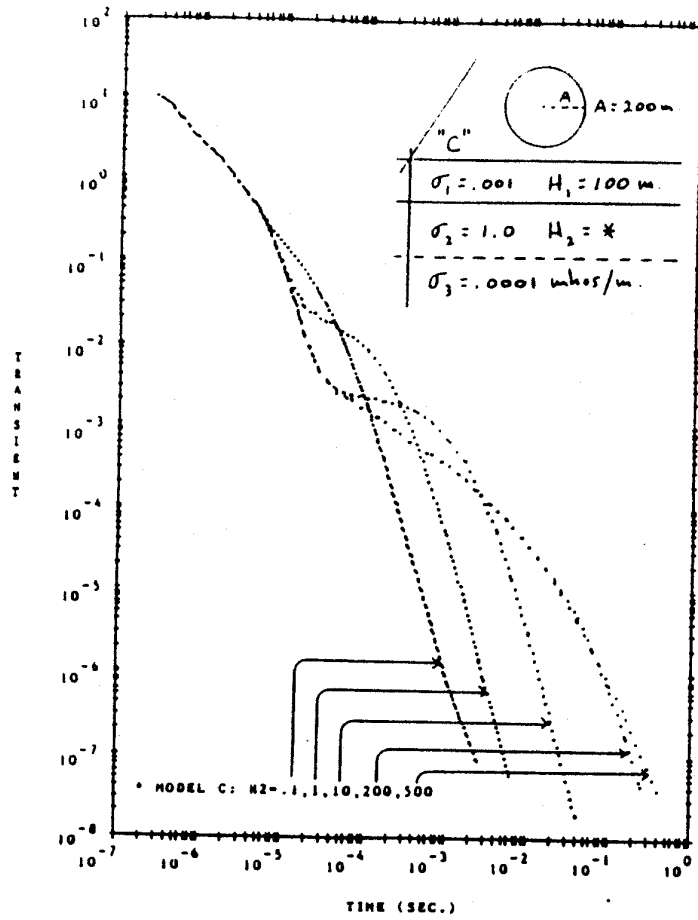
* The term "TRANSIENT" used in these plots refer to a TDR-sounding.

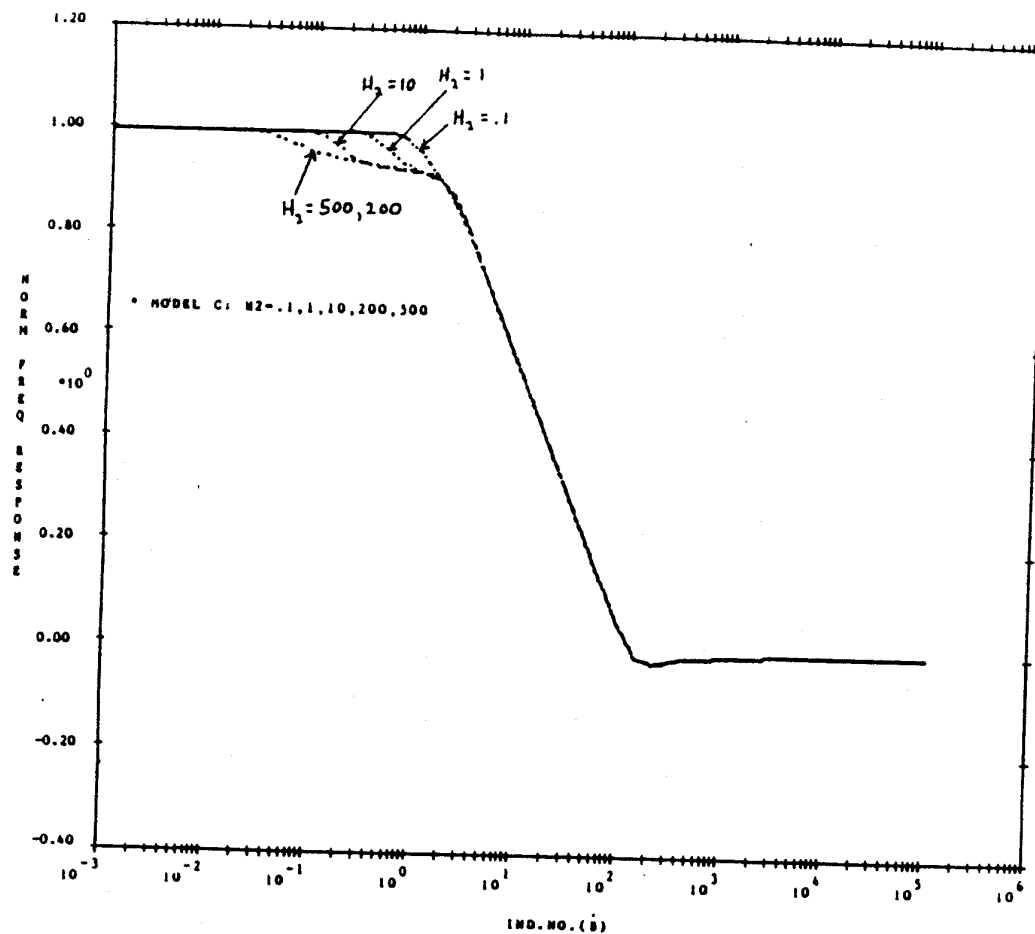


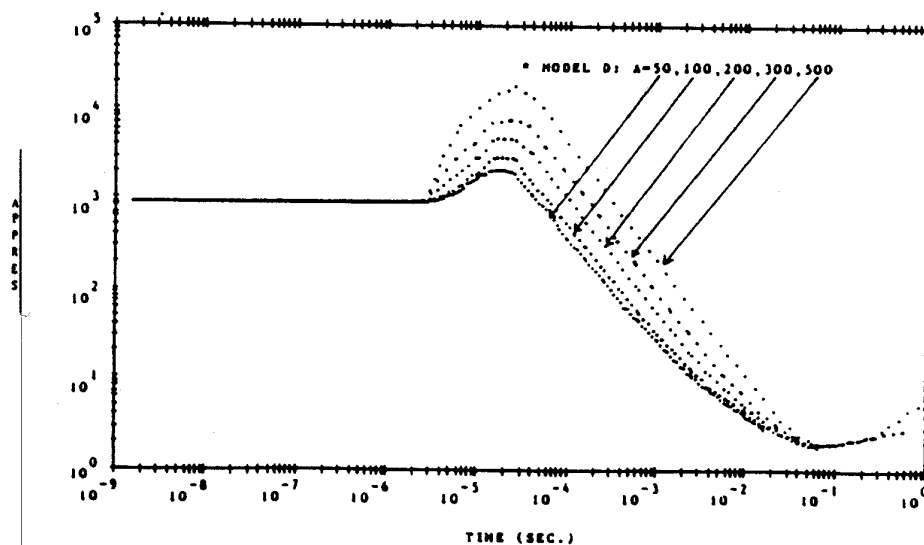
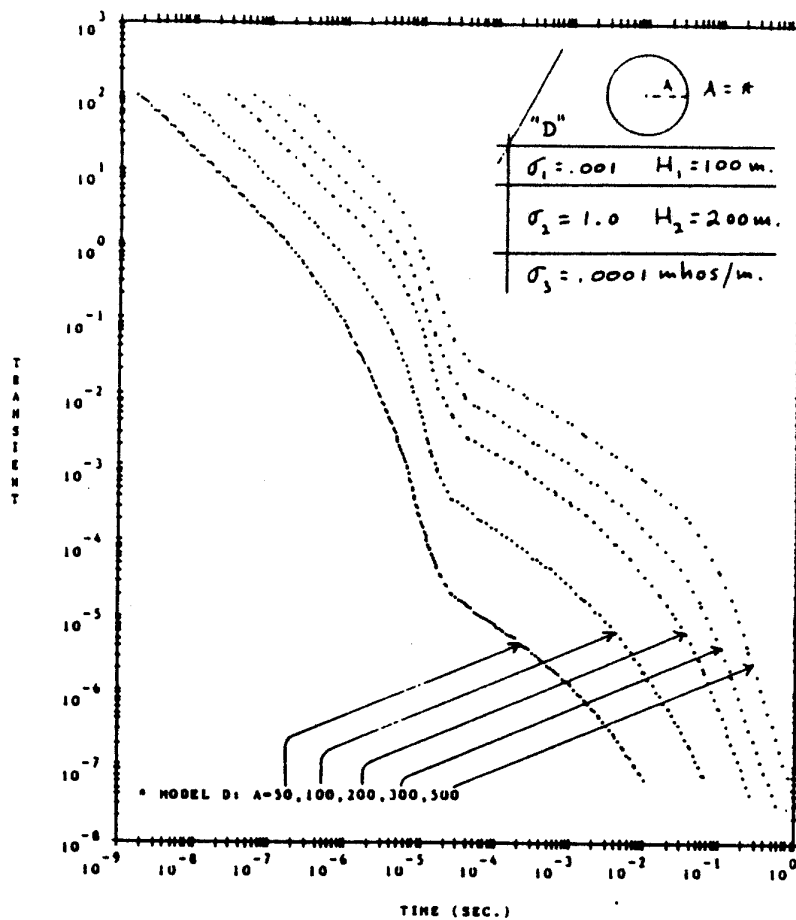


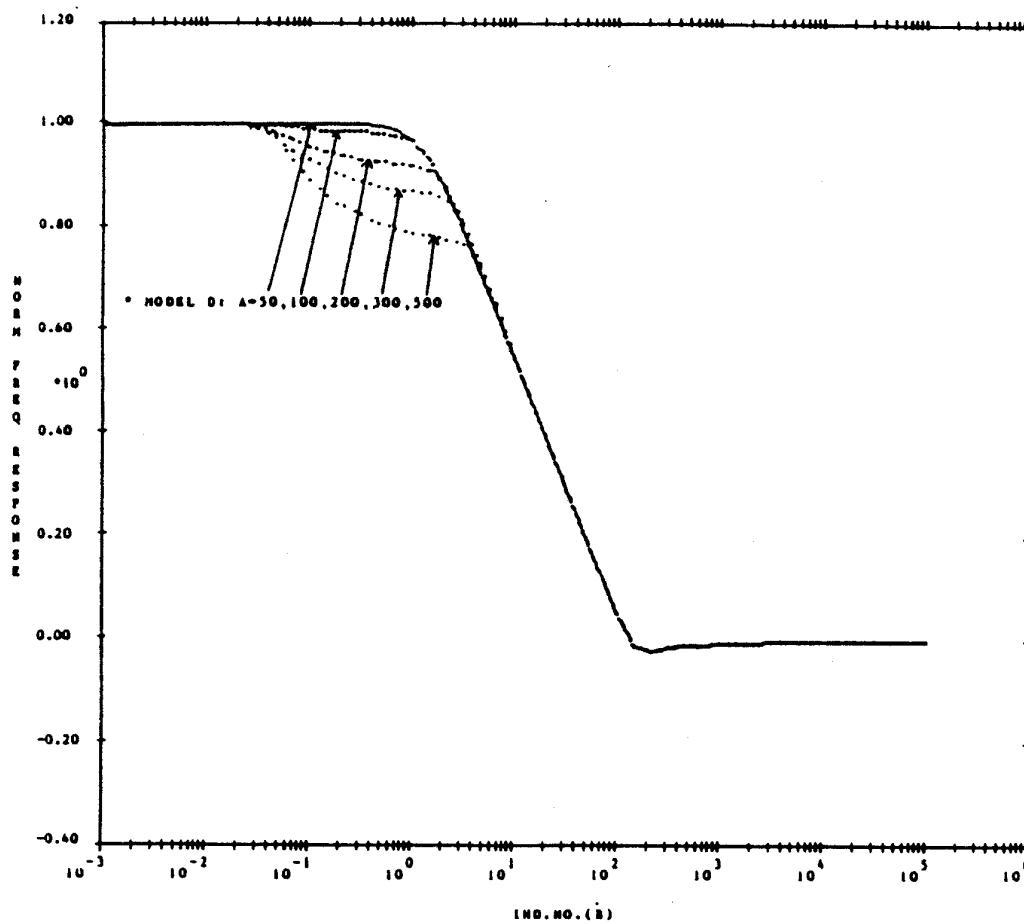


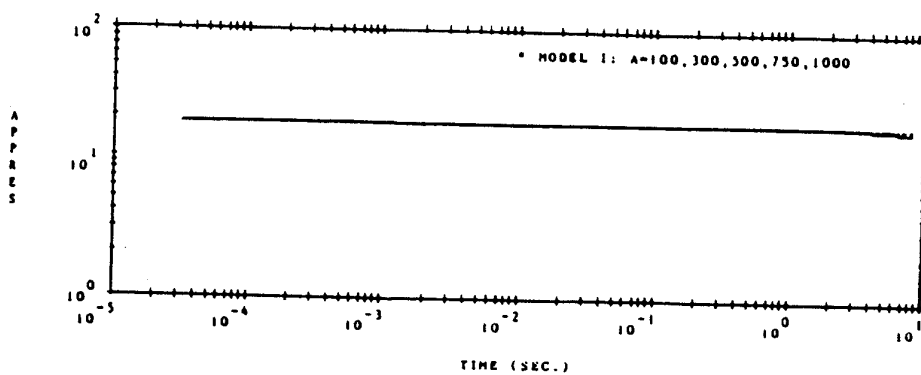
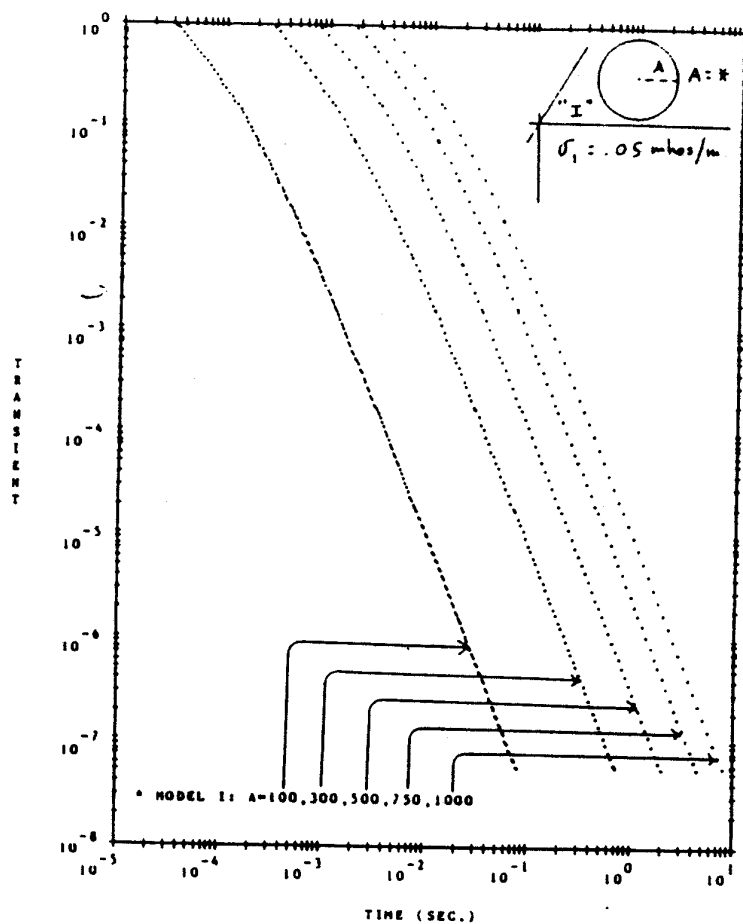


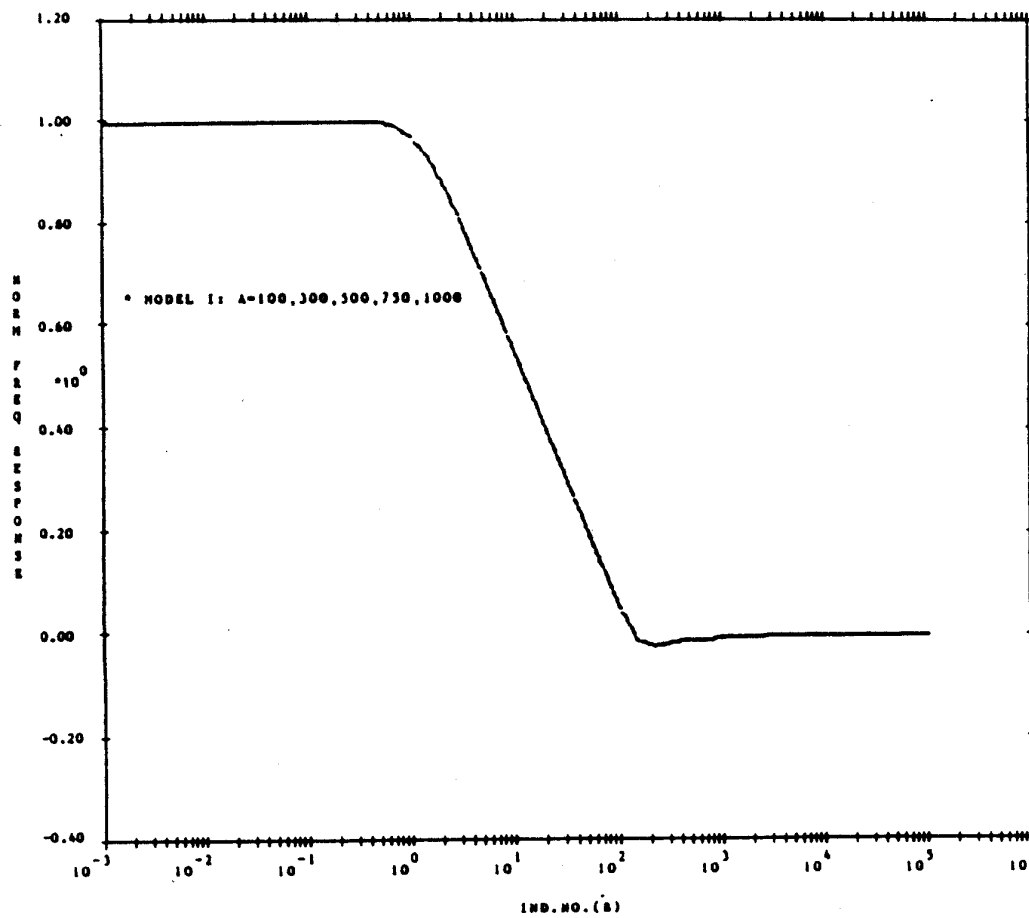


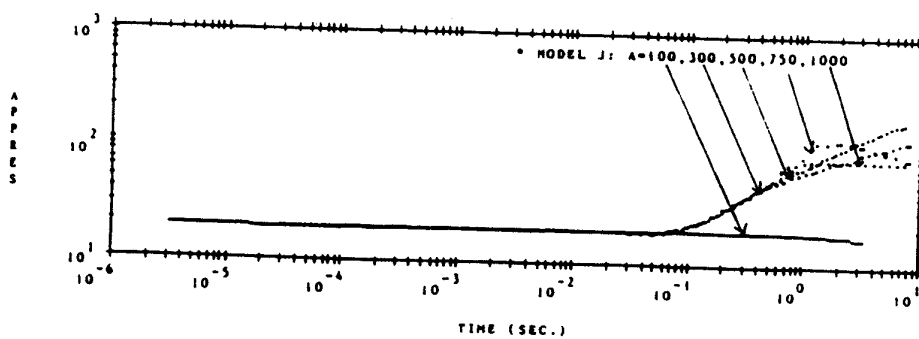
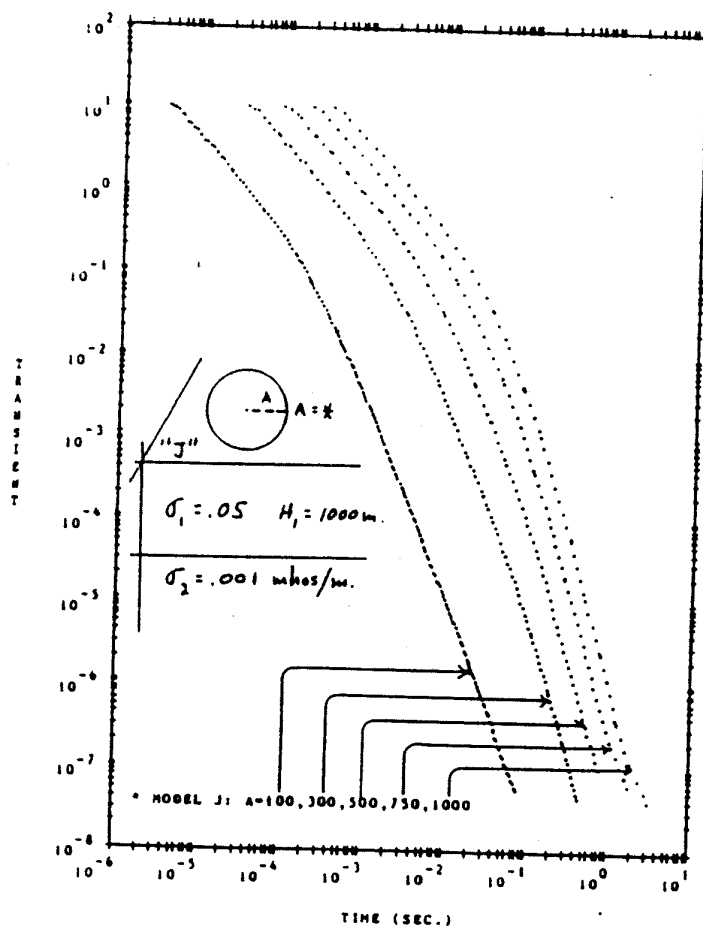


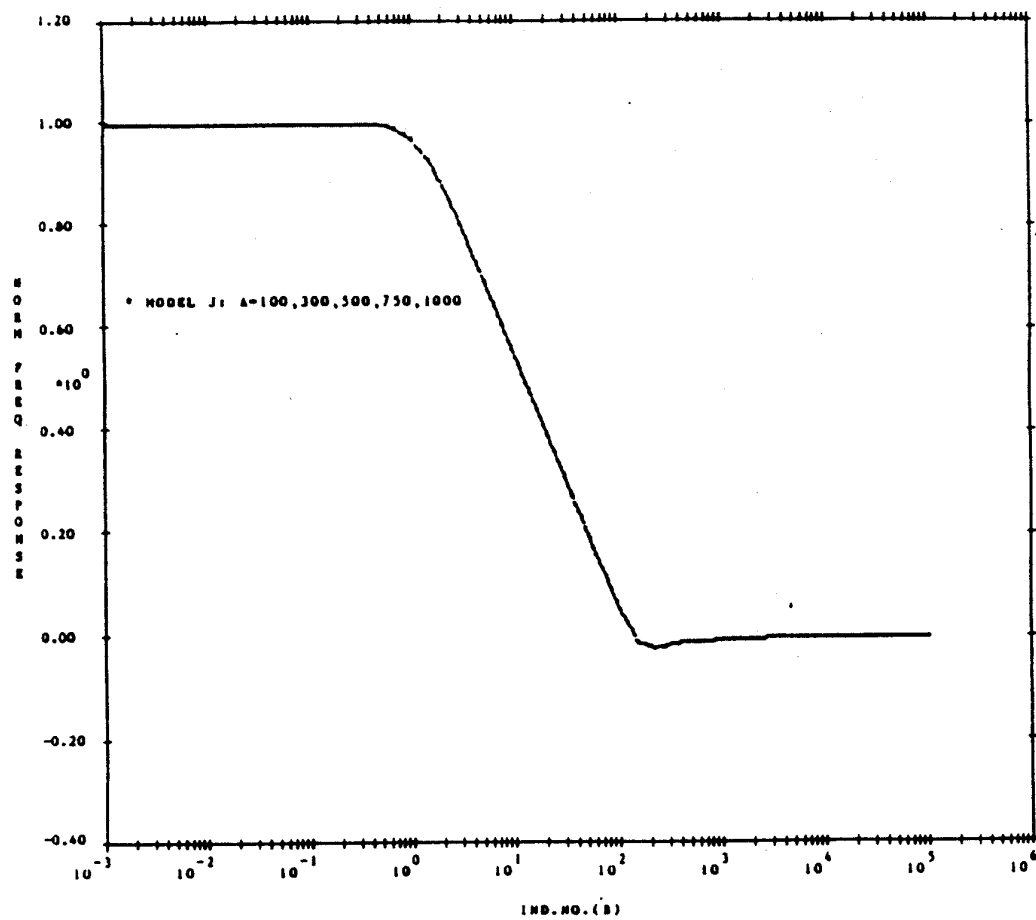


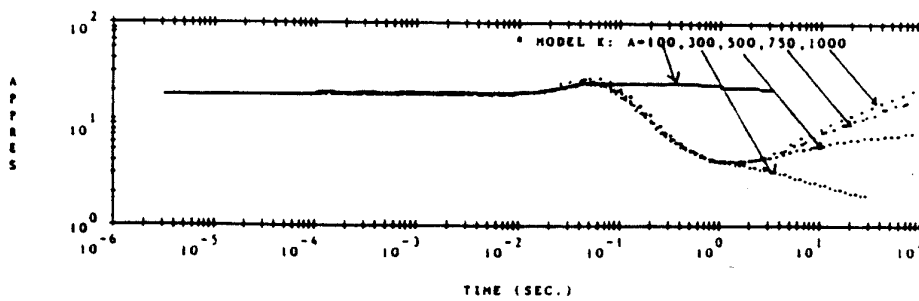
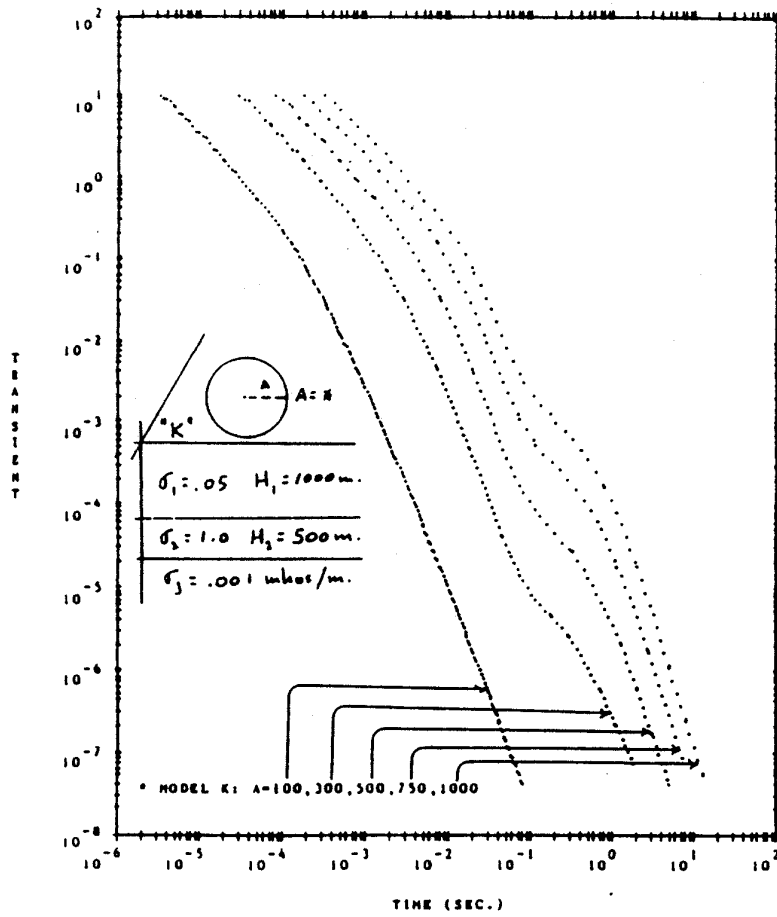


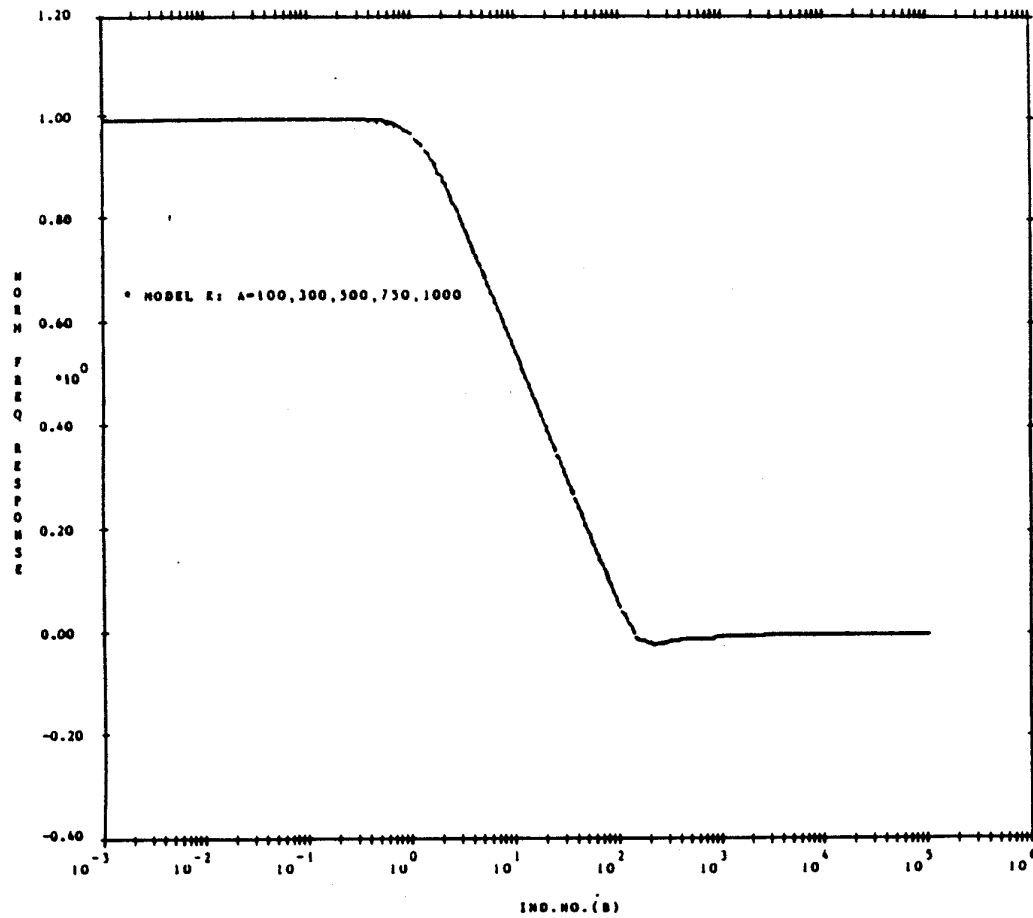


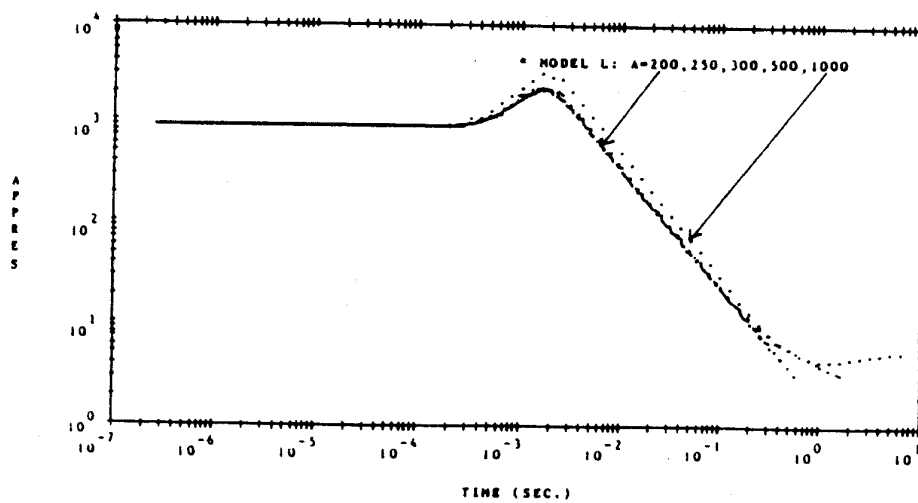
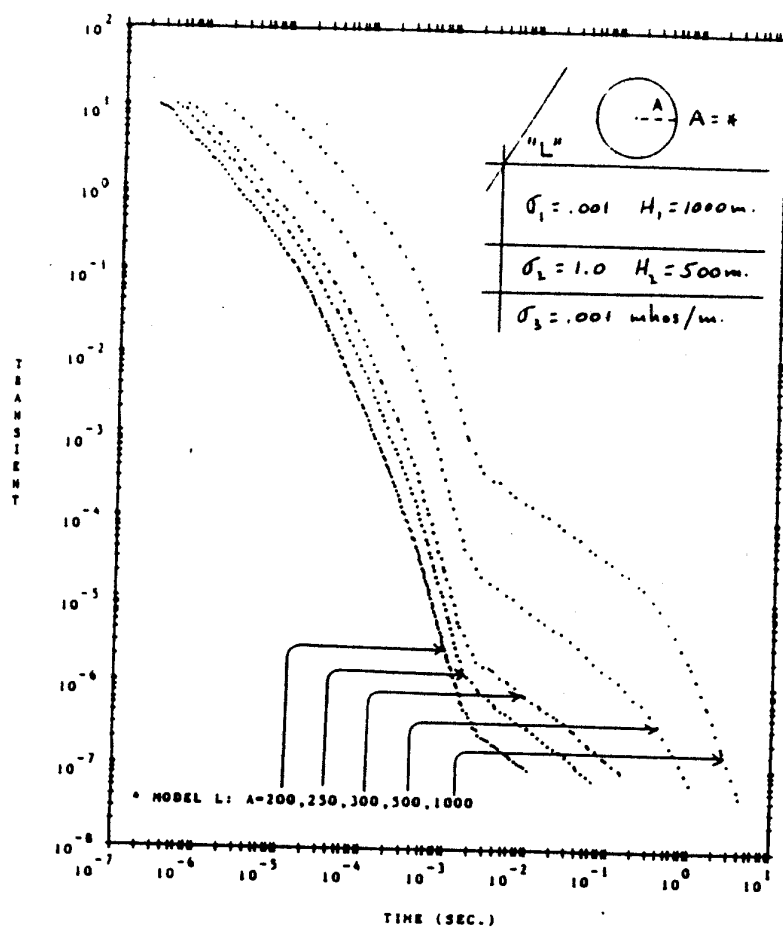


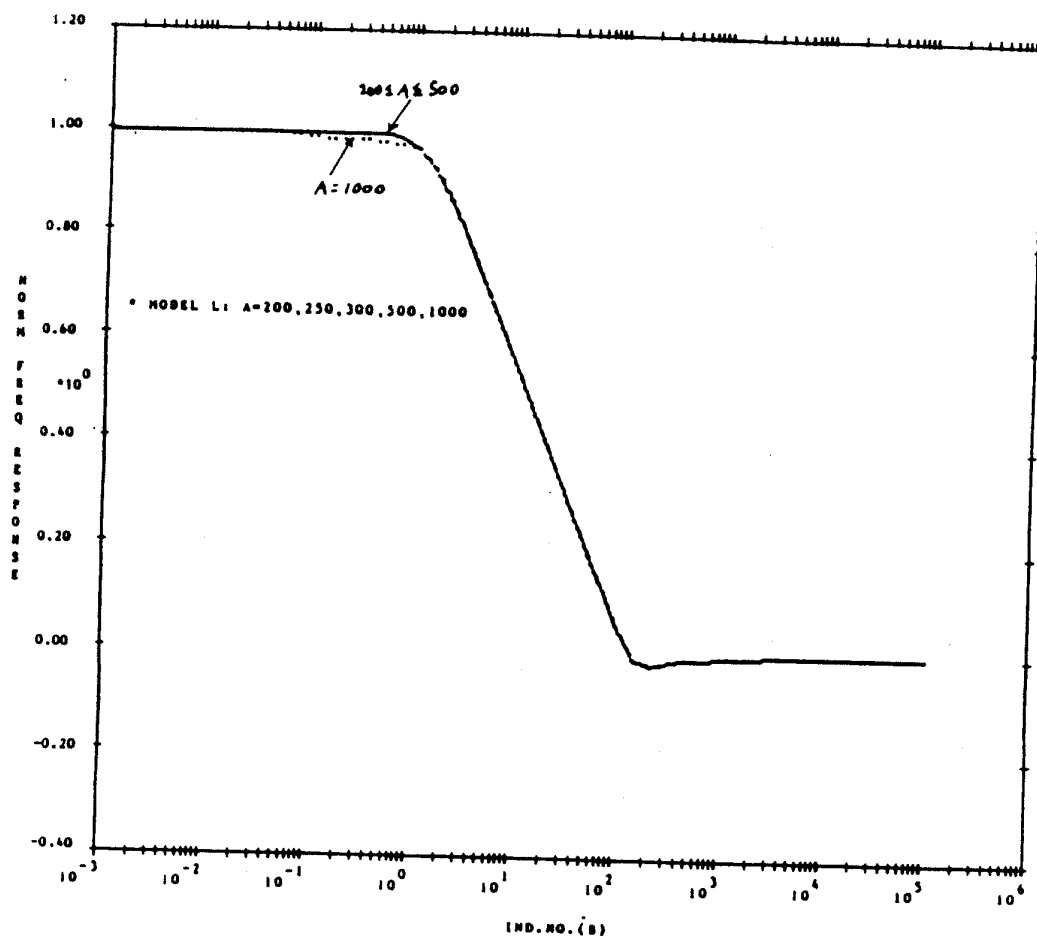












Appendix 4.-- Source code availability and listing

Source Code Availability

The current version of the source code may be obtained by writing directly to the author*. A magnetic tape copy can be sent to requestors to be copied and returned. This method of releasing the source code was selected in order to satisfy requests for the latest (e.g., possibly updated) version. The magnetic tape is usually recorded in the following mode (unless requested otherwise):

Industry compatible: 9-track, standard ANSI-labeled, ASCII-mode, odd-parity, 800-bpi density, 80-character card-image records (blocked 50-card images, or 4000-characters, per physical block), and contained on one file named "TCOLLOOP.VAX".

* present address is:

U.S. Geological Survey
Mail Stop 964
Box 25046, Denver Federal Center
Denver, CO 80225

Source Listing

The attached subprograms are listed in the following order:

00000010	[MAIN PROGRAM]
00002500	SUBROUTINE APROXO
00002770	REAL FUNCTION ELOOP
00003060	COMPLEX FUNCTION F3ZH
00003190	SUBROUTINE RECUR
00003420	SUBROUTINE NAMELIST
00008300	SUBROUTINE CPUTIME
00008870	SUBROUTINE DECODEIX
00009030	SUBROUTINE DECODEX
00009200	SUBROUTINE ZRRMSG
00009540	SUBROUTINE MINMAX
00009640	SUBROUTINE NONBLANK
00009770	SUBROUTINE PROCINFO
00010140	REAL FUNCTION RFLAGS
00010550	SUBROUTINE SPLINI
00011750	SUBROUTINE SPOINT
00011970	REAL*4 FUNCTION SQJ1
00015560	SUBROUTINE WARN
00015900	REAL FUNCTION RLAGFO
00018290	REAL FUNCTION RLAGF1

C {TCOLOOP}: TRANSIENT SOUNDING FOR COINCIDENT LOOP {11/18/81}	00000010
C FORWARD SOLUTIONS, WHERE CIRCULAR LOOP HAS RADIUS A>0.0 AND	00000020
C THE LOOP IS PLACED ON THE EARTH'S SURFACE (I.E., ONLY	00000030
C THE GROUND CASE Z=0.0 IS CONSIDERED HERE).	00000040
C THE TRANSIENT FIELD (TX-RX SAME LOOP) IS ASSUMED MEASURED AT THE	00000050
C LOOP CENTER, BUT AT THE SURFACE OF THE EARTH.	00000060
C	00000070
C BY W.L.ANDERSON, U.S. GEOLOGICAL SURVEY, DENVER, COLORADO.	00000080
C	00000090
C--REFERENCES:	00000100
C	00000110
C ANDERSON, W.L., 1975, NTIS REPORT PB-242-800.	00000120
C ANDERSON, W.L., 1979, USGS OPEN-FILE REPT. 79-590.	00000130
C MORRISON, ET AL, 1969, GEOPHYS. PROSP. V.17, P.82-101.	00000140
C RAICHE AND SPIES, 1981, GEOPHYSICS, V.46, NO.1, P.53-64.	00000150
C	00000160
C NOTE THAT NORMALIZED TIME (TAU) IS USED FROM TO TO TM, WHERE	00000170
C TIME=0.5*TAU*SIG1*(FOURPI*E-7)*A**2 (TIME IN SEC.)	00000180
C I.E., TAU=(2.0*TIME)/(SIG1*FOURPI*E-7*A**2).	00000190
C IPCH=1 OPTION (DEFAULT 0) WILL WRITE FILE10 WITH	00000200
C (TRANS, TIME, APPRES) IN FORMAT (3E16.8).	00000210
C IPCH>1 WILL WRITE FILE10 (AS ABOVE), AND ALSO FOR011,	00000220
C FOR012, AND FOR013 FOR POSSIBLE PLOTTING PURPOSES (LATER).	00000230
C	00000240
C--SUBPROGRAMS RFLAGS AND ELOOP ARE CALLED TO COMPUTE THE TRANIENT	00000250
C USING LAGGED-CONVOLUTION IN TIME (DEPENDING ON NB OPTION--SEE DOC.)	00000260
C AND DIRECT OR SPLINED FREQ FUNCTION IN (B0, BM)--MIN, MAX IND.NUMBER.	00000270
C NOTE: FREQ.FUNCT E/E0=1.0 IS ASSUMED IF B<B0 AND -0.0 IF B>BM, WHERE	00000280

```

C  DEFAULT BO=.001, BM=.1E6 ARE USUALLY ADEQUATE FOR MOST MODELS.
C
    CHARACTER*80 TITLE
    REAL SIG(10),H(10),DER(2), T(200),V(200), AR(200)
    COMPLEX K2(10),KS1,C4,ZA,ZAC2
    EXTERNAL ELOOP
    COMMON/PASS/ZAC2,ANORM,SIG,BO,BM,SIG1,EPS
    COMMON/SPLN/XS(200),YS(200),AS(200),BS(200),CS(200),NS,ISPLN
    COMMON/MODEL/K2,KS1,H,Z,A,R,HMAX,M
C**
C** SEE CALL NAMELIST SIMULATOR FOR THE VAX
C**
C**      NAMELIST/PARMS/M,SIG,H,A,Z,EPS,IFILL,
C**      1 BO,BM,NB,TO,TM,NT,XNORM,IOUT,IOUTS,IPCH,ISTOP
    COMMON/NAME_LIST/M,SIG(10),H(9),A,IFILL1,EPS,IFILL2,
    1 BO,BM,NB,TO,TM,NT,XNORM,IOUT,IOUTS,IPCH,ISTOP
    DATA DER/2*0.0/,C2/.730921017/,THRESH/.1E-6/
C---PRESET
    DO I=1,200
        XS(I)=0.0
        YS(I)=0.0
    ENDDO
    R=0.0
    Z=0.0
    IPCH=0
    BO=.001
    NB=6
    BM=.1E6
    M=1
    XNORM=10.
    DO 10 I=1,9
        SIG(I)=0.0
        H(I)=0.0
        SIG(10)=0.0
        A=0.0
        EPS=.1E-9
        ISTOP=1
        IOUTS=16
        TO=0.0
        NT=0
        TM=0.0
        IN=5
        IOUT=6
20  READ(IN,30,END=999) TITLE
30  FORMAT(A)
    CALL SETTIME
C**      READ(IN,PARMS,END=999)
    CALL NAMELIST(IN,'SPARMS',*999)
    M=M
    DO 35 I=1,9
        SIG(I)=SIG(I)
        H(I)=H(I)
        SIG(10)=SIG(10)
        EPS=EPS
        BO=BO
        BM=BM
        A=A

```

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00000740
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00000770
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00000810
00000820
00000830
00000840
00000850

```

CALL NONBLANK(TITLE,NONBLK)
IF(IOUT.GT.0)
2  WRITE(6,40)
3  TITLE,M,XNORM,IPCH,A.
1  IOUTS,TO,NT,TH,ISTOP,IOUT,BO,NB,BM,EPS,SIG,H
40  FORMAT('1{TCOLOOP}:',6X,A<NONBLK>//
2  5H M = ,I2,10X,6HXNORM=,E8.2,2X,5HIPCH=,I4,7X,
3  2HA=,E11.4/
4  9H IOUTS = ,I3,5X,3HTO=,E11.4,2X,5HNT = ,I4,7X,3HTM=,E11.4,2X,
5  8HISTOP = ,I1/7H IOUT =,I5,
6  5X,3HBO=,E11.4,2X,5HNB = ,I4,7X,3HBM=,E11.4,2X,4HEPS=,E9.2//
7  6H SIG =,5E12.4/6X,5E12.4//
8  6H H =,5E12.4/6X,5E12.4)
IF(IOUTS.GT.0) WRITE(IOUTS,40)
6  TITLE,M,XNORM,IPCH,A.
1  IOUTS,TO,NT,TH,ISTOP,IOUT,BO,NB,BM,EPS,SIG,H
IF(NT.LE.0) CALL ERRMSG('NT<=0',1,IOUT,IOUTS)
IF(M.LT.1.OR.M.GT.10) CALL ERRMSG('M<1 OR M>10',4,IOUT,IOUTS)
IF(A.LE.0.0) CALL ERRMSG('A<=0',2,IOUT,IOUTS)
IF(BO.LE.0.0.OR.BM.LE.0)
6  CALL ERRMSG('BO<=0 OR BM<=0',3,IOUT,IOUTS)
IF(TO.LE.0.0.OR.TH.LE.0)
6  CALL ERRMSG('TO<=0 OR TH<=0',3,IOUT,IOUTS)
IF(SIG(1).LE.0.0)CALL ERRMSG('SIG(1)<=0',3,IOUT,IOUTS)
C--PRESET SOME CONSTANTS
AA=A*A
SIG1=SIG(1)
TCON=6.28318531E-7*SIG1*AA
ZA=CMPLX(A,0.0)
IF(M.EQ.1) THEN
HMAX=A
ELSE
CALL MINMAX(H,M-1,TEM,HMAX)
IF(TEM.LE.0.0.OR.HMAX.LE.0.0)
1  CALL ERRMSG('SOME H(I)<=0 FOR I<M',0,IOUT,IOUTS)
ENDIF
ANORM=A/HMAX
ZAC2=ANORM/C2
ISPLN=0
IF(NB.GT.0.AND.NB.LT.12) ISPLN=1
IF(ISPLN.EQ.0) GO TO 49
C--GET PRE-SPLINED FREQ. FUNCTION (0<NB<12 OPTION)
DB=EXP(2.30258509/FLOAT(NB))
BMTEST=0.5*(BM+BM*DB)
MS=0
TEM=BO/DB
ISPLN=0
46  TEM=TEM*DB
IF(TEM.GE.BMTEST) GO TO 47
MS=MS+1
IF(MS.GT.200)CALL ERRMSG('SPLINED MS>200',1,IOUT,IOUTS)
OLDX=XS(MS)
XS(MS)=TEM
OLDY=YS(MS)
YS(MS)=ELOOP(TEM*TEM)
C
C--APPLY THE 'THRESH TEST' TO SEE IF REST OF PREVIOUS CURVE CAN BE

```

```

C USED TO SAVE RECOMPUTING REST OF FREQ RESPONSE. (NOTE THAT THE
C FIRST CURVE, OR A CHANGE IN BO,NB,OR BM, WILL FALL-THRU ALL IF
C TESTS AND ESTABLISH A NEW 'PREV CURVE' FOR SUBSEQUENT TESTS.)
C--BEGIN 'THRESH TEST':
  IF(TEM.GE.1.0) THEN
    IF(TEM.EQ.OLDX) THEN
      IF(OLDY.NE.0.0) THEN
        IF(ABS((YS(MS)-OLDY)/OLDY).LT.THRESH) THEN
          MS=NS
          GO TO 47
        ENDIF
      ENDIF
    ENDIF
  ENDIF
C--END OF 'THRESH TEST'
C
  GO TO 46
47  NS=MS
    CALL SPLINI(NS,0.0,XS,YS,AS,BS,CS,0,DER,T,V)
C WRITE FILE11 IF IPCH>1 (FOR LATER PLOTTING--IF DESIRED)
  IF(IPCH.GT.1) WRITE(11,1000) TITLE(1:40),NS,(XS(1),YS(1),I=1,NS)
1000 FORMAT('3'/'IND.NO.(B)'/NORM FREQ RESPONSE'/A/I/(2G16.8))
  ISPLN=1
49  NEW=1
    DT=EXP(2.30258509/FLOAT(NT))
    TMTEST=0.5*(TM+TH*DT)
    IT=0
    TEM=TO/DT
    IF(IOUT.GT.0) WRITE(IOUT,50)
50  FORMAT('0',4X,'TAU(TO:TM)',3X,'TIME(SEC)',4X,'TRANS',8X,
  &'TRANS(NORM)',2X,'NORM*XNORM',3X,'APP.RES.'/)
    IF(IOUTS.GT.0) WRITE(IOUTS,50)
    LATE=0
60  TEM=TEM*DT
    IF(TEM.GE.TMTEST) GO TO 82
    TIME=ICON*TEM
    IF(LATE.EQ.1) THEN
      CALL APROX1(TEM,TRANS)
    ELSE
C--GET TRANSIENT IMPULSE RESPONSE VIA LAGGED CONVOLUTION IN TIME.
      TRANS=.63661977*RFLAGS(0,ELOOP,EPS,0.5*TO,TMTEST,TEM,NEW)
      NEW=0
      IF(TRANS.LT.1.E-7) THEN
        IF(IT.LT.3)
          1 CALL ERRMSG('IT<3--TO TOO BIG',1,IOUT,IOUTS)
          CALL APROX0(IT,T,V)
          CALL APROX1(TEM,TRANS)
          LATE=1
        ENDIF
      ENDIF
      IT=IT+1
      IF(IT.GT.200)CALL ERRMSG('IT>200--NT, TM TOO BIG',1,IOUT,IOUTS)
      T(IT)=TEM
      V(IT)=TRANS
      IF(IT.EQ.1) TRANS1=TRANS
      TNORM=TRANS/TRANS1
      TXNORM=TNORM*XNORM

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00001430
 00001440
 00001450
 00001460
 00001470
 00001480
 00001490
 00001500
 00001510
 00001520
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 00001560
 00001570
 00001580
 00001590
 00001600
 00001610
 00001620
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 00001680
 00001690
 00001700
 00001710
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 00001730
 00001740
 00001750
 00001760
 00001770
 00001780
 00001790
 00001800
 00001810
 00001820
 00001830
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 00001850
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 00001880
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 00001900
 00001910
 00001920
 00001930
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 00001950
 00001960
 00001970
 00001980
 00001990

```

C--GET APP.RES.
SO=1.29552377*TEM*TRANS
YO=SO*.66666667
X1=((((((((110000.*YO+12360.90299)*YO+
1 3379.08752)*YO+955.90217)*YO+
2 255.84635)*YO+71.89746)*YO+
3 20.88351)*YO+6.49229)*YO+
4 2.38095)*YO+1.70998)**2
X1=YO*X1
IF(X1.LE.1.4) THEN
X2=X1
ELSE IF(X1.GT.1.4.AND.X1.LE.2.8) THEN
X2=X1+0.001635*X1**4.892
ELSE IF(X1.GT.2.8.AND.X1.LE.5.69) THEN
X2=X1+0.004018*X1**4.01364
ELSE
CALL WARN('X1>5.69; APP.RES.=1./SIG1 USED.',0,IOUT,IOUTS,*66)
66 APPRES=1./SIG1
GO TO 68
ENDIF
APPRES=0.5/(SIG1*TEM*X2)
68 AR(IT)=APPRES
IF(IOUT.GT.0) WRITE(IOUT,70) TEM,TIME,TRANS,TNORM,TXNORM,
1 APPRES
70 FORMAT(1X,6E13.5)
IF(IOUTS.GT.0) WRITE(IOUTS,70) TEM,TIME,TRANS,TNORM,TXNORM,
1 APPRES
IF(IPCH.NE.0) WRITE(10,100) TRANS,TIME,APPRES
100 FORMAT(3E16.8)
GO TO 60
82 IF(IOUTS.GT.0) WRITE(IOUTS,90)
90 FORMAT(129X)
CALL CPUTIME(IOUT,IOUTS)
C WRITE FILE13 IF IPCH>1 (FOR LATER PLOTTING--IF DESIRED)
IF(IPCH.GT.1) THEN
WRITE(12,1900) TITLE(1:40)
1900 FORMAT('3'/'TIME (SEC.)'/'APPRES'/A)
WRITE(12,2002) IT,(TCON*T(J),AR(J),J=1,IT)
WRITE(13,2000) TITLE(1:40)
2000 FORMAT('3'/'TIME (SEC.)'/'TRANSIENT'/A)
DO I=1,IT
II=I
IF(V(I).LT.1.E-7) GO TO 2001
ENDDO
2001 WRITE(13,2002) II,(TCON*T(J),V(J),J=1,II)
2002 FORMAT(1/(2G16.8))
ENDIF
IF(ISTOP.NE.1) GO TO 20
999 CALL EXIT
END
SUBROUTINE APROXO(IT,T,V)
C--LATE TIME APPROXIMATION INITIALIZATION WHEN 1ST COMPUTED TRANS<1E-7
C AND 2<IT<201 (REQUIRED).
C
SAVE
DIMENSION A(201),B(201),C(201),D(2),T(1),V(1),W1(201),W2(201),
1 TLOG(201),VLOG(201)
00002000
00002010
00002020
00002030
00002040
00002050
00002060
00002070
00002080
00002090
00002100
00002110
00002120
00002130
00002140
00002150
00002160
00002170
00002180
00002190
00002200
00002210
00002220
00002230
00002240
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00002500
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00002560

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DATA D/2*0.0/
DO 10 I=1,IT
  TLOG(I)=ALOG(T(I))
10  VLOG(I)=ALOG(V(I))
  NT=IT+1
  TLOG(NT)=87.498234
  VLOG(NT)=-87.498234
  CALL SPLINI(NT,0.0,TLOG,VLOG,A,B,C,0,D,W1,W2)
  RETURN
C** ENTRY APROX1(TEM,TRANS)
  ENTRY APROX1(TEM,TRANS)
  AT=ALOG(TEM)
  IF(AT.GT.87.498234) THEN
    TRANS=0.0
    RETURN
  ENDIF
  CALL SPOINT(NT,TLOG,VLOG,A,B,C,AT,TT)
  TRANS=EXP(TT)
  RETURN
END
REAL FUNCTION ELOOP(B2)
C--COSINE-TRANSFORM KERNEL FOR COINCIDENT LOOP WITH
C  A>0, R=0, AND Z=0.0.
C
  REAL SIG(10),H(10),Z
  COMPLEX ZAC2,K2(10),KS1,ZFLD
  COMMON/MODEL/K2,KS1,H,Z,A,R,HMAX,M
  COMMON/PASS/ZAC2,ANORM,SIG,B0,BM,SIG1,EPS
  COMMON/SPLN/XS(200),YS(200),AS(200),BS(200),CS(200),NS,ISPLN
  EXTERNAL F3ZH
  B=SQRT(B2)
  IF(B.LT.B0) GO TO 3
  IF(B.GT.BM) GO TO 4
  IF(ISPLN.EQ.0) GO TO 10
C--ISPLN=1 (0<NB<12 OPTION) INTERPOLATE PRE-SPLINED FREQ. FUNCTION
  CALL SPOINT(NS,XS,YS,AS,BS,CS,B,ELOOP)
  RETURN
10  F=(B/A)**2/(39.47841762E-7*SIG1)
  KS1=CMPLX(0.0,-7.895683523E-6*F)
  DO 1 I=1,M
1    K2(I)=KS1*CMPLX(SIG(I),0.0)
    ZFLD=ZAC2*SQJ1(ANORM,F3ZH,EPS,LL) + 1.0
    ELOOP=REAL(ZFLD)
    RETURN
3    ELOOP=1.0
    RETURN
4    ELOOP=0.0
    RETURN
END
COMPLEX FUNCTION F3ZH(X)
C--KERNEL FOR HANKEL TRANSFORM IN CURLOOP WHEN R=0.0 AND Z=0.0
C  SCALED BY HMAX STORED IN COMMON/MODEL/
C
  COMPLEX Z1,Z0,K2(10),KS1,HALF
  REAL H(10),Z
  COMMON/MODEL/K2,KS1,H,Z,A,R,HMAX,M
  DATA HALF/(0.5,0.0)/

```

00002570
00002580
00002590
00002600
00002610
00002620
00002630
00002640
00002650
00002660
00002670
00002680
00002690
00002700
00002710
00002720
00002730
00002740
00002750
00002760
00002770
00002780
00002790
00002800
00002810
00002820
00002830
00002840
00002850
00002860
00002870
00002880
00002890
00002900
00002910
00002920
00002930
00002940
00002950
00002960
00002970
00002980
00002990
00003000
00003010
00003020
00003030
00003040
00003050
00003060
00003070
00003080
00003090
00003100
00003110
00003120
00003130


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      Y=X/HMAX
      CALL RECUR(Y,Z1,Z0)
      F3ZH=Z1/(Z0+Z1)-HALF
      RETURN
      END
      SUBROUTINE RECUR(Y,Z1,Z0)
C--BACKWARD RECURRENCE FOR COMPLEX IMPEDANCES Z1,Z0 GIVEN ARGUMENT
C  Y=(-X/HMAX) AND MODEL PARAMETERS IN COMMON/MODEL/
C
      REAL H(10),Z
      COMPLEX Z1,Z0,K2(10),KS1,ONE,ZZ,X2,U
      COMMON/MODEL/K2,KS1,H,Z,A,R,HMAX,M
      DATA ONE/(1.0,0.0)/
      X2=CMPLX(Y*Y,0.0)
      Z0=KS1/CMPLX(Y,0.0)
      Z1=KS1/CSQRT(X2-K2(M))
      IF(M.EQ.1) GO TO 20
      J=M-1
      U=CSQRT(X2-K2(J))
      ZZ=KS1/U
      U=CEXP(CMPLX(-2.0*H(J),0.0)*U)
      U=(ONE-U)/(ONE+U)
      Z1=ZZ*((Z1+ZZ*U)/(ZZ+Z1*U))
      IF(J.EQ.1) GO TO 20
      J=J-1
      GO TO 10
      20  RETURN
      END
      SUBROUTINE NAMEDLIST(IUNIT,NAME,*)
C
C {NAMEDLIST INPUT ON VAX-11/780} VIA "CALL NAMEDLIST" {VERSION: 12/10/80}
C
C--A SIMULATED 'NAMEDLIST/NAME/' PROCESSOR FOR VAX-11 FORTRAN-77 TO
C IMPLEMENT "CALL NAMEDLIST(IUNIT,'$NAME',*EOF)" ON VAX, WHICH
C IS SIMILAR TO "READ(IUNIT,NAME,END=EOF)" ON MOST LARGE SYSTEMS.
C
C--BY W.L.ANDERSON, U.S. GEOLOGICAL SURVEY, DENVER, COLORADO.
C
C--THIS IS A SUBSET OF THE ACTUAL NAMEDLIST/NAME/ AVAILABLE ON
C MOST LARGE MAIN-FRAME SYSTEMS. CURRENT OPTIONS ARE:
C
C (1) ALL VARNAM'S ARE RESTRICTED TO 1 TO 6 CHAR'S (ALP,NUM, AND '_')
C     BUT MUST BEGIN WITH AN ALP CHAR (E.G., A3_, BVAR, C_2, ETC.)
C (2) ONLY VARIABLE TYPES REAL*4 *8 (NAMTYP=1) AND INTEGER*2 *4
C     (NAMTYP=0). SEE C---- EXAMPLE STATEMENTS FOR NAMTYP BELOW -----.
C     {NOTE: COMPLEX, LOGICAL, OR CHARACTER VARIABLE TYPES ARE "NOT"
C     CODED IN THIS VERSION.}
C (3) MAX. 60 VARNAM'S ALLOWED IN NAMEDLIST (FOR ALL 'SNAME'S' USED).
C (4) MAX. NUMBER FIELD (FLOAT OR FIXED) IS 20 CHAR WIDE, WHERE
C     BLANK CHAR'S ARE IGNORED, AND TYPE CONVERSION IS AUTOMATIC.
C     FLOAT NUMBERS WITH OPTIONAL E+XX OR D-XX AND WITH OR WITHOUT '.'
C     IN THE MANTISSA IS ALLOWED (E.G., 123E-3, .123D+02, -3.14, ETC.).
C (5) PARTIAL ARRAY'S ALLOWED; E.G., A(10)=25.1,
C     AND B=1,3.2,...
C (6) REPEAT FACTORS ALLOWED; E.G., C=2*1,3,...
C (7) ONLY 1-DIM ARRAYS ALLOWED WITH MAX SIZE 99999.
C (8) THE NAMEDLIST '$NAME' MUST BE 2 TO 7 CHAR'S, AND MUST BEGIN WITH

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C      A "$" CHAR (E.G., 'SP', 'SPARMS', ETC.); ALSO, THE FIRST CHAR IN 00003710
C      IFILE MAY BEGIN IN COL. 1 BUT LESS THAN COL. 72 (BUFFER IS 80). 00003720
C      LINES IN IFILE MAY BE CONTINUED TO COL. 1 ON NEXT LINE, AND 00003730
C      TERMINATE THE NAMELIST BY "${END}"--THE "END" IS OPTIONAL. E.G., 00003740
C      00003750
C      SPARMS A=1,B=2.3,7*1,C(3)--.123E-10, 00003760
C      D=1800, E=5*20$END 00003770
C      SNEXNAM F=123, G=-10,C(2)=15.02 S 00003780
C      ...END-OF-IFILE... 00003790
C (9) ABOUT 98% OF ALL THE POSSIBLE ERRORS ARE DETECTED AND AN 00003800
C      ERROR MESSAGE IS PRINTED ON UNIT 06, FOLLOWED BY CALL EXIT. 00003810
C      (NOTE: WATCH OUT FOR THE REMAINING 2% UNDETECTED ERRORS!) 00003820
C      00003830
C      00003840
C--SUBROUTINES CALLED: 00003850
C      00003860
C      DECODEIX, DECODEX, AND NONBLANK. 00003870
C      00003880
C--USAGE: 00003890
C      00003900
C      1. MODIFY FILE 'INCLNAMES.FOR' AS REQUIRED (USE ANY EDITOR). 00003910
C      (SEE C---- EXAMPLE STATEMENTS BELOW -----.). 00003920
C      2. RECOMPILE SUBROUTINE 'NAMELIST' WITH THE DESIRED INCLNAMES.FOR. 00003930
C      3. IN USERS CALLING PROGRAM, USE: 00003940
C      CALL NAMELIST(IUNIT,'$NAME',*N) --ON VAX, WHERE N=E.O.F RETURN 00003950
C      STATEMENT LABEL. THIS SIMULATES ON VAX: 00003960
C      'READ(IUNIT,NAME,END=N)' ON SYSTEMS WITH NAMELIST/NAME/... 00003970
C      00003980
C*****00003990
C      00004000
C      CHARACTER*(*) NAME 00004010
C      CHARACTER*1 C(47),BUFI 00004020
C      CHARACTER*6 VARNAM 00004030
C      CHARACTER*20 NUMFLD 00004040
C      CHARACTER*80 BUF 00004050
C      00004060
C-----00004070
C----- THE USER MUST CHANGE THE FOLLOWING STATEMENTS FOR THE SPECIFIC 00004080
C----- NAMELIST VARIABLES DESIRED (E.G., USE TECO OR EDT, ETC.)-----00004090
C----- DIMENSION NO_NAM VARIABLES TO AGREE WITH CHANGED DATA STATEMENTS00004100
C== 00004110
C--ON VAX USE THE FOLLOWING INCLUDE STATEMENT (OPTIONALLY, USE /LIST): 00004120
C== 00004130
C>> INCLUDE 'INCLNAMES.FOR/NOLIST' 00004140
C 00004150
C----- INCLNAM12.FT -----00004160
C----- FOR USE IN CALL NAMELIST -----00004170
C NORMALLY, ONE SHOULD COPY 'INCLNAM12.FT' TO 'INCLNAMES.FT'; THEN 00004180
C EDIT 'INCLNAMES.FT' AS DESIRED FOR USERS CALL NAMELIST. NOTE THAT 00004190
C ONE MUST RECOMPILE 'NAMELIST.FT' WITH USERS CALLING PROGRAM, 00004200
C WHERE 'NAMELIST.FT' CONTAINS THE FOLLOWING STATEMENT: 00004210
C 00004220
C      INCLUDE 'INCLNAMES.FT/LIST' 00004230
C-----00004240
C 00004250
C*****00004260
C THIS IS "SPARMS INPUT" FOR PROGRAMS "TCILOOP" AND "TCOLOOP" 00004270
C*****00004280

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C
COMMON/NAME_LIST/V1,V2,V3,V4,V5,V6,V7,V8,V9,V10,
* V11,V12,V13,V14,V15,V16,V17,V18
INTEGER V1,V7,V10,V13,V15,V16,V17,V18
DIMENSION V1(1),V2(10),V3(9),V4(1),
* V5(1),V6(1),V7(1),V8(1),V9(1),V10(1),
* V11(1),V12(1),V13(1),V14(1),V15(1),
* V16(1),V17(1),V18(1),V19(1),V20(1),
* V21(1),V22(1),V23(1),V24(1),V25(1),
* V26(1),V27(1),V28(1),V29(1),V30(1),
* V31(1),V32(1),V33(1),V34(1),V35(1),
* V36(1),V37(1),V38(1),V39(1),V40(1),
* V41(1),V42(1),V43(1),V44(1),V45(1),
* V46(1),V47(1),V48(1),V49(1),V50(1),
* V51(1),V52(1),V53(1),V54(1),V55(1),
* V56(1),V57(1),V58(1),V59(1),V60(1)
DIMENSION NAMDIM(60),NAMLEN(60),NAMTYP(60)
CHARACTER*6 NAM(60)
DATA NAM/'M','SIG','H','A','Z','EPS','ISTEP',
1 'BO','BM','NB','TO','TM','NT','XNORM','IOUT',
2 'IOUTS','IPCH','ISTOP',42*'/
DATA NAMDIM/1,10,9,15*1,42*0/
DATA NAMLEN/1,3,3*1,3,5,6*2,5,4,5,4,5,42*0/
DATA NAMTYP/0,5*1,0,2*1,0,2*1,0,1,4*0,42*0/
DATA NO_NAM/18/
C----- END OF INCLUDE STATEMENTS -----
C
C--
C-- FOR EXAMPLE, FILE 'INCLNAMES.FOR' MAY CONTAIN (WITHOUT "C--"):
C--
C-- COMMON/NAME_LIST/V1,V2,V3,V4
C-- REAL*8 V1
C-- INTEGER V3
C-- DIMENSION V1(1),V2(2),V3(3),V4(4),
C-- * V5(1),V6(1),V7(1),V8(1),V9(1),V10(1),
C-- * V11(1),V12(1),V13(1),V14(1),V15(1),
C-- * V16(1),V17(1),V18(1),V19(1),V20(1),
C-- * V21(1),V22(1),V23(1),V24(1),V25(1),
C-- * V26(1),V27(1),V28(1),V29(1),V30(1),
C-- * V31(1),V32(1),V33(1),V34(1),V35(1),
C-- * V36(1),V37(1),V38(1),V39(1),V40(1),
C-- * V41(1),V42(1),V43(1),V44(1),V45(1),
C-- * V46(1),V47(1),V48(1),V49(1),V50(1),
C-- * V51(1),V52(1),V53(1),V54(1),V55(1),
C-- * V56(1),V57(1),V58(1),V59(1),V60(1)
C-- DIMENSION NAMDIM(60),NAMLEN(60),NAMTYP(60)
C-- CHARACTER*6 NAM(60)
C-- DATA NAM/'A','BB','ICC','DDD',4*56*'/
C-- DATA NAMDIM/1,2,3,4,56*0/
C-- DATA NAMLEN/1,2,3,5,56*0/
C-- DATA NAMTYP/2*1,0,1,56*0/
C-- DATA NO_NAM/4/
C----- END OF EXAMPLE INCLUDE STATEMENTS -----
C
C*****
C NOTE: THE ABOVE EXAMPLE SIMULATES
C 'NAMELIST/NAME/A,BB,ICC,DDD_4'

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C      'READ(IUNIT,NAME,END=EOF)'          00004850
C      'READ(IUNIT,ANYNAM,END=EOF)'        00004860
C      IN THE CALLING PROGRAM USING:      00004870
C      ...                                00004880
C      REAL*8 A                            00004890
C      ...                                00004900
C      COMMON/NAME_LIST/A,BB(2),ICC(3),DDD_4(4) 00004910
C      ...                                00004920
C      CALL NAMELIST(IUNIT,'$NAME',*EOF)    00004930
C      ...                                00004940
C      CALL NAMELIST(IUNIT,'$ANYNAM',*EOF)  00004950
C      ...                                00004960
C      ...                                00004970
C*****00004980
C      DATA C/'A','B','C','D','E','F','G','H','I','J','K','L','M','N', 00004990
*      'O','P','Q','R','S','T','U','V','W','X','Y','Z','_', 00005000
*      '1','2','3','4','5','6','7','8','9','0', 00005010
*      ' ','$','-','(','*',')','+','-' / 00005020
J=LEN(NAME) 00005030
IF(J.LT.2.OR.J.GT.7) THEN 00005040
  CALL ERRMSG('CALL NAMELIST ILLEGAL WITH NAME= '// 00005050
1 NAME//' (LENGTH<2 OR >7 CHAR'S)',1,6,0) 00005060
ENDIF 00005070
IF(NAME(1:1).NE.'$') 00005080
1 CALL ERRMSG('CALL NAMELIST ILLEGAL WITH NAME= '// 00005090
2 NAME//' (1ST CHAR MUST BE "$" CHAR)',1,6,0) 00005100
C--INITIALIZE 00005110
  INAME=0 00005120
10 READ(IUNIT,11,END=99991,ERR=99992) BUF 00005130
11 FORMAT(A80) 00005140
  IF(INAME.EQ.1) GO TO 20 00005150
C--LOOK FOR "$NAME" 00005160
  I=INDEX(BUF,NAME) 00005170
  IF(I.EQ.0) GO TO 10 00005180
  INAME=1 00005190
  ICOL=I+J 00005200
  JNAM=0 00005210
  ILEN=0 00005220
  VARNAM= 00005230
  NUMLEN=0 00005240
  IELE=1 00005250
  GO TO 30 00005260
20 ICOL=1 00005270
30 CALL NONBLANK(BUF,LENBUF) 00005280
C--BEGIN PARSER LOOP (THE BIG 20000 LOOP) 00005290
  IEND=0 00005300
  DO 20000 I=ICOL,LENBUF 00005310
    BUFI=BUF(I:I) 00005320
    DO 40 IC=1,27 00005330
      IF(BUFI.EQ.C(IC)) GO TO 100 00005340
40 CONTINUE 00005350
    DO 50 IC=28,37 00005360
      IF(BUFI.EQ.C(IC)) GO TO 200 00005370
50 CONTINUE 00005380
    DO 60 IC=38,47 00005390
      IC=IC-37 00005400
      IF(BUFI.EQ.C(IC)) GO TO 70 00005410

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60	CONTINUE	00005422
61	WRITE(6,66) I,BUF	00005430
66	FORMAT(/' {NAMESLIST}: ERROR IN FOLLOWING RECORD AT COL(' ,I2,'):/	00005440
	1 IX,A80/(IX,X,'~')	00005450
	CALL ERRMSG('ILLEGAL CHAR=""/BUFI/"' FOUND',0,6,0)	00005460
67	WRITE(6,66) I,BUF	00005470
	CALL ERRMSG('NUMLEN<1 IN DECODEIX',0,6,0)	00005480
68	WRITE(6,66) I,BUF	00005490
	CALL ERRMSG('NUMLEN<1 IN DECODEX',0,6,0)	00005500
70	GO TO (20000,72,73,74,75,76,77,78,79,79),IC_	00005510
C--'\$' CHAR		00005520
72	IEND=1	00005530
	IF(NUMLEN.GT.0) GO TO 798	00005540
	IF(JNAM.EQ.0) GO TO 99990	00005550
	WRITE(6,66) I,BUF	00005560
	CALL ERRMSG('MISPLACED "\$" CHAR',0,6,0)	00005570
C--'-' CHAR		00005580
73	IEQ=1	00005590
C--CHECK FOR VALID VARNAM, LENGTH ILEN, ETC.		00005600
	IF(ILEN.LT.1) GO TO 733	00005610
	DO 732 J=1,NO_NAM	00005620
	JNAM=J	00005630
	JLEN=NAMLEN(J)	00005640
	IF(JLEN.NE.ILEN) GO TO 732	00005650
	DO 731 K=1,JLEN	00005660
	IF(VARNAM(K:K).NE.NAM(JNAM)(K:K)) GO TO 732	00005670
731	CONTINUE	00005680
C--VARNAM VERIFIED OK TO PROCEED TO NUMFLD(S)		00005690
C		00005700
	IDIM=NAMDIM(JNAM)	00005710
	NUMLEN=0	00005720
	NDEC=0	00005730
	NREP=1	00005740
	NEXP=0	00005750
	GO TO 20000	00005760
732	CONTINUE	00005770
	WRITE(6,66) I,BUF	00005780
	CALL ERRMSG('ILLEGAL VARNAM="//VARNAM/"' FOUND',0,6,0)	00005790
733	WRITE(6,66) I,BUF	00005800
	CALL ERRMSG('MISPLACED "=" CHAR',0,6,0)	00005810
C--',' CHAR		00005820
74	IF(NUMLEN.GT.0) GO TO 799	00005830
	WRITE(6,66) I,BUF	00005840
	CALL ERRMSG('MISPLACED "," CHAR',0,6,0)	00005850
C--'(' CHAR		00005860
75	IELE=0	00005870
	GO TO 20000	00005880
C--'*' CHAR		00005890
76	IF(JNAM.EQ.0.OR.NUMLEN.LT.1.OR.NUMLEN.GT.5) GO TO 767	00005900
760	CALL DECODEIX(NUMFLD,NUMLEN,NREP,*67)	00005910
	NUMLEN=0	00005920
	IF(NREP.GT.0.AND.NREP.LE.NAMDIM(JNAM)) GO TO 20000	00005930
	WRITE(6,66) I,BUF	00005940
	CALL ERRMSG('REPEAT FACTOR <1 OR >NAMDIM',0,6,0)	00005950
767	WRITE(6,66) I,BUF	00005960
	CALL ERRMSG('REPEAT WIDTH > 5 OR MISPLACED "*" CHAR',0,6,0)	00005970
C--')' CHAR		00005980

77	IF(IELE.NE.0) GO TO 772	00005990
	CALL DECODEIX(NUMFLD,NUMLEN,IELE,*67)	00006000
	IF(IELE.LT.1) GO TO 773	00006010
	NREP=1	00006020
	GO TO 20000	00006030
772	WRITE(6,66) I,BUF	00006040
	CALL ERRMSG('MISPLACED ")" CHAR',0,6,0)	00006050
773	WRITE(6,66) I,BUF	00006060
	CALL ERRMSG('ARRAY IELE<1 OR >NAMDIM ',0,6,0)	00006070
C--'	CHAR	00006080
78	IF(JNAM.EQ.0.OR.NEXP.GT.0.OR.NDEC.GT.0) GO TO 781	00006090
	NDEC=NUMLEN+1	00006100
	IF(NAMTYP(JNAM).EQ.1) GO TO 200	00006110
781	WRITE(6,66) I,BUF	00006120
	CALL ERRMSG('MISPLACED "." CHAR',0,6,0)	00006130
C--'-	OR '+' CHAR	00006140
79	IF(IELE.GT.0.OR.NEXP.GT.0) GO TO 210	00006150
	WRITE(6,66) I,BUF	00006160
	CALL ERRMSG('MISPLACED "-" OR "+" CHAR',0,6,0)	00006170
C--<ALP>	CHAR	00006180
100	IF(NUMLEN.GT.0) GO TO 209	00006190
	IF(ILEN.GT.0) GO TO 102	00006200
	IEQ=0	00006210
	IELE=1	00006220
102	ILEN=ILEN+1	00006230
	IF(ILEN.GT.6) GO TO 101	00006240
	VARNAM(ILEN:ILEN)=BUFI	00006250
	GO TO 20000	00006260
101	WRITE(6,66) I,BUF	00006270
	CALL ERRMSG('VARNAM>6 CHAR''S',0,6,0)	00006280
C--<+NUM>	CHAR	00006290
200	IF(IELE.EQ.0) GO TO 210	00006300
	IF(IEQ.EQ.0) GO TO 102	00006310
	GO TO 210	00006320
209	IF(BUFI.EQ.'E'.OR.BUFI.EQ.'D') THEN	00006330
	NEXP=NUMLEN+1	00006340
	ELSE	00006350
	GO TO 61	00006360
	ENDIF	00006370
210	NUMLEN=NUMLEN+1	00006380
	IF(NUMLEN.GT.20) GO TO 211	00006390
	NUMFLD(NUMLEN:NUMLEN)=BUFI	00006400
	GO TO 20000	00006410
211	WRITE(6,66) I,BUF	00006420
	CALL ERRMSG('NUM FIELD>20 CHAR''S',0,6,0)	00006430
C--PROCESS	NUMBER FIELD	00006440
799	IDIM=IDIM-1	00006450
	IF(IDIM.LT.0) GO TO 10004	00006460
798	IF(NEXP.GT.0) GO TO 1000	00006470
C--[NEXP=0]		00006480
	IF(NDEC.GT.0) GO TO 899	00006490
C--[NEXP=0, NDEC=0]		00006500
	CALL DECODEIX(NUMFLD,NUMLEN,IX,*67)	00006510
C--CONVERT	IX AND STORE IN COMMON	00006520
800	X=IX	00006530
	IF(IELE.GT.NAMDIM(JNAM)) GO TO 773	00006540
8000	GO TO (801,802,803,804,805,806,807,808,809,810,	00006550

```
* 811,812,813,814,815,816,817,818,819,820,      00006560
* 821,822,823,824,825,826,827,828,829,830,      00006570
* 831,832,833,834,835,836,837,838,839,840,      00006580
* 841,842,843,844,845,846,847,848,849,850,      00006590
* 851,852,853,854,855,856,857,858,859,860),JNAM 00006600
801 V1(IELE)-X      00006610
GO TO 10000        00006620
802 V2(IELE)-X      00006630
GO TO 10000        00006640
803 V3(IELE)-X      00006650
GO TO 10000        00006660
804 V4(IELE)-X      00006670
GO TO 10000        00006680
805 V5(IELE)-X      00006690
GO TO 10000        00006700
806 V6(IELE)-X      00006710
GO TO 10000        00006720
807 V7(IELE)-X      00006730
GO TO 10000        00006740
808 V8(IELE)-X      00006750
GO TO 10000        00006760
809 V9(IELE)-X      00006770
GO TO 10000        00006780
810 V10(IELE)-X     00006790
GO TO 10000        00006800
811 V11(IELE)-X     00006810
GO TO 10000        00006820
812 V12(IELE)-X     00006830
GO TO 10000        00006840
813 V13(IELE)-X     00006850
GO TO 10000        00006860
814 V14(IELE)-X     00006870
GO TO 10000        00006880
815 V15(IELE)-X     00006890
GO TO 10000        00006900
816 V16(IELE)-X     00006910
GO TO 10000        00006920
817 V17(IELE)-X     00006930
GO TO 10000        00006940
818 V18(IELE)-X     00006950
GO TO 10000        00006960
819 V19(IELE)-X     00006970
GO TO 10000        00006980
820 V20(IELE)-X     00006990
GO TO 10000        00007000
821 V21(IELE)-X     00007010
GO TO 10000        00007020
822 V22(IELE)-X     00007030
GO TO 10000        00007040
823 V23(IELE)-X     00007050
GO TO 10000        00007060
824 V24(IELE)-X     00007070
GO TO 10000        00007080
825 V25(IELE)-X     00007090
GO TO 10000        00007100
826 V26(IELE)-X     00007110
GO TO 10000        00007120
```

827	V27(IELE)=X	00007130
	GO TO 10000	00007140
828	V28(IELE)=X	00007150
	GO TO 10000	00007160
829	V29(IELE)=X	00007170
	GO TO 10000	00007180
830	V30(IELE)=X	00007190
	GO TO 10000	00007200
831	V31(IELE)=X	00007210
	GO TO 10000	00007220
832	V32(IELE)=X	00007230
	GO TO 10000	00007240
833	V33(IELE)=X	00007250
	GO TO 10000	00007260
834	V34(IELE)=X	00007270
	GO TO 10000	00007280
835	V35(IELE)=X	00007290
	GO TO 10000	00007300
836	V36(IELE)=X	00007310
	GO TO 10000	00007320
837	V37(IELE)=X	00007330
	GO TO 10000	00007340
838	V38(IELE)=X	00007350
	GO TO 10000	00007360
839	V39(IELE)=X	00007370
	GO TO 10000	00007380
840	V40(IELE)=X	00007390
	GO TO 10000	00007400
841	V41(IELE)=X	00007410
	GO TO 10000	00007420
842	V42(IELE)=X	00007430
	GO TO 10000	00007440
843	V43(IELE)=X	00007450
	GO TO 10000	00007460
844	V44(IELE)=X	00007470
	GO TO 10000	00007480
845	V45(IELE)=X	00007490
	GO TO 10000	00007500
846	V46(IELE)=X	00007510
	GO TO 10000	00007520
847	V47(IELE)=X	00007530
	GO TO 10000	00007540
848	V48(IELE)=X	00007550
	GO TO 10000	00007560
849	V49(IELE)=X	00007570
	GO TO 10000	00007580
850	V50(IELE)=X	00007590
	GO TO 10000	00007600
851	V51(IELE)=X	00007610
	GO TO 10000	00007620
852	V52(IELE)=X	00007630
	GO TO 10000	00007640
853	V53(IELE)=X	00007650
	GO TO 10000	00007660
854	V54(IELE)=X	00007670
	GO TO 10000	00007680
855	V55(IELE)=X	00007690

	GO TO 10000	00007700
856	V56(IELE)=X	00007710
	GO TO 10000	00007720
857	V57(IELE)=X	00007730
	GO TO 10000	00007740
858	V58(IELE)=X	00007750
	GO TO 10000	00007760
859	V59(IELE)=X	00007770
	GO TO 10000	00007780
860	V60(IELE)=X	00007790
	GO TO 10000	00007800
	C--[NEXP=0, NDEC>0]	00007810
899	CALL DECODEX(NUMFLD,NUMLEN,NDEC,X,*68)	00007820
	C--CONVERT X AND STORE IN COMMON	00007830
900	IF(IELE.GT.NAMDIM(JNAM)) GO TO 773	00007840
	GO TO 8000	00007850
	C--[NEXP>0]	00007860
1000	IF(NDEC.GT.0) GO TO 2000	00007870
	C--[NEXP>0, NDEC=0]	00007880
	CALL DECODEIX(NUMFLD,NEXP-1,IX,*67)	00007890
	X=IX	00007900
1002	J=1	00007910
	DO 1001 K=NEXP+1,NUMLEN	00007920
	NUMFLD(J:J)=NUMFLD(K:K)	00007930
1001	J=J+1	00007940
	CALL DECODEIX(NUMFLD,NUMLEN-NEXP,IE,*67)	00007950
	X=X*10.**IE	00007960
	C** (LATER INSERT A CALL TO A OVERFLOW HANDLER, ETC.)	00007970
	GO TO 900	00007980
	C--[NEXP>0, NDEC>0]	00007990
2000	CALL DECODEX(NUMFLD,NEXP-1,NDEC,X,*68)	00008000
	GO TO 1002	00008010
	C--NEXT IELE?	00008020
10000	IELE=IELE+1	00008030
	IF(IELE.GT.NAMDIM(JNAM)) GO TO 10002	00008040
	IF(NREP.GT.1) GO TO 10003	00008050
10001	IF(IEND.EQ.1) GO TO 99990	00008060
	NUMLEN=0	00008070
	NDEC=0	00008080
	NEXP=0	00008090
	NREP=1	00008100
	ILEN=0	00008110
	VARNAM=' '	00008120
	GO TO 20000	00008130
10002	IELE=1	00008140
	GO TO 10001	00008150
10003	NREP=NREP-1	00008160
	IDIM-IDIM-1	00008170
	IF(IDIM.GE.0) GO TO 8000	00008180
10004	WRITE(6,66) 1,BUF	00008190
	CALL ERRMSG('TOO MANY ELEMENTS FOR GIVEN NAMDIM.',0,6,0)	00008200
	C--END OF DO 20000 CONTINUE PARSER -OR- READ IN NEXT BUF, ETC.	00008210
20000	CONTINUE	00008220
	GO TO 10	00008230
	C--'\$' CHAR (DELIMITER \$(END) FOR THIS \$NAME --\$)	00008240
99990	RETURN	00008250
	C--E.O.F. ON FILE IUNIT ENCOUNTERED.	00008260

```

99991 RETURN 1
99992 CALL ERRMSG('CANNOT OPEN/READ CALL NAMELIST(IFILE,...)',1,6,0)
      END
      SUBROUTINE CPUTIME(I1,I2)
C
C CPUTIME WRITES "ELAPSED & CPU" TIME FROM PREVIOUS "CALL SETTIME" ON
C FORTRAN UNITS I1 (IF NOT 0) AND I2 (IF NOT 0).
C
C WILL EJECT FIRST IF I1>0 (OR I2>0).
C DOUBLE SPACE FIRST IF I1<0 (OR I2<0).
C
C E.G., USE TO TIME ELAPSED & CPU TIME FOR PROGRAM OR CODE SEGMENTS AS:
C
C CALL SETTIME ! DON'T FORGET TO DO THIS!
C >>>> THE CODE TO TIME IS HERE <<<<< ! USUALLY A COMPLETE PROGRAM
C CALL CPUTIME(-6,16) ! OR USE I1 OR I2=0 TO OMIT WRITE.
C
      SAVE
      INTEGER*4 ABSVAL(4),INCRVAL(4)
      CALL PROCINFO(ABSVAL,INCRVAL)
      TIMES=SECNDS(TIME0)
      MIN=TIMES/60.0
      SEC=AMOD(TIMES,60.0)
      CPUSEC=INCRVAL(1)*.01
      IMIN=CPUSEC/60.0
      CSEC=AMOD(CPUSEC,60.0)
      PCPU=100.*(CPUSEC/TIMES)
      IF(I1.NE.0) THEN
        IF(I1.GT.0) THEN
          J=1
        ELSE
          J=0
        ENDIF
        WRITE(IABS(I1),60) J,TIMES,MIN,SEC,CPUSEC,IMIN,CSEC,PCPU,
        1 (INCRVAL(I),I=2,4)
        60 FORMAT(I1,65('S'))/ ' TOTAL "ELAPSED" TIME=',F16.2,' SEC. (' ,
        1 I4,' MIN.',F6.2,' SEC.)/
        2 ' CPU TIME=',F15.2,' SEC. (' ,I4,' M. ',F5.2,
        1 ' S.) CPU % =',F6.2,' %'/
        3 ' BUF.I/O COUNT=',I10/
        4 ' DIR.I/O COUNT=',I10/
        5 ' PAGE FAULTS=',2X,I10/
        6 ' ',65('S'))//
      ENDIF
      IF(I2.NE.0) THEN
        IF(I2.GT.0) THEN
          J=1
        ELSE
          J=0
        ENDIF
        WRITE(IABS(I2),60) J,TIMES,MIN,SEC,CPUSEC,IMIN,CSEC,PCPU,
        1 (INCRVAL(I),I=2,4)
      ENDIF
      RETURN
C** ENTRY 'CALL SETTIME'--MUST BE DONE BEFORE 'CALL CPUTIME(I1,I2)'
      ENTRY SETTIME()
      TIME0=SECNDS(0.0)

```

```

CALL PROCINFO(ABSVAL,INCRVAL)
RETURN
END
SUBROUTINE DECODEIX(NUMFLD,NUMLEN,IX,*)
C--USED IN CALL NAMELIST(IUNIT,'$NAME',*)
CHARACTER*9 FMT
CHARACTER*20 NUMFLD
IF(NUMLEN.LT.1) RETURN 1
IDIFF=20-NUMLN
IF(IDIFF.EQ.0) THEN
    ENCODE(9,991,FMT) NUMLEN
ELSE
    ENCODE(9,992,FMT) NUMLEN,IDIFF
ENDIF
991 FORMAT('I',I2,' ')
992 FORMAT('I',I2,' ',I2,'X')
DECODE(9,FMT,NUMFLD) IX
RETURN
END
SUBROUTINE DECODEX(NUMFLD,NUMLEN,NDEC,X,*)
C--USED IN CALL NAMELIST(IUNIT,'$NAME',*)
CHARACTER*12 FMT
CHARACTER*20 NUMFLD
IF(NUMLEN.LT.1) RETURN 1
LENDEC=NUMLEN-NDEC
IDIFF=20-NUMLN
IF(IDIFF.EQ.0) THEN
    ENCODE(12,991,FMT) NUMLEN,LENDEC
ELSE
    ENCODE(12,992,FMT) NUMLEN,LENDEC,IDIFF
ENDIF
991 FORMAT('F',I2,'.',I2,' ')
992 FORMAT('F',I2,'.',I2,'.',I2,'X')
DECODE(12,FMT,NUMFLD) X
RETURN
END
SUBROUTINE ERRMSG(MSG,ISKIP,IUNIT1,IUNIT2)
C
C GENERAL ERROR MESSAGE OUTPUT AND EXIT ON VAX-11/780
C
C MSG*(*) = VARIABLE-LENGTH 'MESSAGE'
C ISKIP = 0 FOR NO BLANK LINE BEFORE OUTPUT TO IUNIT1 & IUNIT2
C         > 0 FOR ONE BLANK LINE BEFORE.
C IUNIT1 = 0 TO SUPPRESS OUTPUT ON IUNIT1 (>0 TO WRITE ON IUNIT1).
C IUNIT2 = 0 TO SUPPRESS OUTPUT ON IUNIT2 (>0 TO WRITE ON IUNIT2).
C
C MESSAGES ARE WRITTEN IN THE FORM:
C
C {ERRMSG}: _MSG_HERE_
C
CHARACTER*(*) MSG
I=LEN(MSG)
DO 1 J=1,2
    IF(J.EQ.1) THEN
        JUNIT=IUNIT1
    ELSE
        JUNIT=IUNIT2

```

00008840
00008850
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00009370
00009380
00009390
00009400

```

      ENDIF
      IF(JUNIT.GT.0) THEN
        IF(ISKIP.EQ.0) THEN
          WRITE(JUNIT,2) MSG
        ELSE
          WRITE(JUNIT,3) MSG
        ENDIF
      ENDIF
      CONTINUE
      CALL EXIT
2    FORMAT(1X,'(ERRMSG): ',A<I>)
3    FORMAT(1X,'(ERRMSG): ',A<I>)
      END
      SUBROUTINE MINMAX(A,N,AMIN,AMAX)
      DIMENSION A(1)
      AMIN=A(1)
      AMAX=AMIN
      DO 1 I=2,N
        AMIN=AMIN1(AMIN,A(I))
        AMAX=AMAX1(AMAX,A(I))
1    CONTINUE
      RETURN
      END
      SUBROUTINE NONBLANK(C,NB)
C--DETERMINE NON-BLANK CHAR LENGTH (=NB ON EXIT) OF C*(*)
C  NOTE THAT NB WILL BE IN [0,LEN(C)].
C
      CHARACTER*(*) C
      L=LEN(C)
      DO 10 I=L,1,-1
        NB=I
        IF(C(I:I).NE.' ') RETURN
10    CONTINUE
      NB=0
      RETURN
      END
      SUBROUTINE PROCINFO(ABS_VALUES,INCR_VALUES)
C
C** SUBROUTINE TO OBTAIN ABSOLUTE AND INCREMENTAL VALUES OF PROCESS
C  PARAMETERS: CPU TIME, BUFFERED I/O COUNT, DIRECT I/O COUNT, AND
C  PAGE FAULTS.
C
      IMPLICIT INTEGER*2(W),INTEGER*4(L)
      PARAMETER (JPI$ CPUTIM = '00000407'X,
1    JPI$ BUFIO = '0000040C'X,JPI$ DIRIO = '0000040B'X,
2    JPI$ PAGEFLTS= '0000040A'X)
      INTEGER*4 ABS_VALUES(4),INCR_VALUES(4),LCL_VALUES(4)
      COMMON/ITEMLIST/
1    W_LEN1,W_CODE1,L_ADDR1,L_LENADDR1,
2    W_LEN2,W_CODE2,L_ADDR2,L_LENADDR2,
3    W_LEN3,W_CODE3,L_ADDR3,L_LENADDR3,
4    W_LEN4,W_CODE4,L_ADDR4,L_LENADDR4,
5    W_LEN5,W_CODES
      DATA W_LEN1,W_LEN2,W_LEN3,W_LEN4,W_LEN5/5*4/
      DATA W_CODE1/JPI$ CPUTIM/,
1    W_CODE2/JPI$ BUFIO/,
2    W_CODE3/JPI$ DIRIO/,

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3 W_CODE4/JPI$PAGEFLTS/,
4 W_CODE5/0/
DATA L_LENADDR1,L_LENADDR2,L_LENADDR3,L_LENADDR4/4*0/
L_ADDR1=ZLOC(LCL_VALUES(1))
L_ADDR2=ZLOC(LCL_VALUES(2))
L_ADDR3=ZLOC(LCL_VALUES(3))
L_ADDR4=ZLOC(LCL_VALUES(4))
C** PERFORM THE SYSTEM SERVICE CALL
CALL SYSSGETJPI(,,W_LEN1,,)
C** ASSIGN THE NEW VALUES TO THE ARGUMENTS
DO I=1,4
    INCR VALUES(I)=LCL_VALUES(I)-ABS_VALUES(I)
    ABS_VALUES(I)=LCL_VALUES(I)
END DO
RETURN
END
REAL FUNCTION RFLAGS(N,FUN,TOL,TO,TM,T,NEW)
C--FOURIER TRANSFORM LAG CONVOLUTION & SPLINE INTERPOLATION
C GIVES FOURIER COSINE OR SINE TRANSFORMS VIA RLAGF0,RLAGF1
C REF: ANDERSON,1975,NTIS REPT. PB-242-800,P.76-87.
C
C N = 0 FOR COSINE TRANSFORM (VIA RLAGF0)
C N = 1 FOR SINE TRANSFORM (VIA RLAGF1)
C FUN = EXTERNAL REAL KERNEL FUNCTION.
C TOL = TOLERANCE REQUESTED FOR RLAGF0 OR RLAGF1
C TO = TMIN TO USE (E.G., LET TO=.5*TMIN, TMIN=TRUE)
C TM = TMAX TO USE (TM>TO)
C T = TRANSFORM PARAMETER (TO<T<TM) FOR THIS CALL (NEW=1 OR 0)
C NEW = 1 REQUIRED FOR 1ST CALL OR TO RESET SPLINE COEFFICIENTS.
C NEW = 0 FOR ALL CALLS AFTER 1ST--USES SPLINE INTERPOLATION ONLY.
C
REAL ARG(200),Y(200),AR(200),BR(200),CR(200),
& D(2),W1(200),W2(200)
EXTERNAL FUN
DATA D/2*0.0/
IF(NEW.EQ.0) GO TO 3
NT=AIN(5.*ALOG(TM/TO))+5
IF(NT.GT.200)CALL ERRMSG('IN RFLAGS: NT>200 ',4,6,16)
NT1=NT+1
X0=ALOG(TO)+.2*NT
NU=1
DO 1 J=1,NT
    I=NT1-J
    X=X0-.2*J
    EX=EXP(X)
    ARG(I)=EX
    IF(N.EQ.0) Y(I)=RLAGF0(X,FUN,TOL,L,NU)/EX
    IF(N.NE.0) Y(I)=RLAGF1(X,FUN,TOL,L,NU)/EX
1
NU=0
CALL SPLINI(NT,0.0,ARG,Y,AR,BR,CR,0,D,W1,W2)
2
IF(NT.LT.0) CALL ERRMSG('IN RFLAGS: NT<0 AFTER SPLINI ',6,6,16)
3
IF(T.LT.TO) CALL ERRMSG('IN RFLAGS: T<TO',3,6,16)
IF(T.GT.TM) CALL ERRMSG('IN RFLAGS: T>TM',3,6,16)
CALL SPOINT(NT,ARG,Y,AR,BR,CR,T,X)
RFLAGS=X
RETURN
END

```

```

SUBROUTINE SPLINI(M,H,X,Y,A,B,C,IT,D,P,S)
C--ONE DIMENSIONAL CUBIC SPLINE COEFFICIENT DETERMINATION.
C
C      BY W.L.ANDERSON, U.S. GEOLOGICAL SURVEY, DENVER, COLORADO
C
C  PARS--- M= NUMBER OF DATA POINTS .GT. 2
C          H= EQUAL INTERVAL OPTION WHEN H.GT.0. (USE DUMMY X HERE),
C            UNEQUAL INTERVALS IF H=0. (X REQUIRED STORAGE)
C          X= INDEP.VAR WHEN H=0. (DIM .GE. M).
C          Y= DEPENDENT VARIABLE (DIM .GE. M).
C          A,B,C=COEFF.ARRAYS (EACH DIM .GE. M)
C            RESULTS ARE RETURNED IN 1ST(M-1) ELEMENTS OF A,B,&C.
C            ALSO USED AS WORK ARRAYS DURING EXECUTION.
C          IT= TYPE OF BOUNDARY CONDITION SUPPLIED IN D ARRAY. USE
C            IT=1 IF 1ST DERIVATIVES GIVEN AT END POINTS, OR
C            IT=0 IF 2ND DERIVATIVES GIVEN AT END POINTS.
C          D= BOUNDARY ARRAY (DIM 2) AT POINT 1 AND M RESPECTIVELY.
C          P,S= WORK ARRAYS (EACH DIM=M).
C--ERROR RETURN WITH M=-(ABS(M)) IF ANY PARM OUT OF RANGE.
C  THE RESULTING CUBIC SPLINE IS OF THE FORM:
C      Y=Y(I)+A(I)*(X-X(I))+B(I)*(X-X(I))**2+C(I)*(X-X(I))**3
C      FOR I=1,2,...,M-1
C
C      REAL*4  X(1),Y(1),A(1),B(1),C(1),D(2),P(1),S(1),MUL
C      IF(IT.LT.0.OR.IT.GT.1.OR.H.LT.0..OR.M.LT.3) GO TO 999
C      N=M-1
C      IF(IT.EQ.0) GO TO 20
C--1ST DERIVATIVE BOUNDARIES GIVEN
C      NE=N-1
C      IF(H) 999,11,1
C--EQUAL SPACING H .GT. 0. AND IT=1
C      1 HH=3.0/H
C      DO 2 I=1,NE
C        B(I)=4.0
C        C(I)=1.0
C        A(I)=1.0
C      2 P(I)=HH*(Y(I+2)-Y(I))
C        P(1)=P(1)-D(1)
C        P(NE)=P(NE)-D(2)
C--SOLUTION OF TRIDIAGONAL MATRIX EQ. OF ORDER NE
C      3 C(1)=C(1)/B(1)
C        P(1)=P(1)/B(1)
C      DO 4 I=2,NE
C        MUL=1.0/(B(I)-A(I)*C(I-1))
C        C(I)=MUL*C(I)
C      4 P(I)=MUL*(P(I)-A(I)*P(I-1))
C--OBTAIN SPLINE COEFFICIENTS
C      A(NE+IT)=P(NE)
C      I=NE-1
C      5 A(I+IT)=P(I)-C(I)*A(I+IT+1)
C        I=I-1
C        IF(I.GE.1) GO TO 5
C        IF(IT.EQ.0) GO TO 6
C        A(1)=D(1)
C        A(M)=D(2)
C      6 IF(H.EQ.0.) GO TO 14

```

```

      HH=1.0/H
      DO 7 I=1,N
      MUL=HH*(Y(I+1)-Y(I))
      B(I)=HH*(3.0*MUL-(A(I+1)+2.0*A(I)))
7     C(I)=HH*HH*(-2.0*MUL+A(I+1)+A(I))
      RETURN
C--UNEQUAL SPACING H=0.. AND IT=1
11 DO 12 I=1,N
12 S(I+1)=X(I+1)-X(I)
   DO 13 I=1,NE
   B(I)=2.0*(S(I+1)+S(I+2))
   C(I)=S(I+1)
   A(I)=S(I+2)
13 P(I)=3.0*(S(I+1)**2*(Y(I+2)-Y(I+1))+S(I+2)**2*(Y(I+1)-Y(I)))/
   $ (S(I+1)*S(I+2))
   P(1)=P(1)-S(3)*D(1)
   P(NE)=P(NE)-S(N)*D(2)
   GO TO 3
14 DO 15 I=1,N
   HH=1.0/S(I+1)
   MUL=(Y(I+1)-Y(I))*HH**2
   B(I)=3.0*MUL-(A(I+1)+2.0*A(I))*HH
15 C(I)=-2.0*MUL*HH+(A(I+1)+A(I))*HH**2
   RETURN
C--2ND DERIVATIVE BOUNDARIES GIVEN
20 NE=N+1
   IF(H) 999,31,21
C--EQUAL SPACING H .GT. 0 AND IT=0
21 HH=3.0/H
   DO 22 I=2,N
   B(I)=4.0
   C(I)=1.0
   A(I)=1.0
22 P(I)=HH*(Y(I+1)-Y(I-1))
   B(1)=2.0
   B(NE)=2.0
   C(1)=1.0
   C(NE)=1.0
   A(NE)=1.0
   P(1)=HH*(Y(2)-Y(1))-0.5*H*D(1)
   P(NE)=HH*(Y(M)-Y(N))+0.5*H*D(2)
   GO TO 3
C--UNEQUAL SPACING H=0 AND IT=0
31 DO 32 I=1,N
32 S(I+1)=X(I+1)-X(I)
   N1=N-1
   DO 33 I=1,N1
   B(I+1)=2.0*(S(I+1)+S(I+2))
   C(I+1)=S(I+1)
   A(I+1)=S(I+2)
33 P(I+1)=3.0*(S(I+1)**2*(Y(I+2)-Y(I+1))+S(I+2)**2*(Y(I+1)-Y(I)))/
   * (S(I+1)*S(I+2))
   B(1)=2.0
   B(NE)=2.0
   C(1)=1.0
   C(NE)=1.0
   A(NE)=1.0

```

00011120
 00011130
 00011140
 00011150
 00011160
 00011170
 00011180
 00011190
 00011200
 00011210
 00011220
 00011230
 00011240
 00011250
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 00011290
 00011300
 00011310
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 00011390
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 00011500
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 00011600
 00011610
 00011620
 00011630
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 00011650
 00011660
 00011670
 00011680

```

P(1)=3.0*(Y(2)-Y(1))/S(2)-0.5*S(2)*D(1)
P(NE)=3.0*(Y(M)-Y(N))/S(M)+0.5*S(M)*D(2)
GO TO 3
999 M=-IABS(M)
RETURN
END
SUBROUTINE SPOINT(M,X,Y,A,B,C,XX,YY)
C--GIVEN CUBIC SPLINE COEFF'S A,B,C,AND M OBS.DATA ARRAYS X,Y
C SPOINT EVALUATES THE PIECEWISE CUBIC SPLINE ORDINATE YY AT THE
C ABSCISSA XX, WHERE XX IS IN THE CLOSED INTERVAL (X(1),X(M)).
C NOTE: IF COMPUTING OVER EQUAL INTERVALS, USE THE SUBR 'CUBIC'
C WHICH REQUIRES ONLY ONE CALL.
C
  DIMENSION X(1),Y(1),A(1),B(1),C(1)
  IF(XX.LT.X(1).OR.XX.GT.X(M)) GO TO 9
  M1=M-1
  DO 1 I=1,M1
    J=I
    IF(XX.LE.X(I+1)) GO TO 2
  1 CONTINUE
  9 WRITE(6,60) XX,X(1),X(M)
  60 FORMAT('OERROR IN SPOINT CALL--XX=',E16.8,' NOT IN CLOSED INTERVAL
  * ('E16.8',' ',E16.8,')')
  RETURN
  2 Z=XX-X(J)
  YY=Y(J)+((C(J)*Z+B(J))*Z+A(J))*Z
  RETURN
END
REAL*4 FUNCTION SQJ1(B,FUN,TOL,NF)
C-----
C** THIS IS A REAL*4 VERSION WRITTEN FOR THE VAX-11/780 BY
C W.L.ANDERSON, U.S.GEOLOGICAL SURVEY, DENVER, COLORADO, USA.
C-----
C SUBPROGRAM SQJ1 WILL COMPUTE THE FOLLOWING INFINITE INTEGRAL:
C THE REAL*4 HANKEL TRANSFORM-SQUARE OF ORDER-1 FOR BOUNDED CONTINUOUS
C KERNEL FUNCTIONS AND A FIXED TRANSFORM ARGUMENT B.GT.0. THE
C METHOD IS SIMILAR TO THE NEW-1 CASE FOR SINGLE-POWER J0,J1-FILTERS
C DESIGNED AND PUBLISHED IN THE FOLLOWING REFERENCE:
C
C--REF: ANDERSON, W.L., 1979, GEOPHYSICS, VOL. 44, NO. 7, P. 1287-1305.
C
C--SPECIFICALLY, SQJ1 EVALUATES THE INTEGRAL FROM 0 TO INFINITY OF
C FUN(G)*[J1(G*B)]**2 *DG, DEFINED AS THE J1**2 HANKEL TRANSFORM OF
C ORDER N=1 AND TRANSFORM ARGUMENT B.GT.0. THE METHOD IS BY
C ADAPTIVE DIGITAL FILTERING OF THE REAL*4 KERNEL FUNCTION FUN (SEE
C THE ABOVE REFERENCE FOR ADDITIONAL INFORMATION).
C
C--PARAMETERS (ALL INPUT, EXCEPT NF)
C
C B = REAL*4 TRANSFORM ARGUMENT B>0.0 OF THE HANKEL TRANSFORM.
C FUN(G)= EXTERNAL DECLARED REAL*4 FUNCTION NAME (USER SUPPLIED)
C OF A REAL*4 ARGUMENT G>0. THIS REFERENCE MUST BE SUPPLIED.
C IF PARAMETERS OTHER THAN G ARE REQUIRED IN FUN, USE COMMON
C IN THE CALLING PROGRAM AND IN SUBPROGRAM FUN. FUN(G)
C MUST BE A CONTINUOUS BOUNDED FUNCTION FOR G.GT.0.
C THE VALUE OF G IN FUN(G) MUST NOT BE CHANGED BY THE USER.
C (G>0.0 WILL BE ASSIGNED AN ABSCISSA VALUE BY SQJ1.)

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*WT(387)/-9.302363879800099E-20/,WT(388)/ 6.6318383372175E-20/ 00014770
*WT(389)/-4.727968171282729E-20/,WT(390)/ 3.370661607632613E-20/ 00014780
*WT(391)/-2.403011031359726E-20/,WT(392)/ 1.713153881218087E-20/ 00014790
*WT(393)/-1.221341134602363E-20/,WT(394)/ 8.707181429542280E-21/ 00014800
*WT(395)/-6.207521077792512E-21/,WT(396)/ 4.425463988842000E-21/ 00014810
*WT(397)/-3.155000395835719E-21/,WT(398)/ 2.249261879409999E-21/ 00014820
*WT(399)/-1.603543051538933E-21/,WT(400)/ 1.143197379660855E-21/ 00014830
*WT(401)/-8.150078813546612E-22/,WT(402)/ 5.810351225960625E-22/ 00014840
*WT(403)/-4.142313344616877E-22/,WT(404)/ 2.953136303480927E-22/ 00014850
*WT(405)/-2.105348607743343E-22/,WT(406)/ 1.500944118463614E-22/ 00014860
*WT(407)/-1.070052322309586E-22/,WT(408)/ 7.628611471159240E-23/ 00014870
*WT(409)/-5.438585792837369E-23/,WT(410)/ 3.877274007553577E-23/ 00014880
*WT(411)/-2.764184653478325E-23/,WT(412)/ 1.970641801894714E-23/ 00014890
*WT(413)/-1.404909843147521E-23/,WT(414)/ 1.001588663330109E-23/ 00014900
*WT(415)/-7.140532395899525E-24/,WT(416)/ 5.090636832712442E-24/ 00014910
*WT(417)/-3.629226189021914E-24/,WT(418)/ 2.587357217905591E-24/ 00014920
DATA
*WT(419)/-1.844586958423583E-24/,WT(420)/ 1.315049505312082E-24/ 00014930
*WT(421)/-9.375296774269097E-25/,WT(422)/ 6.683863590894837E-25/ 00014940
*WT(423)/-4.765072157206098E-25/,WT(424)/ 3.397118112049352E-25/ 00014950
*WT(425)/-2.421872841072187E-25/,WT(426)/ 1.726603263516931E-25/ 00014960
*WT(427)/-1.230938988644950E-25/,WT(428)/ 8.775817915630044E-26/ 00014970
*WT(429)/-6.256819583036690E-26/,WT(430)/ 4.461171435353558E-26/ 00014980
*WT(431)/-3.181251616647866E-26/,WT(432)/ 2.269032642804270E-26/ 00014990
*WT(433)/-1.618955905684386E-26/,WT(434)/ 1.155727651063629E-26/ 00015000
*WT(435)/-8.256240401524400E-27/,WT(436)/ 5.903135682837950E-27/ 00015010
*WT(437)/-4.224588415734394E-27/,WT(438)/ 3.025918616503642E-27/ 00015020
*WT(439)/-2.16862775353370E-27/,WT(440)/ 1.554288235465150E-27/ 00015030
*WT(441)/-4.937813102320317E-28/ 00015040
C 00015050
C FOLLOWING CODE FOR STARTING WEIGHT=214 FROM TOTAL WTS=441. 00015060
C 00015070
C 00015080
C 00015090
C 00015100

```

NONE=0	00015110
C-----INITIALIZE KERNEL ABSCISSA GENERATION FOR GIVEN B	00015120
Y1=0.131425823982233791D1/DBLE(B)	00015130
100 SQJ1=0.0E0	00015140
CMAX=0.0E0	00015150
NF=0	00015160
Y=Y1	00015170
C-----BEGIN RIGHT-SIDE CONVOLUTION AT WEIGHT 214	00015180
ASSIGN 110 TO M	00015190
I=214	00015200
Y=Y*E	00015210
GO TO 200	00015220
110 TMAX=AMAX1(ABS(T),TMAX)	00015230
I=I+1	00015240
Y=Y*E	00015250
IF(I.LE.250) GO TO 200	00015260
IF(TMAX.EQ.0.0E0) NONE=1	00015270
C-----ESTABLISH TRUNCATION CRITERION (CMAX-TMAX)	00015280
CMAX=TOL*CMAX	00015290
ASSIGN 120 TO M	00015300
GO TO 200	00015310
C-----CHECK FOR FILTER TRUNCATION AT RIGHT END	00015320
120 IF(ABS(T).LE.TMAX) GO TO 130	00015330
I=I+1	00015340
Y=Y*E	00015350
IF(I.LE.441) GO TO 200	00015360
130 Y=Y1	00015370
C-----CONTINUE WITH LEFT-SIDE CONVOLUTION AT WEIGHT 213	00015380
ASSIGN 140 TO M	00015390
I=213	00015400
GO TO 200	00015410
C-----CHECK FOR FILTER TRUNCATION AT LEFT END	00015420
140 IF(ABS(T).LE.TMAX.AND.	00015430
* NONE.EQ.0) GO TO 190	00015440
I=I-1	00015450
Y=Y*E	00015460
IF(I.GT.0) GO TO 200	00015470
C-----NORMALIZE BY B TO ACCOUNT FOR INTEGRATION RANGE CHANGE	00015480
190 SQJ1=SQJ1/B	00015490
RETURN	00015500
200 C=FUN(SNGL(Y))*WT(I)	00015510
NF=NF+1	00015520
SQJ1=SQJ1+C	00015530
GO TO M,(110,120,140)	00015540
END	00015550
SUBROUTINE WARN(MSG,ISKIP,IUNIT1,IUNIT2,*)	00015560
C	00015570
C GENERAL WARNING MESSAGE OUTPUT AND RETURN 1 ON VAX-11/780	00015580
C	00015590
C MSG*(*) = VARIABLE-LENGTH 'MESSAGE'	00015600
C ISKIP = 0 FOR NO BLANK LINE BEFORE OUTPUT TO IUNIT1 & IUNIT2	00015610
C > 0 FOR ONE BLANK LINE BEFORE.	00015620
C IUNIT1 = 0 TO SUPPRESS OUTPUT ON IUNIT1 (>0 TO WRITE ON IUNIT1).	00015630
C IUNIT2 = 0 TO SUPPRESS OUTPUT ON IUNIT2 (>0 TO WRITE ON IUNIT2).	00015640
C	00015650
C MESSAGES ARE WRITTEN IN THE FORM:	00015660
C	00015670

```

C {WARN}: _MSG_HERE_                                00015680
C                                                     00015690
C CHARACTER*(*) MSG                                00015700
C I=LEN(MSG)                                        00015710
C DO 1 J=1,2                                       00015720
C   IF(J.EQ.1) THEN                                00015730
C     JUNIT=IUNIT1                                  00015740
C   ELSE                                           00015750
C     JUNIT=IUNIT2                                  00015760
C   ENDIF                                          00015770
C   IF(JUNIT.GT.0) THEN                             00015780
C     IF(ISKIP.EQ.0) THEN                           00015790
C       WRITE(JUNIT,2) MSG                         00015800
C     ELSE                                          00015810
C       WRITE(JUNIT,3) MSG                         00015820
C     ENDIF                                          00015830
C   ENDIF                                          00015840
1 CONTINUE                                         00015850
RETURN 1                                           00015860
2 FORMAT(1X,{WARN}: ',A<I>')                      00015870
3 FORMAT(/1X,{WARN}: ',A<I>')                     00015880
END                                                 00015890
REAL FUNCTION RLAGFO(X,FUN,TOL,L,NEW)              00015900
C--*** A SPECIAL LAGGED* CONVOLUTION METHOD TO COMPUTE THE 00015910
C INTEGRAL FROM 0 TO INFINITY OF 'FUN(G)*COS(G*B)*DG' DEFINED AS THE 00015920
C REAL FOURIER COSINE TRANSFORM WITH ARGUMENT X(-ALOG(B)) 00015930
C BY CONVOLUTION FILTERING WITH REAL FUNCTION 'FUN'--AND 00015940
C USING A VARIABLE CUT-OFF METHOD WITH EXTENDED FILTER TAILS.... 00015950
C                                                     00015960
C--REF: ANDERSON, W.L., 1975, NTIS REPT. PB-242-800. 00015970
C                                                     00015980
C--PARAMETERS:                                     00015990
C                                                     00016000
C * X      - REAL ARGUMENT(-ALOG(B) AT CALL) OF THE FOURIER TRANSFORM 00016010
C 'RLAGFO' IS USEFUL ONLY WHEN X=(LAST X)-.20 *** I.E., 00016020
C SPACED SAME AS FILTER USED--IF THIS IS NOT CONVENIENT, 00016030
C THEN SUBPROGRAM 'RFOURO' IS ADVISED FOR GENERAL USE. 00016040
C (ALSO SEE PARM 'NEW' & NOTES (2)-(4) BELOW). 00016050
C FUN(G)- EXTERNAL DECLARED REAL FUNCTION NAME (USER SUPPLIED). 00016060
C NOTE: IF PARMS OTHER THAN G ARE REQUIRED, USE COMMON IN 00016070
C CALLING PROGRAM AND IN SUBPROGRAM FUN. 00016080
C THE REAL FUNCTION FUN SHOULD BE A MONOTONE 00016090
C DECREASING FUNCTION AS THE ARGUMENT G BECOMES LARGE... 00016100
C TOL- REAL TOLERANCE EXCEPTED AT CONVOLVED TAILS--I.E., 00016110
C IF FILTER*FUN<TOL*MAX, THEN REST OF TAIL IS TRUNCATED. 00016120
C THIS IS DONE AT BOTH ENDS OF FILTER. TYPICALLY, 00016130
C TOL <= .0001 IS USUALLY OK--BUT THIS DEPENDS ON 00016140
C THE FUNCTION FUN AND PARAMETER X...IN GENERAL, 00016150
C A 'SMALLER TOL' WILL USUALLY RESULT IN 'MORE ACCURACY' 00016160
C BUT WITH 'MORE WEIGHTS' BEING USED. TOL IS NOT DIRECTLY 00016170
C RELATED TO TRUNCATION ERROR, BUT GENERALLY SERVES AS AN 00016180
C APPROXIMATION INDICATOR... FOR VERY LARGE OR SMALL B, 00016190
C ONE SHOULD USE A SMALLER TOL THAN RECOMMENDED ABOVE... 00016200
C L- RESULTING NO. FILTER WTS. USED IN THE VARIABLE 00016210
C CONVOLUTION (L DEPENDS ON TOL AND FUN). 00016220
C MIN.L=24 AND MAX.L=281--WHICH COULD 00016230
C OCCUR IF TOL IS VERY SMALL AND/OR FUN NOT DECREASING 00016240

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C          VERY FAST...
C          1 IS NECESSARY 1ST TIME OR BRAND NEW X.
C          0 FOR ALL SUBSEQUENT CALLS WHERE X=(LAST X)-0.20
C          IS ASSUMED INTERNALLY BY THIS ROUTINE.
C          NOTE: IF THIS IS NOT TRUE, ROUTINE WILL
C          STILL ASSUME X=(LAST X)-0.20 ANYWAY...
C          IT IS THE USERS RESPONSIBILITY TO NORMALIZE
C          BY CORRECT B=EXP(X) OUTSIDE OF CALL (SEE USAGE BELOW).
C          THE LAGGED CONVOLUTION METHOD PICKS UP SIGNIFICANT
C          TIME IMPROVEMENTS WHEN THE KERNEL IS NOT A
C          SIMPLE ELEMENTARY FUNCTION...DUE TO INTERNALLY SAVING
C          ALL KERNEL FUNCTION EVALUATIONS WHEN NEW=1...
C          THEN WHEN NEW=0, ALL PREVIOUSLY CALCULATED
C          KERNELS WILL BE USED IN THE LAGGED CONVOLUTION
C          WHERE POSSIBLE, ONLY ADDING NEW KERNEL EVALUATIONS
C          WHEN NEEDED (DEPENDS ON PARMS TOL AND FUN)
C
C--THE RESULTING REAL CONVOLUTION SUM IS GIVEN IN RLAGFO; THE FOURIER
C TRANSFORM IS THEN RLAGFO/B WHICH IS TO BE COMPUTED AFTER EXIT FROM
C THIS ROUTINE.... WHERE B=EXP(X), X=ARGUMENT USED IN CALL...
C
C--USAGE-- 'RLAGFO' IS CALLED AS FOLLOWS:
C
C      ...
C      EXTERNAL RF
C      ...
C      R=RLAGFO(ALOG(B),RF,TOL,L,NEW)/B
C      ...
C      END
C      REAL FUNCTION RF(G)
C      ...USER SUPPLIED CODE...
C      END
C
C--NOTES:
C      (1). EXP-UNDERFLOW'S MAY OCCUR IN EXECUTING THE SUBPROGRAM
C      BELOW; HOWEVER, THIS IS OK PROVIDED THE MACHINE SYSTEM SETS
C      ANY & ALL EXP-UNDERFLOW'S TO 0.0....
C      (2). AS AN AID TO UNDERSTANDING & USING THE LAGGED CONVOLUTION
C      METHOD, LET BMAX>BMIN>0 BE GIVEN. THEN IT CAN BE SHOWN
C      THAT THE ACTUAL NUMBER OF B'S IS NB=AIN(5.*ALOG(BMAX/BMIN))+1,
C      PROVIDED BMAX/BMIN>=1. THE USER MAY THEN ASSUME AN 'ADJUSTED'
C      BMINA=BMAX*EXP(-.2*(NB-1)). THE METHOD GENERATES THE DECREASING
C      ARGUMENTS SPACED AS X=ALOG(BMAX),X-.2,X-.2*2,...,ALOG(BMINA).
C      FOR EXAMPLE, ONE MAY CONTROL THIS WITH THE CODE:
C
C      ...
C      NB=AIN(5.*ALOG(BMAX/BMIN))+1
C      NB1=NB+1
C      X0=ALOG(BMAX)+.2
C      NEW=1
C      DO 1 J=1,NB
C      I=NB1-J
C      X=X0-.2*J
C      ARG(I)=EXP(X)
C      ANS(I)=RLAGFO(X,RF,TOL,L,NEW)/ARG(I)
C      1      NEW=0
C      ...
C      (3). IF RESULTS ARE STORED IN ARRAYS ARG(1),ANS(1),I=1,NB FOR
C      ARG IN (BMINA,BMAX), THEN THESE ARRAYS MAY BE USED, FOR EXAMPLE,

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C      TO SPLINE-INTERPOLATE AT A DIFFERENT (LARGER OR SMALLER)
C      SPACING THAN USED IN THE LAGGED CONVOLUTION METHOD.
C      (4). IF A DIFFERENT RANGE OF B IS DESIRED, THEN ONE MAY
C      ALWAYS RESTART THE ABOVE PROCEDURE IN (2) WITH A NEW
C      BMAX, BMIN AND BY SETTING NEW=1....
C      (5). ABSCISSA CORRESPONDING TO WEIGHT IS GENERATED TO SAVE STORAGE
C
C      DIMENSION KEY(281),SAVE(281)
C      DIMENSION YT(281),Y1(76),Y2(76),Y3(76),Y4(53)
C      EQUIVALENCE (YT(1),Y1(1)),(YT(77),Y2(1)),(YT(153),Y3(1)),
C      1 (YT(229),Y4(1))
C--COS-EXTENDED FILTER WEIGHT ARRAYS:
C      DATA Y1/
C      1 5.1178101E-14, 2.9433849E-14, 2.5492522E-14, 1.9034819E-14,
C      2 6.4179780E-14, 1.3085746E-15, 1.1989957E-13, -1.2216234E-14,
C      3 1.7534103E-13, 7.9373498E-15, 2.1235658E-13, 7.9981520E-14,
C      4 2.3815757E-13, 1.9714260E-13, 2.8920132E-13, 3.4161340E-13,
C      5 4.0349917E-13, 5.2203885E-13, 5.9837223E-13, 7.8015306E-13,
C      6 8.8911655E-13, 1.1709731E-12, 1.3165595E-12, 1.7578463E-12,
C      7 1.9538564E-12, 2.6289768E-12, 2.9167697E-12, 3.9044344E-12,
C      8 4.3927341E-12, 5.7526904E-12, 6.6569552E-12, 8.4555678E-12,
C      9 1.0063229E-11, 1.2487964E-11, 1.5134682E-11, 1.8501488E-11,
C      1 2.2720051E-11, 2.7452598E-11, 3.4025443E-11, 4.0875985E-11,
C      2 5.0751668E-11, 6.1094382E-11, 7.5492982E-11, 9.1445759E-11,
C      3 1.1227336E-10, 1.3676464E-10, 1.6720269E-10, 2.0423244E-10,
C      4 2.4932743E-10, 3.0470661E-10, 3.7198526E-10, 4.5449934E-10,
C      5 5.5502537E-10, 6.7793669E-10, 8.2810001E-10, 1.0112626E-09,
C      6 1.2354800E-09, 1.5085255E-09, 1.8432253E-09, 2.2503397E-09,
C      7 2.7499027E-09, 3.3569525E-09, 4.1025670E-09, 5.0077487E-09,
C      8 6.1205950E-09, 7.4703399E-09, 9.1312760E-09, 1.1143911E-08,
C      9 1.3622929E-08, 1.6623917E-08, 2.0324094E-08, 2.4798610E-08,
C      1 3.0321709E-08, 3.6992986E-08, 4.5237482E-08, 5.5183434E-08/
C      DATA Y2/
C      1 6.7491070E-08, 8.2317946E-08, 1.0069271E-07, 1.2279375E-07,
C      2 1.5022907E-07, 1.8316969E-07, 2.2413747E-07, 2.7322865E-07,
C      3 3.3441046E-07, 4.0756197E-07, 4.9894278E-07, 6.0793233E-07,
C      4 7.4443665E-07, 9.0679753E-07, 1.1107379E-06, 1.3525651E-06,
C      5 1.6573073E-06, 2.0174273E-06, 2.4728798E-06, 3.0090445E-06,
C      6 3.6898816E-06, 4.4879625E-06, 5.5059521E-06, 6.6935820E-06,
C      7 8.2160716E-06, 9.9828691E-06, 1.2260527E-05, 1.4888061E-05,
C      8 1.8296530E-05, 2.2202672E-05, 2.7305154E-05, 3.3109672E-05,
C      9 4.0751046E-05, 4.9372484E-05, 6.0820947E-05, 7.3619571E-05,
C      1 9.0780005E-05, 1.0976837E-04, 1.3550409E-04, 1.6365676E-04,
C      2 2.0227521E-04, 2.4398338E-04, 3.0197018E-04, 3.6370760E-04,
C      3 4.5083748E-04, 5.4213338E-04, 6.7315347E-04, 8.0800951E-04,
C      4 1.0051938E-03, 1.2041401E-03, 1.5011708E-03, 1.7942344E-03,
C      5 2.2421056E-03, 2.6730676E-03, 3.3490681E-03, 3.9815050E-03,
C      6 5.0028666E-03, 5.9285668E-03, 7.4730905E-03, 8.8233510E-03,
C      7 1.1160132E-02, 1.3119627E-02, 1.6653199E-02, 1.9472767E-02,
C      8 2.4800811E-02, 2.8793704E-02, 3.6762063E-02, 4.2228780E-02,
C      9 5.3905163E-02, 6.0804660E-02, 7.7081738E-02, 8.3874501E-02,
C      1 1.0377190E-01, 1.0377718E-01, 1.1892208E-01, 9.0437429E-02/
C      DATA Y3/
C      1 7.1685138E-02, -3.9473064E-02, -1.5078720E-01, -4.0489859E-01,
C      2 -5.6018995E-01, -6.8050388E-01, -1.5094224E-01, 6.6304064E-01,
C      3 1.3766748E+00, -8.0373222E-01, -1.0869629E+00, 1.2812892E+00,

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4-5.0341082E-01,-4.4274455E-02, 2.0913102E-01,-1.9999661E-01, 00017390
5 1.5207664E-01,-1.0920260E-01, 7.8169956E-02,-5.6651561E-02, 00017400
6 4.1611799E-02,-3.0880012E-02, 2.3072559E-02,-1.7311631E-02, 00017410
7 1.3021442E-02,-9.8085025E-03, 7.3943529E-03,-5.5769518E-03, 00017420
8 4.2073164E-03,-3.1745026E-03, 2.3954154E-03,-1.8076122E-03, 00017430
9 1.3640816E-03,-1.0293934E-03, 7.7682952E-04,-5.8623518E-04, 00017440
1 4.4240399E-04,-3.3386183E-04, 2.5195025E-04,-1.9013541E-04, 00017450
2 1.4348659E-04,-1.0828284E-04, 8.1716174E-05,-6.1667509E-05, 00017460
3 4.6537684E-05,-3.5119887E-05, 2.6503388E-05,-2.0000904E-05, 00017470
4 1.5093768E-05,-1.1390572E-05, 8.5959318E-06,-6.4869407E-06, 00017480
5 4.8953713E-06,-3.6942830E-06, 2.7878625E-06,-2.1038241E-06, 00017490
6 1.5875917E-06,-1.1980090E-06, 9.0398030E-07,-6.8208296E-07, 00017500
7 5.1458650E-07,-3.8817581E-07, 2.9272267E-07,-2.2067921E-07, 00017510
8 1.6623514E-07,-1.2514102E-07, 9.4034535E-08,-7.0556837E-08, 00017520
9 5.2741581E-08,-3.9298610E-08, 2.9107255E-08,-2.1413893E-08, 00017530
1 1.5742032E-08,-1.1498608E-08, 8.7561571E-09,-7.2959446E-09/ 00017540
DATA Y4/ 00017550
1 6.8816619E-09,-8.9679825E-09, 1.4258275E-08,-1.9564299E-08, 00017560
2 2.0235313E-08,-1.4725545E-08, 5.4632820E-09, 3.5995580E-09, 00017570
3-9.5287133E-09, 1.1460041E-08,-1.0250532E-08, 7.4641748E-09, 00017580
4-4.4703465E-09, 2.0499053E-09,-4.4806353E-10,-4.0374336E-10, 00017590
5 7.0321001E-10,-6.7067960E-10, 4.9130404E-10,-2.8840747E-10, 00017600
6 1.2373144E-10,-1.5260443E-11,-4.2027559E-11, 6.1885474E-11, 00017610
7-5.9273937E-11, 4.6588766E-11,-3.2054182E-11, 1.9831637E-11, 00017620
8-1.1210098E-11, 5.9567021E-12,-3.2427812E-12, 2.1353868E-12, 00017630
9-1.8476851E-12, 1.8438474E-12,-1.8362842E-12, 1.7241847E-12, 00017640
1-1.5161479E-12, 1.2627657E-12,-1.0129176E-12, 7.9578625E-13, 00017650
2-6.2131435E-13, 4.8745900E-13,-3.8703630E-13, 3.1172547E-13, 00017660
3-2.5397802E-13, 2.0824130E-13,-1.7123163E-13, 1.4113344E-13, 00017670
4-1.1687986E-13, 9.7664016E-14,-8.2977176E-14, 7.2515267E-14, 00017680
5-5.6047478E-14/ 00017690
C--$SENDATA 00017700
IF(NEW) 10,30,10 00017710
10 LAG=-1 00017720
X0=-X-30.30251236 00017730
DO 20 IR=1,281 00017740
20 KEY(IR)=0 00017750
30 LAG=LAG+1 00017760
RLAGF0=0.0 00017770
CMAX=0.0 00017780
L=0 00017790
ASSIGN 110 TO M 00017800
I=149 00017810
GO TO 200 00017820
110 CMAX=AMAX1(ABS(C),CMAX) 00017830
I=I+1 00017840
IF(I.LE.170) GO TO 200 00017850
IF(CMAX.EQ.0.0) GO TO 150 00017860
CMAX=TOL*CMAX 00017870
ASSIGN 120 TO M 00017880
I=148 00017890
GO TO 200 00017900
120 IF(ABS(C).LE.CMAX) GO TO 130 00017910
I=I-1 00017920
IF(I.GT.0) GO TO 200 00017930
130 ASSIGN 140 TO M 00017940
I=171 00017950

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      GO TO 200
140  IF(ABS(C).LE.CMAX) GO TO 190
      I=I+1
      IF(I.LE.281) GO TO 200
      GO TO 190
150  ASSIGN 160 TO M
      I=1
      GO TO 200
160  IF(C.EQ.0.0) GO TO 170
      I=I+1
      IF(I.LE.148) GO TO 200
170  ASSIGN 180 TO M
      I=281
      GO TO 200
180  IF(C.EQ.0.0) GO TO 190
      I=I-1
      IF(I.GE.171) GO TO 200
190  RETURN
C--STORE/RETRIEVE ROUTINE (DONE INTERNALLY TO SAVE CALL'S)
200  LOOK=I+LAG
      IQ=LOOK/282
      IR=MOD(LOOK,282)
      IF(IR.EQ.0) IR=1
      IROLL=IQ*281
      IF(KEY(IR).LE.IROLL) GO TO 220
210  C=SAVE(IR)*YT(I)
      RLAGFO=RLAGFO+C
      L=L+1
      GO TO M,(110,120,140,160,180)
220  KEY(IR)=IROLL+IR
      SAVE(IR)=FUN(EXP(X0+FLOAT(LOOK)*.20))
      GO TO 210
      END
      REAL FUNCTION RLAGFI(X,FUN,TOL,L,NEW)
C--*** A SPECIAL LAGGED* CONVOLUTION METHOD TO COMPUTE THE
C  INTEGRAL FROM 0 TO INFINITY OF 'FUN(G)*SIN(G*B)*DG' DEFINED AS THE
C  REAL FOURIER SINE TRANSFORM WITH ARGUMENT X(-ALOG(B))
C  BY CONVOLUTION FILTERING WITH REAL FUNCTION 'FUN'--AND
C  USING A VARIABLE CUT-OFF METHOD WITH EXTENDED FILTER TAILS....
C
C--REF: ANDERSON, W.L., 1975, NTIS REPT. PB-242-800.
C
C--PARAMETERS:
C
C  * X      - REAL ARGUMENT(-ALOG(B) AT CALL) OF THE FOURIER TRANSFORM
C            'RLAGFI' IS USEFUL ONLY WHEN X-(LAST X)-.20 *** I.E.,
C            SPACED SAME AS FILTER USED--IF THIS IS NOT CONVENIENT,
C            THEN SUBPROGRAM 'RFOURI' IS ADVISED FOR GENERAL USE.
C            (ALSO SEE PARM 'NEW' & NOTES (2)-(4) BELOW).
C  FUN(G)-  EXTERNAL DECLARED REAL FUNCTION NAME (USER SUPPLIED).
C            NOTE: IF PARMS OTHER THAN G ARE REQUIRED, USE COMMON IN
C            CALLING PROGRAM AND IN SUBPROGRAM FUN.
C            THE REAL FUNCTION FUN SHOULD BE A MONOTONE
C            DECREASING FUNCTION AS THE ARGUMENT G BECOMES LARGE...
C  TOL=     REAL TOLERANCE EXCEPTED AT CONVOLVED TAILS--I.E.,
C            IF FILTER*FUN<TOL*MAX, THEN REST OF TAIL IS TRUNCATED.
C            THIS IS DONE AT BOTH ENDS OF FILTER.  TYPICALLY,

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C      TOL <= .0001 IS USUALLY OK--BUT THIS DEPENDS ON
C      THE FUNCTION FUN AND PARAMETER X...IN GENERAL,
C      A 'SMALLER TOL' WILL USUALLY RESULT IN 'MORE ACCURACY'
C      BUT WITH 'MORE WEIGHTS' BEING USED.  TOL IS NOT DIRECTLY
C      RELATED TO TRUNCATION ERROR, BUT GENERALLY SERVES AS AN
C      APPROXIMATION INDICATOR... FOR VERY LARGE OR SMALL B,
C      ONE SHOULD USE A SMALLER TOL THAN RECOMMENDED ABOVE...
C      RESULTING NO. FILTER WTS. USED IN THE VARIABLE
C      CONVOLUTION (L DEPENDS ON TOL AND FUN).
C      MIN.L=20 AND MAX.L=266--WHICH COULD
C      OCCUR IF TOL IS VERY SMALL AND/OR FUN NOT DECREASING
C      VERY FAST...
C
C      * NEW= 1 IS NECESSARY 1ST TIME OR BRAND NEW X.
C      0 FOR ALL SUBSEQUENT CALLS WHERE X=(LAST X)-0.20
C      IS ASSUMED INTERNALLY BY THIS ROUTINE.
C      NOTE: IF THIS IS NOT TRUE, ROUTINE WILL
C      STILL ASSUME X=(LAST X)-0.20 ANYWAY...
C      IT IS THE USERS RESPONSIBILITY TO NORMALIZE
C      BY CORRECT B=EXP(X) OUTSIDE OF CALL (SEE USAGE BELOW).
C      THE LAGGED CONVOLUTION METHOD PICKS UP SIGNIFICANT
C      TIME IMPROVEMENTS WHEN THE KERNEL IS NOT A
C      SIMPLE ELEMENTARY FUNCTION...DUE TO INTERNALLY SAVING
C      ALL KERNEL FUNCTION EVALUATIONS WHEN NEW=1...
C      THEN WHEN NEW=0, ALL PREVIOUSLY CALCULATED
C      KERNELS WILL BE USED IN THE LAGGED CONVOLUTION
C      WHERE POSSIBLE, ONLY ADDING NEW KERNEL EVALUATIONS
C      WHEN NEEDED (DEPENDS ON PARMS TOL AND FUN)
C
C      --THE RESULTING REAL CONVOLUTION SUM IS GIVEN IN RLACF1; THE FOURIER
C      TRANSFORM IS THEN RLACF1/B WHICH IS TO BE COMPUTED AFTER EXIT FROM
C      THIS ROUTINE.... WHERE B=EXP(X), X=ARGUMENT USED IN CALL...
C
C      --USAGE-- 'RLACF1' IS CALLED AS FOLLOWS:
C
C      ...
C      EXTERNAL RF
C      ...
C      R=RLACF1(ALOG(B),RF,TOL,L,NEW)/B
C      ...
C      END
C      REAL FUNCTION RF(G)
C      ...USER SUPPLIED CODE...
C      END
C
C      --NOTES:
C      (1). EXP-UNDERFLOW'S MAY OCCUR IN EXECUTING THE SUBPROGRAM
C      BELOW; HOWEVER, THIS IS OK PROVIDED THE MACHINE SYSTEM SETS
C      ANY & ALL EXP-UNDERFLOW'S TO 0.0....
C      (2). AS AN AID TO UNDERSTANDING & USING THE LAGGED CONVOLUTION
C      METHOD, LET BMAX>BMIN>0 BE GIVEN. THEN IT CAN BE SHOWN
C      THAT THE ACTUAL NUMBER OF B'S IS NB=AIN(5.*ALOG(BMAX/BMIN))+1.
C      PROVIDED BMAX/BMIN>=1. THE USER MAY THEN ASSUME AN 'ADJUSTED'
C      BMINA=BMAX*EXP(-.2*(NB-1)). THE METHOD GENERATES THE DECREASING
C      ARGUMENTS SPACED AS X=ALOG(BMAX),X-.2,X-.2*2,...,ALOG(BMINA).
C      FOR EXAMPLE, ONE MAY CONTROL THIS WITH THE CODE:
C
C      ...
C      NB=AIN(5.*ALOG(BMAX/BMIN))+1
C      NB1=NB+1

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```

XO=ALOG(BMAX)+.2
NEW=1
DO 1 J=1,NB
I=NB1-J
X=XO-.2*J
ARG(I)=EXP(X)
ANS(I)=RLAGF1(X,RF,TOL,L,NEW)/ARG(I)
1 NEW=0
...
(3). IF RESULTS ARE STORED IN ARRAYS ARG(I),ANS(I),I=1,NB FOR
ARG IN (BMNA,BMAX), THEN THESE ARRAYS MAY BE USED, FOR EXAMPLE,
TO SPLINE-INTERPOLATE AT A DIFFERENT (LARGER OR SMALLER)
SPACING THAN USED IN THE LAGGED CONVOLUTION METHOD.
(4). IF A DIFFERENT RANGE OF B IS DESIRED, THEN ONE MAY
ALWAYS RESTART THE ABOVE PROCEDURE IN (2) WITH A NEW
BMAX,BMIN AND BY SETTING NEW=1....
(5). ABSCISSA CORRESPONDING TO WEIGHT IS GENERATED TO SAVE STORAGE
DIMENSION KEY(266),SAVE(266)
DIMENSION WT(266),W1(76),W2(76),W3(76),W4(38)
EQUIVALENCE (WT(1),W1(1)),(WT(77),W2(1)),(WT(153),W3(1)),
1 (WT(229),W4(1))
C---SIN-EXTENDED FILTER WEIGHT ARRAYS:
DATA W1/
1 1.1113940E-09,-1.3237246E-12, 1.5091739E-12,-1.6240954E-12,
2 1.7236636E-12,-1.8227727E-12, 1.9255992E-12,-2.0335514E-12,
3 2.1473541E-12,-2.2675549E-12, 2.3946842E-12,-2.5292661E-12,
4 2.6718110E-12,-2.8227693E-12, 2.9825171E-12,-3.1514006E-12,
5 3.3297565E-12,-3.5179095E-12, 3.7163306E-12,-3.9256378E-12,
6 4.1464798E-12,-4.3794552E-12, 4.6252131E-12,-4.8845227E-12,
7 5.1582809E-12,-5.4474462E-12, 5.7530277E-12,-6.0760464E-12,
8 6.4175083E-12,-6.7783691E-12, 7.1595239E-12,-7.5618782E-12,
9 7.9864477E-12,-8.4344110E-12, 8.9072422E-12,-9.4067705E-12,
1 9.9349493E-12,-1.0493731E-11, 1.1084900E-11,-1.1709937E-11,
2 1.2370354E-11,-1.3067414E-11, 1.3802200E-11,-1.4575980E-11,
3 1.5390685E-11,-1.6249313E-11, 1.7155934E-11,-1.8115250E-11,
4 1.9131898E-11,-2.0209795E-11, 2.1352159E-11,-2.2561735E-11,
5 2.3840976E-11,-2.5192263E-11, 2.6618319E-11,-2.8122547E-11,
6 2.9709129E-11,-3.1382870E-11, 3.3149030E-11,-3.5013168E-11,
7 3.6981050E-11,-3.9058553E-11, 4.1251694E-11,-4.3566777E-11,
8 4.6010537E-11,-4.8590396E-11, 5.1314761E-11,-5.4193533E-11,
9 5.7236720E-11,-6.0455911E-11, 6.3861222E-11,-6.7461492E-11,
1 7.1265224E-11,-7.5279775E-11, 7.9512249E-11,-8.3971327E-11/
DATA W2/
1 8.8668961E-11,-9.3621900E-11, 9.8851764E-11,-1.0438319E-10,
2 1.1024087E-10,-1.1644680E-10, 1.2301979E-10,-1.2997646E-10,
3 1.3733244E-10,-1.4510363E-10, 1.5330772E-10,-1.6196550E-10,
4 1.7110130E-10,-1.8074257E-10, 1.9091922E-10,-2.0166306E-10,
5 2.1300756E-10,-2.2498755E-10, 2.3763936E-10,-2.5100098E-10,
6 2.6511250E-10,-2.8001616E-10, 2.9575691E-10,-3.1238237E-10,
7 3.2994314E-10,-3.4849209E-10, 3.6808529E-10,-3.8878042E-10,
8 4.1063982E-10,-4.3372666E-10, 4.5811059E-10,-4.8386049E-10,
9 5.1105728E-10,-5.3977672E-10, 5.7011632E-10,-6.0215516E-10,
1 6.3601273E-10,-6.7175964E-10, 7.0955028E-10,-7.4942601E-10,
2 7.9161025E-10,-8.3606980E-10, 8.8317110E-10,-9.3270330E-10,
3 9.8533749E-10,-1.0404508E-09, 1.0993731E-09,-1.1605442E-09,
00019100
00019110
00019120
00019130
00019140
00019150
00019160
00019170
00019180
00019190
00019200
00019210
00019220
00019230
00019240
00019250
00019260
00019270
00019280
00019290
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00019530
00019540
00019550
00019560
00019570
00019580
00019590
00019600
00019610
00019620
00019630
00019640
00019650
00019660

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4 1.2267391E-09,-1.2942905E-09, 1.3691677E-09,-1.4429912E-09, 00019670
5 1.5288164E-09,-1.6077524E-09, 1.7085998E-09,-1.7890471E-09, 00019680
6 1.9129068E-09,-1.9857116E-09, 2.1491608E-09,-2.1926779E-09, 00019690
7 2.4312660E-09,-2.3959044E-09, 2.7872500E-09,-2.5610596E-09, 00019700
8 3.2762318E-09,-2.6082940E-09, 4.0261453E-09,-2.3560563E-09, 00019710
9 5.3176554E-09,-1.3960161E-09, 7.7708747E-09, 1.1853546E-09, 00019720
1 1.2760851E-08, 7.4264707E-09, 2.3342187E-08, 2.1869851E-08/ 00019730
DATA W3/ 00019740
1 4.6306744E-08, 5.4631686E-08, 9.6763087E-08, 1.2823337E-07, 00019750
2 2.0832812E-07, 2.9280540E-07, 4.5580888E-07, 6.5992437E-07, 00019760
3 1.0056815E-06, 1.4779183E-06, 2.2284335E-06, 3.2994604E-06, 00019770
4 4.9485823E-06, 7.3545473E-06, 1.1001083E-05, 1.6380539E-05, 00019780
5 2.4469550E-05, 3.6469246E-05, 5.4441527E-05, 8.1176726E-05, 00019790
6 1.2113828E-04, 1.8066494E-04, 2.6954609E-04, 4.0202288E-04, 00019800
7 5.9969995E-04, 8.9437312E-04, 1.3338166E-03, 1.9886697E-03, 00019810
8 2.9643943E-03, 4.4168923E-03, 6.5773518E-03, 9.7855105E-03, 00019820
9 1.4539361E-02, 2.1558670E-02, 3.1871864E-02, 4.6903518E-02, 00019830
1 6.8559512E-02, 9.9170152E-02, 1.4120770E-01, 1.9610835E-01, 00019840
2 2.6192603E-01, 3.2743321E-01, 3.6407406E-01, 3.1257559E-01, 00019850
3 9.0460168E-02, -3.6051039E-01, -8.6324760E-01, -8.1178720E-01, 00019860
4 5.2205241E-01, 1.5449873E+00, -1.1817933E+00, -2.6759896E-01, 00019870
5 8.0869203E-01, -6.2757149E-01, 3.4062630E-01, -1.5885304E-01, 00019880
6 7.0472984E-02, -3.1624462E-02, 1.4894068E-02, -7.4821176E-03, 00019890
7 4.0035936E-03, -2.2543784E-03, 1.3160358E-03, -7.8636604E-04, 00019900
8 4.7658745E-04, -2.9125817E-04, 1.7885105E-04, -1.1012416E-04, 00019910
9 6.7910334E-05, -4.1914054E-05, 2.5881544E-05, -1.5985851E-05, 00019920
1 9.8751880E-06, -6.1008526E-06, 3.7692543E-06, -2.3287953E-06/ 00019930
DATA W4/ 00019940
1 1.4388425E-06, -8.8899353E-07, 5.4926991E-07, -3.3937048E-07, 00019950
2 2.0968284E-07, -1.2955437E-07, 8.0046336E-08, -4.9457371E-08, 00019960
3 3.0557711E-08, -1.8880390E-08, 1.1665454E-08, -7.2076428E-09, 00019970
4 4.4533423E-09, -2.7515696E-09, 1.7001092E-09, -1.0504494E-09, 00019980
5 6.4904567E-10, -4.0102999E-10, 2.4778763E-10, -1.5310321E-10, 00019990
6 9.4600354E-11, -5.8453314E-11, 3.6119400E-11, -2.2320056E-11, 00020000
7 1.3793460E-11, -8.5242656E-12, 5.2675102E-12, -3.2543076E-12, 00020010
8 2.0097689E-12, -1.2405412E-12, 7.6530538E-13, -4.7191929E-13, 00020020
9 2.9084993E-13, -1.7923661E-13, 1.1018948E-13, -6.7885902E-14, 00020030
1 4.2025050E-14, -2.1314731E-14/ 00020040
C---$SENDATA 00020050
C 00020060
10 IF(NEW) 10,30,10 00020070
LAG=-1 00020080
XO=-X-38.30455704 00020090
DO 20 IR=1,266 00020100
20 KEY(IR)=0 00020110
30 LAG=LAG+1 00020120
RLAGF1=0.0 00020130
CMAX=0.0 00020140
L=0 00020150
ASSIGN 110 TO M 00020160
I=191 00020170
GO TO 200 00020180
110 CMAX=AMAX1(ABS(C),CMAX) 00020190
I=I+1 00020200
IF(I.LE.208) GO TO 200 00020210
IF(CMAX.EQ.0.0) GO TO 150 00020220
CMAX=TOL*CMAX 00020230

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	ASSIGN 120 TO M	00020240
	I=190	00020250
	GO TO 200	00020260
120	IF(ABS(C).LE.CMAX) GO TO 130	00020270
	I=I-1	00020280
	IF(I.GT.0) GO TO 200	00020290
130	ASSIGN 140 TO M	00020300
	I=209	00020310
	GO TO 200	00020320
140	IF(ABS(C).LE.CMAX) GO TO 190	00020330
	I=I+1	00020340
	IF(I.LE.266) GO TO 200	00020350
	GO TO 190	00020360
150	ASSIGN 160 TO M	00020370
	I=1	00020380
	GO TO 200	00020390
160	IF(C.EQ.0.0) GO TO 170	00020400
	I=I+1	00020410
	IF(I.LE.190) GO TO 200	00020420
170	ASSIGN 180 TO M	00020430
	I=266	00020440
	GO TO 200	00020450
180	IF(C.EQ.0.0) GO TO 190	00020460
	I=I-1	00020470
	IF(I.GE.209) GO TO 200	00020480
190	RETURN	00020490
	C--STORE/RETRIEVE ROUTINE (DONE INTERNALLY TO SAVE CALL'S)	00020500
200	LOOK=I+LAG	00020510
	IQ=LOOK/267	00020520
	IR=MOD(LOOK,267)	00020530
	IF(IR.EQ.0) IR=1	00020540
	IROLL=IQ*266	00020550
	IF(KEY(IR).LE.IROLL) GO TO 220	00020560
210	C=SAVE(IR)*WT(I)	00020570
	RLAGFI=RLAGFI+C	00020580
	L=L+1	00020590
	GO TO M,(110,120,140,160,180)	00020600
220	KEY(IR)=IROLL+IR	00020610
	SAVE(IR)=FUN(EXP(XO+FLOAT(LOOK)*.20))	00020620
	GO TO 210	00020630
	END	00020640

(NLSOL) TEST EXAMPLE (IOPT=0 CASE)

N= 19 K= 4 IP= 3 M= 1 IALT= 10
ISTOP= 1 IWT= 2 IDER= 1 IPRT= -2 NITER= 15
IDUT= 1 SP= 3

FMT=(2G16.8,T1,G16.8)

PARAMETER LOWER BOUNDS: BL=

0.99999997E-04 0.99999997E-04 0.10000000E+02 0.99999997E-05

INITIAL PARAMETERS: B=

0.15000000E-01 0.15000001E+00 0.17500000E+03 0.15000000E-01

PARAMETER HIGHER BOUNDS: BH=

0.50000000E+01 0.50000000E+01 0.10000000E+04 0.10000000E+05

** NLTR (IDER=0) OR NL2SNO (IDER=1) CALLED: 1 **

I	INITIAL X(I)	D(I)
1	0.546171E-01	0.208E+02
2	0.174026E+00	0.553E+00
3	0.420534E+00	0.115E+01
4	0.122434E-02	0.894E+03

IT	NF	F	DF	COSMAX	VAR
0	1	0.424E-01		0.999E+00	
1	2	0.219E-02	0.402E-01	0.992E+00	0.150E+02
2	3	0.175E-04	0.217E-02	0.835E+00	0.150E+02
3	4	0.320E-05	0.143E-04	0.496E+00	0.124E+02
4	5	0.780E-06	0.242E-05	0.298E+00	0.964E+00
5	6	0.183E-06	0.597E-06	0.929E+00	0.384E+01
6	7	0.270E-09	0.183E-06	0.126E+00	0.150E+02
7	8	0.454E-11	0.265E-09	0.103E+00	0.146E+02
8	9	0.454E-11	-0.200E-11	0.103E+00	0.817E+00

***** X-CONVERGENCE *****

FUNCTION 0.453962D-11 VARIABILITY 0.316583E+00
FUNC. EVALS 9 GRAD. EVALS 8
GRAD. NORM 0.442630E-06 COSMAX 0.103409E+00

I	FINAL X(I)	D(I)	G(I)
1	0.445113E-01	0.126E+02	0.221E-06
2	0.201312E+00	0.229E+00	0.713E-07
3	0.453475E+00	0.555E+00	0.520E-07
4	0.999532E-03	0.416E+03	0.373E-06

COVARIANCE = SCALE * (J**T * J)**-1

ROW 1	0.7749E-12			
ROW 2	0.5396E-11	0.6350E-10		
ROW 3	-0.3600E-11	-0.2628E-10	0.1905E-10	
ROW 4	-0.1721E-13	-0.1081E-12	0.7722E-13	0.3932E-15

```

1  DHS(1,1)  JAL  RES  SWES,ENR  ((1,1)  X(1,2)  X(1,3)  ((1,4)  -T(1)
2  0.247509E-01  0.247509E-01  -0.754E-07  -0.308423E-03  0.192423E-03  0.247509E-01  0.000000E+00  0.300000E+00  0.403353E+02
3  0.100535E-01  0.100535E-01  0.101E-06  0.100049E-02  0.282438E-03  0.100535E-01  0.000000E+00  0.300000E+00  0.394681E+02
4  0.100063E-02  0.100073E-02  -0.498E-07  -0.124542E-02  0.414562E-03  0.400068E-02  0.000000E+00  0.300000E+00  0.249957E+03
5  0.175073E-02  0.175073E-02  0.361E-07  0.206134E-02  0.308494E-03  0.175073E-02  0.000000E+00  0.300000E+00  0.571174E+03
6  0.100644E-02  0.100648E-02  -0.468E-07  -0.464975E-02  0.893146E-03  0.100644E-02  0.000000E+00  0.300000E+00  0.393605E+03
7  0.615903E-03  0.615959E-03  0.448E-07  0.726818E-02  0.131076E-02  0.615903E-03  0.000000E+00  0.300000E+00  0.152303E+04
8  0.381454E-03  0.381450E-03  0.361E-08  0.346093E-03  0.192423E-02  0.381454E-03  0.000000E+00  0.300000E+00  0.262155E+04
9  0.236531E-03  0.236535E-03  -0.367E-08  -0.155033E-02  0.232438E-02  0.236531E-03  0.000000E+00  0.300000E+00  0.422777E+04
10 0.140011E-03  0.140013E-03  -0.185E-08  -0.131995E-02  0.414562E-02  0.140011E-03  0.000000E+00  0.300000E+00  0.714229E+04
11 0.302697E-04  0.302703E-04  -0.568E-09  -0.707017E-03  0.608494E-02  0.302697E-04  0.000000E+00  0.300000E+00  0.124580E+05
12 0.439106E-04  0.439117E-04  -0.113E-08  -0.257656E-02  0.393147E-02  0.439106E-04  0.000000E+00  0.300000E+00  0.227736E+05
13 0.230802E-04  0.230826E-04  -0.239E-08  -0.103705E-01  0.131096E-01  0.230802E-04  0.000000E+00  0.300000E+00  0.433272E+05
14 0.116097E-04  0.116115E-04  -0.184E-08  -0.158063E-01  0.192423E-01  0.116097E-04  0.000000E+00  0.300000E+00  0.361349E+05
15 0.562225E-05  0.562242E-05  -0.160E-09  -0.283892E-02  0.282438E-01  0.562225E-05  0.000000E+00  0.300000E+00  0.177864E+06
16 0.263327E-05  0.263322E-05  0.505E-10  0.191693E-02  0.414562E-01  0.263327E-05  0.000000E+00  0.300000E+00  0.379756E+06
17 0.119065E-05  0.119121E-05  -0.559E-09  -0.469269E-01  0.603494E-01  0.119065E-05  0.000000E+00  0.300000E+00  0.339875E+06
18 0.527503E-06  0.527499E-06  0.341E-11  0.646561E-03  0.893147E-01  0.527503E-06  0.000000E+00  0.300000E+00  0.189572E+07
19 0.226671E-06  0.226699E-06  -0.279E-10  -0.123052E-01  0.131096E+00  0.226671E-06  0.000000E+00  0.300000E+00  0.441167E+07
20 0.960498E-07  0.961403E-07  -0.905E-10  -0.941573E-01  0.192423E+00  0.960498E-07  0.000000E+00  0.300000E+00  0.104113E+08

```

** WDERN= 0.3997394E-07

CORRELATION MATRIX

```

1  0.1000E+01
2  0.7592E+00  0.1000E+01
3  -0.9371E+00  -0.7557E+00  0.1000E+01
4  -0.9860E+00  -0.6443E+00  0.3924E+00  0.1000E+01

```

**PARAM_SUL STD_ERROR REL_ERROR % ERROR **

```

1  0.1000E+01  0.3803E-06  0.8803E-04  0.8803E-02
2  0.2000E+00  0.7469E-05  0.3784E-04  0.3784E-02
3  0.2000E+03  0.4354E-05  0.2182E-07  0.2182E-05
4  0.1000E+01  0.1983E-07  0.1983E-05  0.1983E-03

```

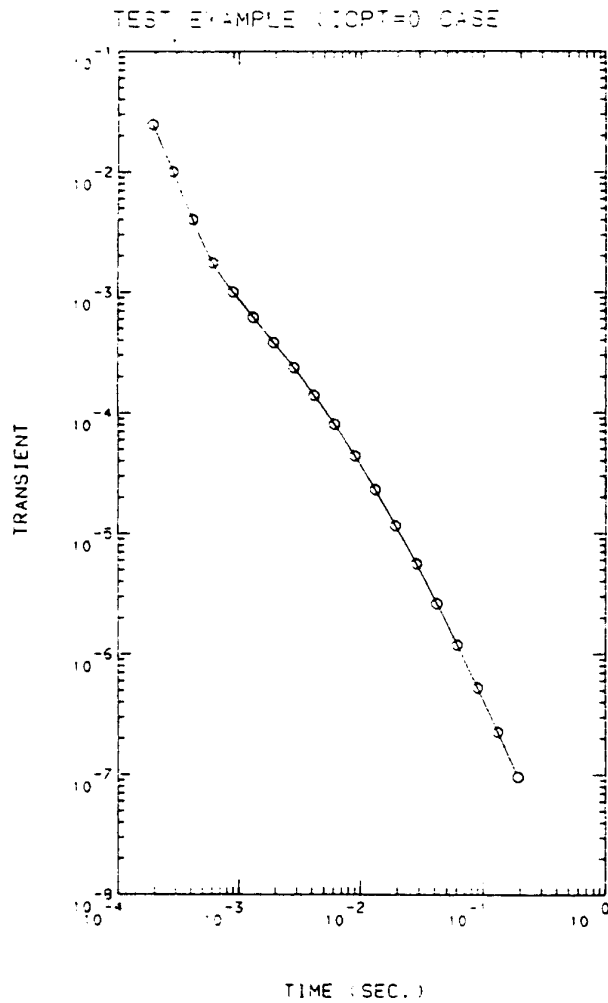
***** E X D ***** TEST EXAMPLE (IOPT=0 CASE)

PARAMETER NAME	FINAL SOLUTION	RESISTIVITY	LAYER DEPTH
1 SIGMA(1) =	0.99995499E-02	1 0.10000450E+03	
2 SIGMA(2) =	0.20000650E+00	2 0.49998374E-01	
3 THICK(1) =	0.20000543E+03		1 0.20000543E+03
4 SHIFT =	0.10000648E-01		


```

#####
TOTAL "ELAPSED" TIME=      249.25 SEC. ( 4 MIN. 9.25 SEC.)
CPU TIME=      235.55 SEC. ( 3 M. 55.55 S.) CPU % = 94.50%
BUF. I/O COUNT=      1
DIR. I/O COUNT=      19
PAGE FAULTS=      140
#####

```



(NLSTCC): TEST EXAMPLE (IOPT=1 CASE)

MM= 2 A= 0.175000E+03 EPS= 0.100000E-09
BO= 0.100000E-02 BM= 0.100000E+06 NB= 6
IOPT= 1

PARAMETER ORDER--

1	SIGMA(1)
2	SIGMA(2)
3	THICK(1)
4	B(4) SHIFT PARAMETER IN B(2*MM)*APPRES

(NLST00) TEST EXAMPLE (IOPT=1 CASE)

N= 10 K= 4 IP= 1 M= 1 IALT= 10
ISTOP= 1 IWT= 1 IDER= 1 IPRT= -2 NITER= 15
IOUT= 1 SP= 3

PARAMETERS HELD FIXED: IS= 4

FMT=(733,016.3,717,016.3

PARAMETER LOWER BOUNDS: BL=

0.99999997E-04 0.99999997E-04 0.10000000E+02 0.99999997E-05

INITIAL PARAMETERS: B=

0.15000000E-01 0.15000001E+00 0.17500000E+03 0.10000000E+01

PARAMETER HIGHER BOUNDS: BH=

0.50000000E+01 0.50000001E+01 0.10000000E+04 0.10000000E+05

PARAMETER INDEX: 1 2 3 4
REORDERED AS...: 1 2 3

REORDERED PARAMETERS:

0.15000000E-01 0.15000001E+00 0.17500000E+03

** NLITR (IDER=0) OR NL2SNC (IDER=1) CALLED: 1 **

I	INITIAL X(I)	D(I)
1	0.546171E-01	0.700E+04
2	0.174026E+00	0.384E+03
3	0.420534E+00	0.560E+03

IT	NF	F	DF	COSMAX	VAR
0	1	0.533E+04		0.981E+00	
1	2	0.209E+04	0.323E+04	0.993E+00	0.159E+02
2	3	0.448E+02	0.205E+04	0.896E+00	0.159E+02
3	4	0.217E+00	0.446E+02	0.548E+00	0.159E+02
4	5	0.553E-02	0.210E+00	0.584E+00	0.147E+02
5	6	0.124E-02	0.529E-02	0.683E+00	0.123E+02
6	7	0.140E-03	0.110E-02	0.592E+00	0.121E+02
7	8	0.352E-04	0.105E-03	0.284E+00	0.135E+02
8	9	0.273E-04	0.795E-05	0.370E+00	0.322E+01
9	10	0.273E-04	-0.575E-05	0.370E+00	0.269E+01

***** X-CONVERGENCE *****

FUNCTION	0.272545D-04	VARIABILITY	0.269431E+01
FUNC. EVALS	10	GRAD. EVALS	9
GRAD. NORM	0.103958E+02	COSMAX	0.369678E+00

I	FINAL X(I)	D(I)	G(I)
1	0.445125E-01	0.131E+05	-0.103E+02
2	0.201318E+00	0.400E+03	0.109E+01

```

      0.45346E+00      0.932E+03      0.109E+01
COVARIANCE * SCALE * 10**1 * 0.0001
ROW 1      0.4397E-13
ROW 2      0.1001E-11      0.4414E-10
ROW 3      0.1362E-12      0.1661E-11      0.4961E-11

      RMS.Y(1)      CAL      RES      $RES.ERR      (1,1)      (1,2)      (1,3)      (1,4)      4T(1)
1      0.117375E+03      0.117374E+03      0.102E-02      0.367317E-03      0.192423E-03      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
2      0.128768E+03      0.128768E+03      -0.453E-04      -0.355494E-04      0.282438E-03      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
3      0.135345E+03      0.135386E+03      -0.626E-03      -0.460055E-03      0.414562E-03      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
4      0.129446E+03      0.129949E+03      -0.310E-02      -0.238365E-02      0.508494E-03      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
5      0.100440E+03      0.100437E+03      0.279E-02      0.278021E-02      0.493146E-03      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
6      0.740456E+02      0.740486E+02      -0.293E-02      -0.402856E-02      0.131096E-02      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
7      0.540326E+02      0.540842E+02      -0.154E-02      -0.285657E-02      0.192423E-02      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
8      0.394512E+02      0.394512E+02      -0.114E-04      -0.290082E-04      0.282438E-02      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
9      0.297439E+02      0.297431E+02      0.313E-03      0.273183E-02      0.414562E-02      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
10     0.229244E+02      0.229241E+02      0.290E-03      0.126468E-02      0.508494E-02      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
11     0.182452E+02      0.182450E+02      0.244E-03      0.133812E-02      0.393147E-02      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
12     0.149123E+02      0.149106E+02      0.170E-02      0.113975E-01      0.131096E-01      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
13     0.125457E+02      0.125436E+02      0.206E-02      0.164526E-01      0.192423E-01      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
14     0.108156E+02      0.108159E+02      -0.297E-03      -0.265402E-02      0.282438E-01      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
15     0.952333E+01      0.952311E+01      0.228E-03      0.239342E-02      0.414562E-01      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
16     0.357520E+01      0.357203E+01      0.317E-02      0.369809E-01      0.508494E-01      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
17     0.731730E+01      0.731888E+01      -0.109E-02      -0.139169E-01      0.393147E-01      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
18     0.726727E+01      0.726572E+01      0.156E-02      0.214211E-01      0.131096E+00      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01
19     0.541287E+01      0.541124E+01      0.163E-02      0.239075E-01      0.192423E+00      0.000000E+00      0.000000E+00      0.000000E+00      0.100000E+01

** RMSERR= 0.1845751E-02

CORRELATION MATRIX
1      0.1000E+01
2      0.7185E+00      0.1000E+01
3      -0.3947E+00      -0.3150E+00      0.1000E+01

**PARAM SOL.      STD_ERROR      REL_ERROR      % ERROR **
1      0.1000E+01      0.2097E-06      0.2097E-04      0.2097E-02
2      0.2000E+00      0.6644E-05      0.3322E-04      0.3322E-02
3      0.2000E+03      0.2227E-05      0.1114E-07      0.1114E-05

***** E N D *****      TEST EXAMPLE (LOPT=1 CASE)

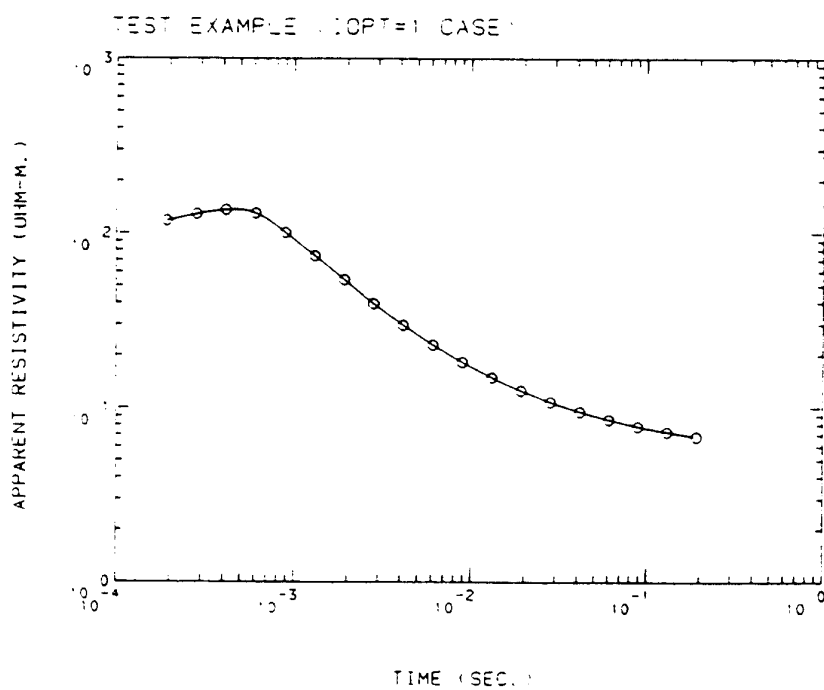
PARAMETER NAME      FINAL SOLUTION      RESISTIVITY      LAYER DEPTH
1      SIGMA( 1) = 0.10000076E+01      1      0.99999237E+02
2      SIGMA( 2) = 0.20001782E+00      2      0.49995546E+01
3      THICK( 1) = 0.19999973E+03      1      0.19999973E+03
4      SHIFT      = 0.10000000E+01

```

```

#####
TOTAL "ELAPSED" TIME:      256.90 SEC. ( 4 MIN. 16.90 SEC.)
CPU TIME:      33.15 SEC. ( 3 M. 33.15 S.)   CPU % = 92.70%
BUT1/O COUNTS:      13
BUT1/O COUNTS:      13
PAGE FAULTS:      10
#####

```



Appendix 3.-- Source code availability and listing

Source Code Availability

The current version of the source code may be obtained by writing directly to the author*. A magnetic tape copy can be sent to requestors to be copied and returned. This method of releasing the source code was selected in order to satisfy requests for the latest (e.g., possibly updated) version. [The attached listing does not include the adaptive nonlinear least-squares algorithm (Dennis and others, 1979) due to its length; however, the complete algorithm is available on the distributed tape.]

The magnetic tape is usually recorded in the following mode (unless requested otherwise):

Industry compatible: 9-track, standard ANSI-labeled, ASCII-mode, odd-parity, 800-bpi density, 80-character card-image records (blocked 50-card images, or 4000-characters, per physical block), and contained on a file named "NLSTCO.VAX".

* present address is:

U.S. Geological Survey
Mail Stop 964
Box 25046, Denver Federal Center
Denver, CO 80225

Source Listing

The attached subprograms are listed in the following order:

```
00000010 (MAIN PROGRAM)
00000170 REAL FUNCTION ELLOOP
00000460 COMPLEX FUNCTION FZCH
00000590 SUBROUTINE RECUR
00000820 SUBROUTINE MARQ_TRANS_ELLOOP_FCODE
00002120 SUBROUTINE MARQ_TRANS_ELLOOP_SUBZ
00003170 SUBROUTINE X2ARES
00003520 SUBROUTINE NAMELIST
00008610 SUBROUTINE DUMYPCODE
00008650 SUBROUTINE SIGSUBEND
00009500 SUBROUTINE CPUTIME
00010070 SUBROUTINE DECODEIX
00010230 SUBROUTINE DECODEX
00010400 SUBROUTINE ERRMSG
00010740 SUBROUTINE MINMAX
00010840 SUBROUTINE NLSOL
00017130 SUBROUTINE NLITR
00018190 SUBROUTINE INTRAN
00018780 SUBROUTINE CALCR
00019270 SUBROUTINE NONBLANK
00019400 SUBROUTINE PROCINFO
00019770 REAL FUNCTION RFLAGS
00020180 SUBROUTINE SPLIN1
00021380 SUBROUTINE SPOINT
00021600 REAL*4 FUNCTION SQJ1
00025190 SUBROUTINE WARN
00025530 REAL FUNCTION ASINH
00025610 FUNCTION ERF
00025940 FUNCTION ERFINV
00026740 INTEGER FUNCTION LDC
00026850 SUBROUTINE NL2SOL
00031420 SUBROUTINE NL2SNO
00032970 SUBROUTINE NL2ITR
00040050 SUBROUTINE ASSESS
00044050 SUBROUTINE COVCLC
00048210 SUBROUTINE DFAULT
00049100 REAL FUNCTION DOTPRD
00049470 SUBROUTINE DUPDAT
00050050 SUBROUTINE GGTSTP
00055970 SUBROUTINE ITSMRY
00058270 SUBROUTINE LINVRT
00058700 SUBROUTINE LITVMU
00059020 SUBROUTINE LIVMUL
00059330 SUBROUTINE LMSTEP
00064440 SUBROUTINE LSCRT
00065090 REAL FUNCTION LSVMIN
00066880 SUBROUTINE LTSQAR
```

```
00067240 SUBROUTINE PARCHK
00069160 SUBROUTINE CAPPLY
00070060 SUBROUTINE CRFACT
00072450 SUBROUTINE RPTMUL
00073200 SUBROUTINE SLUPDT
00073820 SUBROUTINE SLVMUL
00074280 LOGICAL FUNCTION STOPX
00074510 SUBROUTINE VAXPY
00074640 SUBROUTINE VCCPY
00074770 SUBROUTINE VSCOPY
00074900 REAL FUNCTION V2NORM
00075450 INTEGER FUNCTION IMDCON
00075620 REAL FUNCTION RMDCON
00076660 REAL FUNCTION RLAGFO
00079050 REAL FUNCTION RLAGF1
00081410 FUNCTION TCHEB
```

```
C (NLSTCO): 'NLSOL'-INVERSION OF TRANSIENT SOUNDINGS FOR (3/9/82) 00000010
C A COINCIDENT LOOP SYSTEM OF RADIUS A>0. 00000020
C 00000030
C** VAX-11/780 VERSION 00000040
C 00000050
C--BY W.L.ANDERSON, U.S. GEOLOGICAL SURVEY, DENVER, COLORADO. 00000060
C 00000070
C 00000080
C EXTERNAL MARQ TRANS ELOOP FCODE,DUMPCODE, 00000090
1 MARQ TRANS ELOOP SUBZ,SIGSUBEND 00000100
CALL SETTIME 00000110
CALL NLSOL(MARQ TRANS ELOOP FCODE,DUMPCODE, 00000120
1 MARQ TRANS ELOOP SUBZ,SIGSUBEND) 00000130
CALL CPUTIME(6,16) 00000140
CALL EXIT 00000150
END 00000160
REAL FUNCTION ELOOP(B2) 00000170
C--COSINE-TRANSFORM KERNEL FOR COINCIDENT LOOP WITH 00000180
C A>0,R=0, AND Z=0.0. 00000190
C 00000200
C REAL SIG(10),H(10),Z 00000210
COMPLEX ZAC2,K2(10),KS1,ZFLD 00000220
COMMON/MODEL/K2,KS1,H,Z,A,R,HMAX,M 00000230
COMMON/PASS/ZAC2,ANORM,SIG,B0,BM,SIG1,EPS 00000240
COMMON/SPLN/XS(200),YS(200),AS(200),BS(200),CS(200),NS,ISPLN 00000250
EXTERNAL F3ZH 00000260
B=SQRT(B2) 00000270
IF(B.LT.B0) GO TO 3 00000280
IF(B.GT.BM) GO TO 4 00000290
IF(ISPLN.EQ.0) GO TO 10 00000300
C--ISPLN=1 (0<NB<12 OPTION) INTERPOLATE PRE-SPLINED FREQ. FUNCTION 00000310
CALL SPOINT(NS,XS,YS,AS,BS,CS,B,ELOOP) 00000320
RETURN 00000330
10 F=(B/A)**2/(39.47841762E-7*SIG1) 00000340
KS1=CMPLX(0.0,-7.895083523E-6*F) 00000350
DO 1 I=1,M 00000360
1 K2(I)=KS1*CMPLX(SIG(I),0.0) 00000370
```



```

      ZFLD=ZAC2*SQU1(ANORM,F3ZH,EPS,LL) + 1.0      00000380
      ELOOP=REAL(ZFLD)                             00000390
      RETURN                                         00000400
3     ELOOP=1.0                                     00000410
      RETURN                                         00000420
4     ELOOP=0.0                                     00000430
      RETURN                                         00000440
      END                                            00000450
      COMPLEX FUNCTION F3ZH(X)                     00000460
C--KERNEL FOR HANKEL TRANSFORM IN CURLOOP WHEN R=0.0 AND Z=0.0 00000470
C SCALED BY HMAX STORED IN COMMON/MODEL/          00000480
C                                                    00000490
      COMPLEX Z1,Z0,K2(10),KS1,HALF               00000500
      REAL H(10),Z                                00000510
      COMMON/MODEL/K2,KS1,H,Z,A,R,HMAX,M          00000520
      DATA HALF/(0.5,0.0)/                       00000530
      Y=X/HMAX                                     00000540
      CALL RECUR(Y,Z1,Z0)                         00000550
      F3ZH=Z1/(Z0+Z1)-HALF                        00000560
      RETURN                                         00000570
      END                                            00000580
      SUBROUTINE RECUR(Y,Z1,Z0)                   00000590
C--BACKWARD RECURRENCE FOR COMPLEX IMPEDANCES Z1,Z0 GIVEN ARGUMENT 00000600
C Y=(X/HMAX) AND MODEL PARAMETERS IN COMMON/MODEL/ 00000610
C                                                    00000620
      REAL H(10),Z                                00000630
      COMPLEX Z1,Z0,K2(10),KS1,ONE,ZZ,X2,U        00000640
      COMMON/MODEL/K2,KS1,H,Z,A,R,HMAX,M          00000650
      DATA ONE/(1.0,0.0)/                       00000660
      X2=CMPLX(Y*Y,0.0)                          00000670
      Z0=KS1/CMPLX(Y,0.0)                        00000680
      Z1=KS1/CSQRT(X2-K2(M))                      00000690
      IF(M.EQ.1) GO TO 20                         00000700
      J=M-1                                        00000710
      U=CSQRT(X2-K2(J))                          00000720
      ZZ=KS1/U                                    00000730
      U=CEXP(CMPLX(-2.0*H(J),0.0)*U)             00000740
      U=(ONE-U)/(ONE+U)                          00000750
      Z1=ZZ*((Z1+ZZ*U)/(ZZ+Z1*U))                00000760
      IF(J.EQ.1) GO TO 20                         00000770
      J=J-1                                        00000780
      GO TO 10                                     00000790
20     RETURN                                       00000800
      END                                           00000810
      SUBROUTINE MARQ_TRANS ELOOP_FCODE(Y,X,B,PRNT,F,IN,IDER) 00000820
C--FUNCT. EVAL. FOR 'NLSTCO'                     00000830
C                                                    00000840
C--PARAMETERS--                                  00000850
C Y= OBSERVED DEPENDENT VARIABLE ARRAY (DIM. N)   00000860
C X= OBSERVED INDEPENDENT VARIABLE ARRAY (DIM. N,5) 00000870
C B= CURRENT PARAMETER ARRAY ESTIMATES (DIM. K)   00000880
C PRNT= WORK AND PRINT ARRAY (DIM. 5)            00000890
C F= OUTPUT FUNCTION VALUE EVAL. FOR GIVEN Y,X,B AT OBS. IN 00000900
C IN= OBSERVATION NO. TO EVAL. F (1<=IN<=N)      00000910
C IDER= 0 IF ANALYTIC DERIVATIVES ARE USED LATER (PCODE CALLED) 00000920

```

```

C          1 IF ESTIMATED DERIVATIVES USED ONLY (PCODE NOT CALLED) 00000930
C [NOTE: CURRENTLY ONLY IDER=1 CAN BE USED; IDER=C MAY BE ADDED LATER] 00000940
C 00000950
C 00000960
C 00000970
C 00000980
C 00000990
C 00001000
C 00001010
C 00001020
C 00001030
C 00001040
C 00001050
C 00001060
C 00001070
C 00001080
C 00001090
C 00001100
C 00001110
C 00001120
C 00001130
C 00001140
C 00001150
C 00001160
C 00001170
C 00001180
C 00001190
C 00001200
C 00001210
C 00001220
C 00001230
C 00001240
C 00001250
C 00001260
C 00001270
C 00001280
C 00001290
C 00001300
C 00001310
C 00001320
C 00001330
C 00001340
C 00001350
C 00001360
C 00001370
C 00001380
C 00001390
C 00001400
C 00001410
C 00001420
C 00001430
C 00001440
C 00001450
C 00001460
C 00001470

COMPLEX K2(10),KS1,C4,ZA,ZAC2
REAL Y(1),X(500,5),B(1),PRNT(5),SIG(10),H(10),DER(2),
1 BSAVE(20),W2(200),APPRES(500)
EXTERNAL ELOOP
COMMON/TCOM/T(500),VSAVE(500)
COMMON/PASS/ZAC2,ANORM,SIG,B0,BM,SIG1,EPS
COMMON/FPASS/AA,TMIN,TMAX,T0,TM,DB,BMTEST,
* M1,M21,M2,JSPLN,NN,IFIRST,IOP
COMMON/SPLN/XS(200),YS(200),AS(200),BS(200),CS(200),NS,ISPLN
COMMON/MODEL/K2,KS1,H,Z,A,R,HMAX,M
DATA DER/2*0.0/C2/.730921017/,THRESH/.1E-6/
DATA SQPI/1.7724539/,XMU0/1.2566371E-6/
IF(IN.GT.1.OR.M.EQ.1) GO TO 20
DO 10 J=2,M
IF(B(J).EQ.B(J-1)) CALL ERRMSG('SOME SIG(J)=SIG(J-1)',4,6,16)
CONTINUE
20 DO 30 J=1,5
30 PRNT(J)=X(IN,J)
IF(IN.GT.1) GO TO 800
IF(IDER.EQ.1) GO TO 8001
35 SIG1=B(1)
HMAX=A
IF(M.EQ.1) GO TO 45
DO 40 J=1,M1
H(J)=B(M+J)
40 SIG(J)=B(J)
CALL MINMAX(H,M1,HMIN,HMAX)
45 SIG(M)=B(M)
ANORM=A/HMAX
ZAC2=ANORM/C2
TCON=6.28318531E-7*SIG1*AA
IF(JSPLN.EQ.0) GO TO 49
C--GET PRE-SPLINED FREQ FUNCTION (0<NB<12 OPTION)
MS=0
TEM=B0/DB
ISPLN=0
46 TEM=TEM*DB
IF(TEM.GE.BMTEST) GO TO 47
MS=MS+1
IF(MS.GT.200) CALL ERRMSG('SPLINED MS>200 IN FCODE',3,6,16)
OLDX=XS(MS)
XS(MS)=TEM
OLDY=YS(MS)
YS(MS)=ELOOP(TEM*TEM)
C
C--APPLY THE 'THRESH TEST' TO SEE IF REST OF PREVIOUS CURVE CAN BE
C USED TO SAVE RECOMPUTING REST OF FREQ RESPONSE. (NOTE THAT THE
C VERY FIRST CURVE (I.E., WHEN IFIRST=1) WILL FALL-THRU ALL IF
C TESTS AND ESTABLISH A NEW 'PREV CURVE' FOR SUBSEQUENT TESTS.)
C--BEGIN 'THRESH TEST':
IF(TEM.GE.1.0) THEN
IF(TEM.EQ.OLDX) THEN

```

```

                                00001480
                                00001490
                                00001500
                                00001510
                                00001520
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                                00001550
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                                00001800
                                00001810
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                                00001890
                                00001900
                                00001910
                                00001920
                                00001930
                                00001940
                                00001950
                                00001960
                                00001970
                                00001980
                                00001990
                                00002000
                                00002010
                                00002020

                                IF(OLDY.NE.0.0) THEN
                                IF(ABS((YS(MS)-OLDY)/OLDY).LT.THRESH) THEN
                                    MS=MS
                                    GO TO 47
                                ENDF
                                ENDF
                                ENDF
                                ENDF
                                ENDF
                                C--END OF 'THRESH TEST'
                                C
                                GO TO 46
                                47  NS=MS
                                    CALL SPLIN1(NS,0.0,XS,YS,AS,BS,CS,0,DER,T,W2)
                                    ISPLN=1
                                49  TO=.5*TMIN/TCON
                                    TM=TMAX/TCON
                                    NEW=1
                                    IF(IFIRST.EQ.1) IWARN=0
                                    TRANSL=1.E30
                                    DO 70 I=1,NN
                                        T(I)=X(I,1)/TCON
                                C--GET TRANSIENT IMPULSE RESPONSE VIA LAGGED CONVOLUTION IN TIME.
                                    TRANS=.63661977*RFLAGS(0,ELOOP,EPS,TO,TM,T(I),NEW)
                                    NEW=0
                                C--IF CALC. TRANS TOO NOISY, THEN FORCE TRANS=TRANSL; THIS SHOULD NOT
                                C OCCUR WITH THE USUAL TIME RANGE USED WITH MOST FIELD EQUIPMENT.
                                    IF(TRANS.LT.0.0.OR.TRANS.GT.TRANSL) THEN
                                        TRANS=TRANSL
                                        IF(IWARN.EQ.0) THEN
                                            IWARN=1
                                            CALL WARN('NOISE IN CALC. TRANS DETECTED.',0,0,16,*71)
                                        ENDF
                                    ENDF
                                71  TRANSL=TRANS
                                    VSAVE(I)=TRANS
                                C--IF IOPT=1, THEN CONVERT COMPUTED "TRANS" TO "APPRES"
                                    IF(IOPT.EQ.1) THEN
                                        CALL X2ARES(1.29552377*T(I)*TRANS,X2)
                                        IF(X2.LE.0.0) THEN
                                            APPRES(I)=1./SIG1
                                        ELSE
                                            APPRES(I)=0.5/(SIG1*T(I)*X2)
                                        ENDF
                                    ENDF
                                70  CONTINUE
                                    IF(IDER.EQ.0) GO TO 600
                                    IFIRST=0
                                    DO 60 J=1,M21
                                80  BSAVE(J)=B(J)
                                C--GET PRE-SPLINED TRANSIENT
                                600 IF(IOPT.EQ.0) THEN
                                    F=B(M2)*VSAVE(IN)/SIG1
                                ELSE
                                    F=B(M2)*APPRES(IN)
                                ENDF

```

```

      RETURN
500  IF(IDER.EQ.0) GO TO 500
C---IDER=1 EST.DER.OPTION
5001 IF(IFIRST.EQ.1) GO TO 35
      DO 802 J=1,M21
          IF(B(J).NE.BSAVE(J)) GO TO 35
502  CONTINUE
      GO TO 500
      END
      SUBROUTINE MARQ TRANS_ELOOP SUBZ(Y,X,B,PRNT,NPRNT,N,TITLE,IOUT)
C-- INITIALIZATION ROUTINE (CALLED ONCE)
C
C  SUBZ IS CALLED BY NLSOL AFTER THE DATA Y(I),X(I,5) ARE READ.
C  SUBZ CHECKS FOR DATA ERRORS, READS ADDITIONAL $INIT
C  PARAMETERS, AND LOADS SOME CONSTANTS IN COMMON STORAGE...
C
C--PARAMETERS--
C      Y,X,B,PRNT SAME AS IN SUBROUTINE FCODE.
C      NPRNT= CONTROL PARAMETERS TO USE PRNT(NPRNT) ARRAY
C              NPRNT REPRESENTS THE NO. X(I,NPRNT) VALUES
C      N= NO. OBSERVATIONS GIVEN IN Y(N),X(N,5)
C      TITLE= ALPHA TITLE ARRAY READ IN BY PGM IMSLMQ.
C      IOUT= 1 IF UNIT 6 AND 16 PRINT FILES USED
C            0 IF ONLY UNIT 6 PRINT FILE USED.
C
      COMPLEX K2(10),KS1,C4,ZA,ZAC2
      CHARACTER*80 TITLE
      CHARACTER*9 OPT(0:1)
      REAL Y(1),X(500,5),B(1),PRNT(1),SIG(10),H(10)
      COMMON/PASS/ZAC2,ANORM,SIG,B0,BM,SIG1,EPS
      COMMON/FPASS/AA,TMIN,TMAX,TO,TM,DB,BMTEST,
& M1,M21,M2,JSPLN,NN,IFIRST,IOPT
      COMMON/SPLN/FILL(1000),NS,ISPLN
      COMMON/MODEL/K2,KS1,H,Z,A,R,HMAX,M
C**  NAMELIST/INIT/MM,A,Z,EPS,B0,BM,NB
      COMMON/NAME_LIST/FILLS(65),MM,FILLS2(4),EPS,
1 FILLER(303T),IOPT_,FILL3,NB,BO_,PARM(4),BM_,A_,FILLZ
      DATA ISUBZ/0/
      DATA OPT/'TRANSIENT','APPRES'/
      IF(ISUBZ.NE.0) GO TO 10
C--PRESET
      ISUBZ=1
      MM=1
      R=0.0
      Z=0.0
      A=0.0
      B0=.001
      BM=.1E6
      NB=6
      EPS=.1E-9
      IOPT=0
C**10 READ(5,INIT)
10  CALL NAMELIST(5,'$INIT',*11)
      M=MM
      IOPT=IOPT_

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      EPS=EPS_
      BO=BO_
      BM=BM_
      A=A_
11    CALL NONBLANK(TITLE, NONBLK)
      WRITE(6,20) TITLE
20    FORMAT('1(NLSTCO):',5X,A<NONBLK>/)
      IF(IOUT.EQ.1) WRITE(16,20) TITLE
      WRITE(6,30) MM,A,EPS,BO,BM,NB,IOPT
      IF(IOUT.EQ.1) WRITE(16,30) MM,A,EPS,BO,BM,NB,IOPT
30    FORMAT(' MM=',I3,12X,' A=',E13.6,4X,' EPS=',E13.6,
      & ' BO=',E13.6,2X,' BM=',E13.6,4X,' NB=',I3/' IOPT=',I3)
C--TEST $INIT PARMS
      IF(MM.LT.1.OR.MM.GT.10.OR.A.LE.0.0.OR.NB.LT.0.OR.
      & BM.LE.0.0.OR.BO.LE.0.0.OR.IOPT.LT.0.OR.IOPT.GT.1)
      & CALL ERRMSG('SOME $INIT PARMS OUT OF RANGE.',6,6,16)
C--TEST X(I, ) DATA BEFORE PROCEEDING
      DO 40 I=2,N
      IF(X(I,1).LE.X(I-1,1).OR.X(I,1).LE.0.0)
      & CALL ERRMSG('SOME X(I,1)<0.0 OR NOT INCREASING.',7,6,16)
40    CONTINUE
C--PRESET SOME GLOBAL CONSTANTS
      IFIRST=1
      DO I=1,400
      FILL(I)=0.0
      ENDDO
      NN=N
      AA=A*A
      ZA=CMPLX(A,0.0)
      TMIN=X(1,1)
      TMAX=X(N,1)
      JSPLN=0
      JSPLN=0
      IF(NB.GT.0.AND.NB.LT.12) JSPLN=1
      IF(JSPLN.EQ.1) THEN
      DB=EXP(2.30258509/FLOAT(NB))
      BMTEST=0.5*(BM+BM*DB)
      ENDIF
      WRITE(6,50)
      IF(IOUT.EQ.1) WRITE(16,50)
50    FORMAT('////' PARAMETER ORDER--'//')
      M1=MM-1
      M2=2*MM-1
      M2=M2+1
      WRITE(6,110) (I,I,I=1,MM)
      IF(IOUT.EQ.1) WRITE(16,110) (I,I,I=1,MM)
110   FORMAT(5X,I3,6X,6HSIGMA(I3,1H))
      IF(MM.EQ.1) GO TO 132
      DO 120 I=1,M1
      J=MM+I
      IF(IOUT.EQ.1) WRITE(16,130) J,I
120   WRITE(6,130) J,I
130   FORMAT(5X,I3,6X,6HTHICK(I3,1H))
132   WRITE(6,131) M2,M2,OPT(IOPT)
131   FORMAT(5X,I3,10X,'B('I3,') SHIFT PARAMETER IN B(2*MM)*',A)

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      IF(IOUT.EQ.1) WRITE(16,131) M2,M2,OPT(IOPT)
      NPRNT=2
      RETURN
    END
    SUBROUTINE X2ARES(SO,X2)
C--COMPUTE X2 USED IN APPARENT RESISTIVITY (APPRES) CONVERSION.
C REF: RAICHE AND SPIES (1982, P.54-55) GEOPHYSICS, V.46, N.1.
C
C   USE SO=(V/I)*TIME(IN SEC.)/(A*4.4546624E-6) IF CONVERTING "V/I" DATA
C   TO "APPRES" FORM.
C   USE SO=1.29552377*T(NORMALIZED TIME)*TRANS IN IOPT=1 CASE WHEN
C   CONVERTING COMPUTED "TRANS" TO "APPRES" FORM.
C
C   NOTE: X2=0.0 IS RETURNED WHEN AND IF X1>5.69 IN THE RAICHE AND
C   SPIES ALGORITHM (SEE P.55, AFTER EQ. (11)). FOR NORM TIME
C   AND WHEN X2=0, APPRES=1./SIG1 SHOULD BE USED.
C (CORRECT CONST 925.90217 CONFIRMED BY B.SPIES)
      IF(SO.GE.0.13) THEN
        X2=0.0
        RETURN
      ENDIF
      Y0=SO**1.66666667
      X1=((((((((110000.*Y0+12360.90299)*Y0+
1  3379.08752)*Y0+925.90217)*Y0+
2  255.84635)*Y0+71.89746)*Y0+
3  20.88351)*Y0+6.49229)*Y0+
4  2.38095)*Y0+1.70998)**2
      X1=Y0*X1
      IF(X1.LE.1.4) THEN
        X2=X1
      ELSE IF(X1.GT.1.4.AND.X1.LE.2.8) THEN
        X2=X1+0.001635*X1**4.892
      ELSE IF(X1.GT.2.8.AND.X1.LE.5.69) THEN
        X2=X1+0.004018*X1**4.01364
      ELSE
        X2=0.0
      ENDIF
      RETURN
    END
    SUBROUTINE NAMELIST(IUNIT,NAME,*)
C
C (NAMELIST INPUT ON VAX-11/780) VIA "CALL NAMELIST" (VERSION: 12/10/80)
C
C--A SIMULATED 'NAMELIST/NAME/' PROCESSOR FOR VAX-11 FORTRAN-77 TO
C IMPLEMENT "CALL NAMELIST(IUNIT,'$NAME',*EOF)" ON VAX, WHICH
C IS SIMILAR TO "READ(IUNIT,NAME,END=EOF)" ON MOST LARGE SYSTEMS.
C
C--BY W.L.ANDERSON, U.S. GEOLOGICAL SURVEY, DENVER, COLORADO.
C
C--THIS IS A SUBSET OF THE ACTUAL NAMELIST/NAME/ AVAILABLE ON
C MOST LARGE MAIN-FRAME SYSTEMS. CURRENT OPTIONS ARE:
C
C (1) ALL VARNAM'S ARE RESTRICTED TO 1 TO 6 CHAR'S (ALP,NUM, AND ' ')
C     BUT MUST BEGIN WITH AN ALP CHAR (E.G., A3, BVAR, C 2, ETC.)
C (2) ONLY VARIABLE TYPES REAL*4 *8 (NAMTYP=1) AND INTEGER*2 *4

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C      (NAMTYP=0). SEE C==== EXAMPLE STATEMENTS FOR NAMTYP BELOW =====. 00003680
C      (NOTE: COMPLEX, LOGICAL, OR CHARACTER VARIABLE TYPES ARE "NOT" 00003690
C      CODED IN THIS VERSION.) 00003700
C      (3) MAX. 60 VARNAM'S ALLOWED IN NAMELIST (FOR ALL 'SNAME'S USED). 00003710
C      (4) MAX. NUMBER FIELD (FLOAT OR FIXED) IS 20 CHAR WIDE, WHERE 00003720
C      BLANK CHAR'S ARE IGNORED, AND TYPE CONVERSION IS AUTOMATIC. 00003730
C      FLOAT NUMBERS WITH OPTIONAL E+XX OR D-XX AND WITH OR WITHOUT '.' 00003740
C      IN THE MANTISSA IS ALLOWED (E.G., 123E-3, .123D+02, -3.14, ETC.). 00003750
C      (5) PARTIAL ARRAY'S ALLOWED; E.G., A(10)=25.1, 00003760
C      AND B=1,3,2,... 00003770
C      (6) REPEAT FACTORS ALLOWED; E.G., C=2*1,3,... 00003780
C      (7) ONLY 1-DIM ARRAYS ALLOWED WITH MAX SIZE 99999. 00003790
C      (8) THE NAMELIST 'SNAME' MUST BE 2 TO 7 CHAR'S, AND MUST BEGIN WITH 00003800
C      A "$" CHAR (E.G., 'SP', 'SPARMS', ETC.); ALSO, THE FIRST CHAR IN 00003810
C      IFILE MAY BEGIN IN COL. 1 BUT LESS THAN COL. 72 (BUFFER IS 80). 00003820
C      LINES IN IFILE MAY BE CONTINUED TO COL. 1 ON NEXT LINE, AND 00003830
C      TERMINATE THE NAMELIST BY "$[END]"--THE "END" IS OPTIONAL. E.G., 00003840
C      00003850
C      SPARMS A=1,B=2.3,7*1,C(3)=-.123E-10, 00003860
C      D=1800, E=5*20$END 00003870
C      $NEXNAM F=123, G=-10,C(2)=15.02 $ 00003880
C      ...END-OF-IFILE... 00003890
C      (9) ABOUT 98% OF ALL THE POSSIBLE ERRORS ARE DETECTED AND AN 00003900
C      ERROR MESSAGE IS PRINTED ON UNIT 06, FOLLOWED BY CALL EXIT. 00003910
C      (NOTE: WATCH OUT FOR THE REMAINING 2% UNDETECTED ERRORS!) 00003920
C      00003930
C--SUBROUTINES CALLED: 00003940
C      00003950
C      DECODEIX, DECODEX, AND NONBLANK. 00003960
C      00003970
C--USAGE: 00003980
C      00003990
C      1. MODIFY FILE 'INCLNAMES.FOR' AS REQUIRED (USE ANY EDITOR). 00004000
C      (SEE C==== EXAMPLE STATEMENTS BELOW =====.) 00004010
C      2. RECOMPILE SUBROUTINE 'NAMELIST' WITH THE DESIRED INCLNAMES.FOR. 00004020
C      3. IN USERS CALLING PROGRAM, USE: 00004030
C      CALL NAMELIST(IUNIT,'SNAME',*N) --ON VAX, WHERE N=E.O.F RETURN 00004040
C      STATEMENT LABEL. THIS SIMULATES ON VAX: 00004050
C      'READ(IUNIT,NAME,END=N)' ON SYSTEMS WITH NAMELIST/NAME/... 00004060
C      00004070
C*****00004080
C      CHARACTER*(*) NAME 00004100
C      CHARACTER*1 C(47),BUFI 00004110
C      CHARACTER*6 VARNAM 00004120
C      CHARACTER*20 NUMFLD 00004130
C      CHARACTER*80 BUF 00004140
C      00004150
C=====00004160
C===== THE USER MUST CHANGE THE FOLLOWING STATEMENTS FOR THE SPECIFIC 00004170
C===== NAMELIST VARIABLES DESIRED (E.G., USE TECO OR EDT, ETC.)=====00004180
C===== DIMENSION NO_NAM VARIABLES TO AGREE WITH CHANGED DATA STATEMENTS00004190
C== 00004200
C==ON VAX USE THE FOLLOWING INCLUDE STATEMENT (OPTIONALLY, USE /LIST): 00004210
C== 00004220

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C>>  INCLUDE 'INCLNAMES.FOR/NOLIST'                                00004230
C                                                                    00004240
C===== INCLNAM13.FT =====                                00004250
C===== FOR USE IN CALL NAMELIST =====                    00004260
C NORMALLY, ONE SHOULD COPY 'INCLNAM13.FT' TO 'INCLNAMES.FT'; THEN 00004270
C EDIT 'INCLNAMES.FT' AS DESIRED FOR USERS CALL NAMELIST. NOTE THAT 00004280
C ONE MUST RECOMPILE 'NAMELIST.FT' WITH USERS CALLING PROGRAM,      00004290
C WHERE 'NAMELIST.FT' CONTAINS THE FOLLOWING STATEMENT:              00004300
C                                                                    00004310
C    INCLUDE 'INCLNAMES.FT/LIST'                                     00004320
C=====                                00004330
C                                                                    00004340
C=====                                00004350
C THIS IS "$PARMS AND $INIT" INPUT FOR PROGRAMS "NLSTCI" AND "NLSTCO" 00004360
C=====                                00004370
C                                                                    00004380
C$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ 00004390
C$ CHANGE THE FOLLOWING FORTRAN-77 PARAMETER STATEMENT ONLY IF      00004400
C$ INCREASING THE DEFAULT DIMENSIONS FOR NLSTCO:                   00004410
C    PARAMETER (NDIM=500,MDIM=5,KDIM=20)                             00004420
C$ WHERE NDIM=MAX.OBS., MDIM=MAX.INDEP.VARS., KDIM=MAX.UNKNOWN PARMS. 00004430
C$ DO NOT CHANGE THE FOLLOWING RELATED PARAMETER STATEMENT:         00004440
C    PARAMETER (KIDIM=KDIM-1,                                       00004450
C      1 IVDIM=KDIM+60,NKVDIM=96+2*NDIM+(KDIM*(7*KDIM+41))/2)      00004460
C$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ 00004470
C                                                                    00004480
C    COMMON/NAME LIST/V1,V2,V3,V4,V5,V6,V7,V8,V9,V10,              00004490
C      * V11,V12,V13,V14,V15,V16,V17,V18,V19,V20,                  00004500
C      * V21,V22,V23,V24,V25,V26,V27,V28,V29,V30,                  00004510
C      * V31,V32,V33,V34,V35,V36,V37,V38,V39,                      00004520
C      * V40,V41,V42,V43,V44,V45,V46,V47,V48,V49,V50,V51           00004530
C      INTEGER V1,V2,V3,V4,V5,V6,V7,V8,V9,V10,V11,                 00004540
C      * V17, V21,V22,V23,V24,V25, V27,V28,V29, V35,V36,V37,V38,V39, 00004550
C      * V40,V44,V45,V46                                             00004560
C      DIMENSION V1(1),V2(1),V3(1),V4(1),                           00004570
C      * V5(1),V6(1),V7(1),V8(1),V9(1),V10(1),                     00004580
C      * V11(1),V12(1),V13(1),V14(1),V15(1),                       00004590
C      * V16(1),V17(1),V18(1),V19(1),V20(1),                       00004600
C      * V21(1),V22(1),V23(1),V24(1),V25(1),                       00004610
C      * V26(KDIM),V27(KIDIM),V28(1),V29(1),V30(1),                00004620
C      * V31(1),V32(1),V33(1),V34(1),V35(1),                       00004630
C      * V36(1),V37(1),V38(1),V39(1),V40(IVDIM),                   00004640
C      * V41(NKVDIM),V42(KDIM),V43(KDIM),V44(1),V45(1),            00004650
C      * V46(1),V47(1),V48(4),V49(1),V50(2),                       00004660
C      * V51(1),V52(1),V53(1),V54(1),V55(1),                      00004670
C      * V56(1),V57(1),V58(1),V59(1),V60(1)                       00004680
C      DIMENSION NAMDIM(60),NAMLEN(60),NAMTYP(60)                  00004690
C      CHARACTER*6 NAM(60)                                           00004700
C      DATA NAM/'N','K','IP','M','IALT','ISTOP','IWT','IDER',      00004710
C      * 'IPRT','NITER','INON','FF','T','E','TAC','XL','MODLAM',    00004720
C      * 'GAMCR','DEL','ZETA','IOUT','SP','SCALEP','SY','SCALEY',  00004730
C      * 'B','IB','IOB','MM','XO','YO','L','EP','EPS','NEPS',      00004740
C      * 'METHOD','NFIN','IER','MEV','IV','V','BL','BH',           00004750
C      * 'IOPT','ISTEP','NB','BO','PARM','BM','A','Z','9','/'      00004760
C      DATA NAMDIM/25*1,KDIM,KIDIM,12*1,IVDIM,NKVDIM,2*KDIM,4*1,  00004770

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1 4,3*1,9*0/
DATA NAMLEN/2*1,2,1,4,5,3,2*4,5,4,2,2*1,3,2,6,5,3,2*4,
* 2,6,2,6,1,2,3,3*2,1,2,3,4,6,4,2*3,2,1,2*2,
* 4,5,2*2,4,2,2*1,9*0/
DATA NAMTYP/11*0,5*1,0,3*1,5*0,1,3*0,5*1,5*0,0,3*1,3*0,5*1,9*0/
DATA NO NAM/51/
C===== END OF INCLUDE STATEMENTS =====00004730
C00004730
C==00004750
C== FOR EXAMPLE, FILE 'INCLNAMES.FOR' MAY CONTAIN (WITHOUT "C==")00004800
C==00004810
C== COMMON/NAME_LIST/V1,V2,V3,V400004820
C== REAL*8 V100004830
C== INTEGER V300004840
C== DIMENSION V1(1),V2(2),V3(3),V4(4),00004850
C== * V5(1),V6(1),V7(1),V8(1),V9(1),V10(1),00004860
C== * V11(1),V12(1),V13(1),V14(1),V15(1),00004870
C== * V16(1),V17(1),V18(1),V19(1),V20(1),00004880
C== * V21(1),V22(1),V23(1),V24(1),V25(1),00004890
C== * V26(1),V27(1),V28(1),V29(1),V30(1),00004900
C== * V31(1),V32(1),V33(1),V34(1),V35(1),00004910
C== * V36(1),V37(1),V38(1),V39(1),V40(1),00004920
C== * V41(1),V42(1),V43(1),V44(1),V45(1),00004930
C== * V46(1),V47(1),V48(1),V49(1),V50(1),00004940
C== * V51(1),V52(1),V53(1),V54(1),V55(1),00004950
C== * V56(1),V57(1),V58(1),V59(1),V60(1)00004960
C== DIMENSION NAMDIM(60),NAMLEN(60),NAMTYP(60)00004970
C== CHARACTER*6 NAM(60)00004980
C== DATA NAM/'A','BB','ICC','DDD_4',56*' '/00004990
C== DATA NAMDIM/1,2,3,4,56*0/00005000
C== DATA NAMLEN/1,2,3,5,56*0/00005010
C== DATA NAMTYP/2*1,0,1,56*0/00005020
C== DATA NO NAM/4/00005030
C===== END OF EXAMPLE INCLUDE STATEMENTS =====00005040
C00005050
C*****00005060
C NOTE: THE ABOVE EXAMPLE SIMULATES00005070
C 'NAMELIST/NAME/A,BB,ICC,DDD_4'00005080
C 'READ(IUNIT,NAME,END=EOF) '00005090
C 'READ(IUNIT,ANYNAM,END=EOF) '00005100
C IN THE CALLING PROGRAM USING:00005110
C ...00005120
C REAL*8 A00005130
C ...00005140
C COMMON/NAME_LIST/A,BB(2),ICC(3),DDD_4(4)00005150
C ...00005160
C CALL NAMELIST(IUNIT,'$NAME',*EOF)00005170
C ...00005180
C CALL NAMELIST(IUNIT,'$ANYNAM',*EOF)00005190
C ...00005200
C*****00005210
C DATA C/'A','B','C','D','E','F','G','H','I','J','K','L','M','N',00005220
C * 'O','P','Q','R','S','T','U','V','W','X','Y','Z','_',00005230
C * '1','2','3','4','5','6','7','8','9','0',00005240
00005250
00005260
00005270
00005280
00005290
00005300
00005310
00005320

```

```

C--INITIALIZE
NAME=' '
J=LEN(NAME)
IF(J.LET.2.OR.J.GT.7) THEN
    CALL ERRMSG('CALL NAMELIST ILLEGAL WITH NAME= '//
        NAME//'' (LENGTH<2 OR >7 CHAR'S)'),1,0,0)
ENDIF
IF(CHARACTER(NAME).NE.'S')
    CALL ERRMSG('CALL NAMELIST ILLEGAL WITH NAME= '//
        NAME//'' (1ST CHAR MUST BE "$" CHAR)'),1,0,0)

C--INITIALIZE
INAME=0
10 READ(IUNIT,11,END=99991,ERR=99992) BUF
11 FORMAT(A80)
IF(INAME.EQ.1) GO TO 20
C--LOOK FOR " $NAME"
I=INDEX(BUF,NAME)
IF(I.EQ.0) GO TO 10
INAME=1
ICOL=I+J
JNAM=0
ILEN=0
VARNAM=''
NUMLEN=0
IELE=1
GO TO 30
20 ICOL=1
30 CALL NONBLANK(BUF,LENBUF)
C=BEGIN PARSER LOOP (THE BIG 20000 LOOP)
IENTD=0
DO 20000 I=ICOL,LENBUF
    BUFI=BUF(I:I)
    DO 40 IC=1,27
        IF(BUFI.EQ.C(IC)) GO TO 100
40 CONTINUE
    DO 50 IC=28,37
60 IF(BUFI.EQ.C(IC)) GO TO 200
CONTINUE
    DO 60 IC=38,47
    IC =IC-37
    IF(BUFI.EQ.C(IC)) GO TO 70
70 CONTINUE
    WRITE(6,*) I,BUFI
    FORMAT('/' (NAMELIST): ERROR IN FOLLOWING RECORD AT COL(',I2,'): '/'
    IX,A80/'<>'X,' ')
    CALL ERRMSG('ILLEGAL CHAR="//BUFI//' FOUND'),0,0,0)
57 WRITE(6,*) I,BUFI
    CALL ERRMSG('NUMLEN<1 IN DECODEIX ',0,0,0)
58 WRITE(6,*) I,BUFI
    CALL ERRMSG('NUMLEN<1 IN DECODEX',0,0,0)
70 GO TO (20000,72,73,74,75,76,77,78,79,79),IC_
C--'$' CHAR
72 IENTD=1
IF(NUMLEN.GT.0) GO TO 798
IF(JNAM.EQ.0) GO TO 99990
WRITE(6,*) I,BUFI

```

CALL ERRMSG('MISPLACED "S" CHAR',0,0,0)	00005880
C--'=' CHAR	00005890
73 IEQ=1	00005900
C--CHECK FOR VALID VARNAM, LENGTH ILEN, ETC.	00005910
IF(ILEN.LT.1) GO TO 733	00005920
DO 732 J=1,NO_NAM	00005930
JNAM=J	00005940
JLEN=NAMLEN(J)	00005950
IF(JLEN.NE.ILEN) GO TO 732	00005960
DO 731 K=1,JLEN	00005970
IF(VARNAM(K:K).NE.NAM(JNAM)(K:K)) GO TO 732	00005980
731 CONTINUE	00005990
C--VARNAM VERIFIED OK TO PROCEED TO NUMFLD(S)	00006000
C	00006010
IDIM=NAMDIM(JNAM)	00006020
NUMLEN=0	00006030
NDEC=0	00006040
NREP=1	00006050
NEXP=0	00006060
GO TO 20000	00006070
732 CONTINUE	00006080
WRITE(6,66) I,BUF	00006090
CALL ERRMSG('ILLEGAL VARNAM=//VARNAM// FOUND',0,0,0)	00006100
733 WRITE(6,66) I,BUF	00006110
CALL ERRMSG('MISPLACED "=" CHAR ',0,0,0)	00006120
C--',' CHAR	00006130
74 IF(NUMLEN.GT.0) GO TO 799	00006140
WRITE(6,66) I,BUF	00006150
CALL ERRMSG('MISPLACED "," CHAR',0,0,0)	00006160
C--'(' CHAR	00006170
75 IELE=0	00006180
GO TO 20000	00006190
C--'*' CHAR	00006200
76 IF(JNAM.EQ.0.OR.NUMLEN.LT.1.OR.NUMLEN.GT.5) GO TO 767	00006210
760 CALL DECODEIX(NUMFLD,NUMLEN,NREP,*57)	00006220
NUMLEN=0	00006230
IF(NREP.GT.0.AND.NREP.LE.NAMDIM(JNAM)) GO TO 20000	00006240
WRITE(6,66) I,BUF	00006250
CALL ERRMSG('REPEAT FACTOR <1 OR >NAMDIM ',0,0,0)	00006260
767 WRITE(6,66) I,BUF	00006270
CALL ERRMSG('REPEAT WIDTH > 5 OR MISPLACED "*" CHAR',0,0,0)	00006280
C--')' CHAR	00006290
77 .(IELE.NE.0) GO TO 772	00006300
CALL DECODEIX(NUMFLD,NUMLEN,IELE,*57)	00006310
IF(IELE.LT.1) GO TO 773	00006320
NREP=1	00006330
GO TO 20000	00006340
772 WRITE(6,66) I,BUF	00006350
CALL ERRMSG('MISPLACED ")" CHAR',0,0,0)	00006360
773 WRITE(6,66) I,BUF	00006370
CALL ERRMSG('ARRAY IELE<1 OR >NAMDIM ',0,0,0)	00006380
C--'.' CHAR	00006390
78 IF(JNAM.EQ.0.OR.NEXP.GT.0.OR.NDEC.GT.0) GO TO 781	00006400
NDEC=NUMLEN+1	00006410
IF(NAMTYP(JNAM).EQ.1) GO TO 200	00006420

```

781  WRITE(6,66) I,BUF
      CALL ERRMSG('MISPLACED "." CHAR',0,0,0)
C--'-' OR '+' CHAR
79   IF(IELE.GT.0.OR.NEXP.GT.0) GO TO 210
      WRITE(6,66) I,BUF
      CALL ERRMSG('MISPLACED "-" OR "+" CHAR',0,0,0)
C--<ALP> CHAR
100  IF(NUMLEN.GT.0) GO TO 209
      IF(ILEN.GT.0) GO TO 102
      IEQ=0
      IELE=1
102  ILEN=ILEN+1
      IF(ILEN.GT.6) GO TO 101
      VARNAM(ILEN:ILEN)=BUFI
      GO TO 20000
101  WRITE(6,66) I,BUF
      CALL ERRMSG('VARNAM>6 CHAR''S'',0,0,0)
C--<+--NUM> CHAR
200  IF(IELE.EQ.0) GO TO 210
      IF(IEQ.EQ.0) GO TO 102
      GO TO 210
209  IF(BUFI.EQ.'E'.OR.BUFI.EQ.'D') THEN
      NEXP=NUMLEN+1
      ELSE
      GO TO 61
      ENDIF
210  NUMLEN=NUMLEN+1
      IF(NUMLEN.GT.20) GO TO 211
      NUMFLD(NUMLEN:NUMLEN)=BUFI
      GO TO 20000
211  WRITE(6,66) I,BUF
      CALL ERRMSG('NUM FIELD>20 CHAR''S'',0,0,0)
C--PROCESS NUMBER FIELD
799  IDIM=IDIM-1
      IF(IDIM.LT.0) GO TO 10004
798  IF(NEXP.GT.0) GO TO 1000
C--[NEXP=0]
      IF(NDEC.GT.0) GO TO 899
C--[NEXP=0, NDEC=0]
      CALL DECODEIX(NUMFLD,NUMLEN,IX,*67)
C--CONVERT IX AND STORE IN COMMON
800  X=IX
      IF(IELE.GT.NAMDIM(JNAM)) GO TO 773
8000 GO TO (801,802,803,804,805,806,807,808,809,310,
      * 311,812,813,814,815,816,817,818,819,320,
      * 321,822,823,824,825,826,827,828,829,330,
      * 331,832,833,834,835,836,837,838,839,340,
      * 341,842,843,844,845,846,847,848,849,350,
      * 351,852,853,854,855,856,857,858,859,360),JNAM
801  V1(IELE)=X
      GO TO 10000
802  V2(IELE)=X
      GO TO 10000
803  V3(IELE)=X
      GO TO 10000

```

804	V4(IELE)=X	00006980
	GO TO 10000	00006990
805	V5(IELE)=X	00007000
	GO TO 10000	00007010
806	V6(IELE)=X	00007020
	GO TO 10000	00007030
807	V7(IELE)=X	00007040
	GO TO 10000	00007050
808	V8(IELE)=X	00007060
	GO TO 10000	00007070
809	V9(IELE)=X	00007080
	GO TO 10000	00007090
810	V10(IELE)=X	00007100
	GO TO 10000	00007110
811	V11(IELE)=X	00007120
	GO TO 10000	00007130
812	V12(IELE)=X	00007140
	GO TO 10000	00007150
813	V13(IELE)=X	00007160
	GO TO 10000	00007170
814	V14(IELE)=X	00007180
	GO TO 10000	00007190
815	V15(IELE)=X	00007200
	GO TO 10000	00007210
816	V16(IELE)=X	00007220
	GO TO 10000	00007230
817	V17(IELE)=X	00007240
	GO TO 10000	00007250
818	V18(IELE)=X	00007260
	GO TO 10000	00007270
819	V19(IELE)=X	00007280
	GO TO 10000	00007290
820	V20(IELE)=X	00007300
	GO TO 10000	00007310
821	V21(IELE)=X	00007320
	GO TO 10000	00007330
822	V22(IELE)=X	00007340
	GO TO 10000	00007350
823	V23(IELE)=X	00007360
	GO TO 10000	00007370
824	V24(IELE)=X	00007380
	GO TO 10000	00007390
825	V25(IELE)=X	00007400
	GO TO 10000	00007410
826	V26(IELE)=X	00007420
	GO TO 10000	00007430
827	V27(IELE)=X	00007440
	GO TO 10000	00007450
828	V28(IELE)=X	00007460
	GO TO 10000	00007470
829	V29(IELE)=X	00007480
	GO TO 10000	00007490
830	V30(IELE)=X	00007500
	GO TO 10000	00007510
831	V31(IELE)=X	00007520

332	GO TO 10000	00007530
	V32(IELE)=X	00007540
	GO TO 10000	00007550
333	V33(IELE)=X	00007560
	GO TO 10000	00007570
334	V34(IELE)=X	00007580
	GO TO 10000	00007590
335	V35(IELE)=X	00007600
	GO TO 10000	00007610
336	V36(IELE)=X	00007620
	GO TO 10000	00007630
337	V37(IELE)=X	00007640
	GO TO 10000	00007650
338	V38(IELE)=X	00007660
	GO TO 10000	00007670
339	V39(IELE)=X	00007680
	GO TO 10000	00007690
340	V40(IELE)=X	00007700
	GO TO 10000	00007710
341	V41(IELE)=X	00007720
	GO TO 10000	00007730
342	V42(IELE)=X	00007740
	GO TO 10000	00007750
343	V43(IELE)=X	00007760
	GO TO 10000	00007770
344	V44(IELE)=X	00007780
	GO TO 10000	00007790
345	V45(IELE)=X	00007800
	GO TO 10000	00007810
346	V46(IELE)=X	00007820
	GO TO 10000	00007830
347	V47(IELE)=X	00007840
	GO TO 10000	00007850
348	V48(IELE)=X	00007860
	GO TO 10000	00007870
349	V49(IELE)=X	00007880
	GO TO 10000	00007890
350	V50(IELE)=X	00007900
	GO TO 10000	00007910
351	V51(IELE)=X	00007920
	GO TO 10000	00007930
352	V52(IELE)=X	00007940
	GO TO 10000	00007950
353	V53(IELE)=X	00007960
	GO TO 10000	00007970
354	V54(IELE)=X	00007980
	GO TO 10000	00007990
355	V55(IELE)=X	00008000
	GO TO 10000	00008010
356	V56(IELE)=X	00008020
	GO TO 10000	00008030
357	V57(IELE)=X	00008040
	GO TO 10000	00008050
358	V58(IELE)=X	00008060
	GO TO 10000	00008070

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859  759(IELE)=X                                00008080
      GO TO 10000                                00008090
860  760(IELE)=X                                00008100
      GO TO 10000                                00008110
C--[NEXP=0, NDEC>0]                             00008120
899  CALL DECODEX(NUMFLD,NUMLEN,NDEC,X,*68)      00008130
C--CONVERT X AND STORE IN COMMON                 00008140
900  IF(IELE.GT.NAMDIM(JNAM)) GO TO 773         00008150
      GO TO 8000                                00008160
C--[NEXP>0]                                       00008170
1000 IF(NDEC.GT.0) GO TO 2000                   00008180
C--[NEXP>0, NDEC=0]                             00008190
      CALL DECODEIX(NUMFLD,NEXP-1,IX,*67)        00008200
      X=IX                                       00008210
1002 J=1                                         00008220
      DO 1001 K=NEXP+1,NUMLEN                   00008230
      NUMFLD(J:J)=NUMFLD(K:K)                   00008240
1001 J=J+1                                       00008250
      CALL DECODEIX(NUMFLD,NUMLEN-NEXP,IE,*67)   00008260
      X=X*10.**IE                                00008270
C** (LATER INSERT A CALL TO A OVERFLOW HANDLER, ETC.) 00008280
      GO TO 900                                00008290
C--[NEXP>0, NDEC>0]                             00008300
2000 CALL DECODEX(NUMFLD,NEXP-1,NDEC,X,*68)      00008310
      GO TO 1002                                00008320
C--NEXT IELE?                                    00008330
10000 IELE=IELE+1                               00008340
      IF(IELE.GT.NAMDIM(JNAM)) GO TO 10002       00008350
      IF(NREP.GT.1) GO TO 10003                  00008360
10001 IF(IELE.EQ.1) GO TO 99990                 00008370
      NUMLEN=0                                   00008380
      NDEC=0                                     00008390
      NEXP=0                                    00008400
      NREP=1                                    00008410
      ILEN=0                                    00008420
      VARNAM=' '                                00008430
      GO TO 20000                                00008440
10002 IELE=1                                     00008450
      GO TO 10001                                00008460
10003 NREP=NREP-1                               00008470
      IDIM=IDIM-1                               00008480
      IF(IDIM.GE.0) GO TO 8000                   00008490
10004 WRITE(6,66) I,BUF                         00008500
      CALL ERRMSG('TOO MANY ELEMENTS FOR GIVEN NAMDIM.',0,6,0) 00008510
C==END OF DO 20000  CONTINUE PARSER -OR- READ IN NEXT BUF, ETC. 00008520
20000 CONTINUE                                  00008530
      GO TO 10                                   00008540
C--'$' CHAR (DELIMITER $(END) FOR THIS SNAME --$) 00008550
99990 RETURN                                    00008560
C--E.O.F. ON FILE IUNIT ENCOUNTERED.            00008570
99991 RETURN 1                                  00008580
99992 CALL ERRMSG('CANNOT OPEN/READ CALL NAMELIST(IFILE,...)',1,6,0) 00008590
      END                                        00008600
      SUBROUTINE DUMYPAGE()                     00008610
C--DUMMY PCODE FOR USE IN 'MARQRT' OR 'NLSOL'    00008620

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CALL ERRMSG('IDER=0 NOT AVAILABLE IN THIS VERSION.',4,0,10)
END
SUBROUTINE SIGSUBEND(Y,X,B,K,N,TITLE,IOUT)
C**GENERAL SUBEND TERMINATION ROUTINE WITH 'SIGMA' NAMES.
C ALSO GIVES RESTART $PARMS ON UNIT=4 AS 'FOR005.TMP'
C
  CHARACTER*132 LINE
  CHARACTER*80 TITLE
  REAL Y(1),X(500,5),B(1)
  CALL NONBLANK(TITLE,NB)
  WRITE(6,10) TITLE
10  FORMAT(//' ***** E N D *****',5X,A<NB>)//
  1 ' PARAMETER NAME',6X,'FINAL SOLUTION',8X,
  2 'RESISTIVITY LAYER DEPTH'//
  IF(IOUT.EQ.1) WRITE(10,10) TITLE
  MM=(K+1)/2
  DO 30 I=1,MM
  R=1.0/B(I)
  WRITE(6,20) I,I,B(I),I,R
20  FORMAT(2X,I3,3X,'SIGMA(',I2,') =',E16.8,2X,I2,E16.8)
  IF(IOUT.EQ.1) WRITE(10,20) I,I,B(I),I,R
30  CONTINUE
  K1=0
  IF(K.EQ.1) GO TO 60
  IF(K.EQ.2) GO TO 52
  M2=MM+1
  K1=K
  IF(MOD(K,2).EQ.0) K1=K-1
  D=0.0
  DO 50 I=M2,K1
  D=D+B(I)
  L=I-MM
  WRITE(6,40) I,L,B(I),L,D
40  FORMAT(2X,I3,3X,'THICK(',I2,') =',E16.8,22X,I2,E16.8)
  IF(IOUT.EQ.1) WRITE(10,40) I,L,B(I),L,D
50  CONTINUE
  IF(K1.EQ.K) GO TO 60
  WRITE(6,54) K,B(K)
54  FORMAT(2X,I3,3X,'SHIFT',5X,'=',E16.8)
  IF(IOUT.EQ.1) WRITE(10,54) K,B(K)
C** GENERATE RESTART $PARMS ON FOR005.TMP
60  REWIND 5
  OPEN(UNIT=4,FILE='FOR005.TMP',STATUS='NEW',
  1  CARRIAGECONTROL='LIST')
  READ(5,65,END=999) LINE
65  FORMAT(A)
  CALL NONBLANK(LINE,NB)
  WRITE(4,66) LINE
66  FORMAT(A<NB>)
  IDOL=0
70  READ(5,65,END=999) LINE
  I=INDEX(LINE,'$')
  IF(I.NE.0) THEN
    IF(IDOL.EQ.0) THEN
      IDOL=1

```



```

J=INDEX(LINE(I-1:), 'S')
IF(J.NE.0) THEN
    IDOL=2
    LINE(J:J)=' '
ENDIF
ELSE
    IDOL=2
    LINE(I:I)=' '
ENDIF
ENDIF
CALL NONBLANK(LINE,NB)
WRITE(4,66) LINE
IF(IDOL.LT.2) GO TO 70
LINE(1:)= 'B='
DO 80 I=1,K
    ENCODE(16,90,LINE(3:18)) B(I)
30  FORMAT(G16.8)
    IF(I.LT.K) THEN
        LINE(19:19)=' '
    ELSE
        LINE(19:19)='S'
    ENDIF
    CALL NONBLANK(LINE,NB)
    WRITE(4,66) LINE
    LINE(1:2)= ' '
80  CONTINUE
100 READ(5,65,END=999) LINE
    CALL NONBLANK(LINE,NB)
    WRITE(4,66) LINE
    GO TO 100
999 RETURN
END
SUBROUTINE CPUTIME(I1,I2)
C
C CPUTIME WRITES "ELAPSED & CPU" TIME FROM PREVIOUS "CALL SETTIME" ON
C FORTRAN UNITS I1 (IF NOT 0) AND I2 (IF NOT 0).
C
C WILL EJECT FIRST IF I1>0 (OR I2>0).
C DOUBLE SPACE FIRST IF I1<0 (OR I2<0).
C
C E.G., USE TO TIME ELAPSED & CPU TIME FOR PROGRAM OR CODE SEGMENTS AS:
C
C CALL SETTIME ! DON'T FORGET TO DO THIS!
C >>>> THE CODE TO TIME IS HERE <<<<< ! USUALLY A COMPLETE PROGRAM
C CALL CPUTIME(-6,16) ! OR USE I1 OR I2=0 TO OMIT WRITE.
C
    SAVE
    INTEGER*4 ABSVAL(4),INCRVAL(4)
    CALL PROCINFO(ABSVAL,INCRVAL)
    TIMES=SECNDS(TIME0)
    MIN=TIMES/60.0
    SEC=AMOD(TIMES,60.0)
    CPUSEC=INCRVAL(1)*.01
    IMIN=CPUSEC/60.0
    CSEC=AMOD(CPUSEC,60.0)

```

00009180
00009190
00009200
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PCPU=100.*(CPUSEC/TIMES)
IF(I1.NE.0) THEN
    IF(I1.GT.0) THEN
        J=1
    ELSE
        J=0
    ENDIF
    WRITE(IABS(I1),60) J,TIMES,MIN,SEC,CPUSEC,IMIN,CSEC,PCPU,
1 (INCRVAL(I),I=2,4)
00 FORMAT(I1,65('$'))/ ' TOTAL "ELAPSED" TIME=',F16.2,' SEC. ('
1 I4,' MIN.',F6.2,' SEC.)/
2 ' CPU TIME=',F15.2,' SEC. (' I4,' M. ',F5.2,
1 ' S.) CPU % =',F6.2,'%'/
3 ' BUF.I/O COUNT=',I10/
4 ' DIR.I/O COUNT=',I10/
5 ' PAGE FAULTS=',2X,I10/
6 ' ',65('$'))//
ENDIF
IF(I2.NE.0) THEN
    IF(I2.GT.0) THEN
        J=1
    ELSE
        J=0
    ENDIF
    WRITE(IABS(I2),60) J,TIMES,MIN,SEC,CPUSEC,IMIN,CSEC,PCPU,
1 (INCRVAL(I),I=2,4)
ENDIF
RETURN
C** ENTRY 'CALL SETTIME'--MUST BE DONE BEFORE 'CALL CPUTIME(I1,I2)'
ENTRY SETTIME()
TIMEO=SECNDS(0.0)
CALL PROCINFO(ABSVAL,INCRVAL)
RETURN
END
SUBROUTINE DECODEIX(NUMFLD,NUMLEN,IX,*)
C--USED IN CALL NAMELIST(IUNIT,'$NAME',*)
CHARACTER*9 FMT
CHARACTER*20 NUMFLD
IF(NUMLEN.LT.1) RETURN 1
IDIFF=20-NUMLEN
IF(IDIFF.EQ.0) THEN
    ENCODE(9,991,FMT) NUMLEN
ELSE
    ENCODE(9,992,FMT) NUMLEN,IDIFF
ENDIF
991 FORMAT(' (I',I2,' )')
992 FORMAT(' (I',I2,' ',I2,'X)')
DECODE(9,FMT,NUMFLD) IX
RETURN
END
SUBROUTINE DECODEX(NUMFLD,NUMLEN,NDEC,X,*)
C--USED IN CALL NAMELIST(IUNIT,'$NAME',*)
CHARACTER*12 FMT
CHARACTER*20 NUMFLD
IF(NUMLEN.LT.1) RETURN 1

```

```

LEND=NUMLEN-NDEC
IDIFF=20-NUMLN
IF (IDIFF.EQ.0) THEN
  ENCODE(12,991,FMT) NUMLN,LEND
ELSE
  ENCODE(12,992,FMT) NUMLN,LEND,IDIFF
ENDIF
991 FORMAT('F',12,'-',12,' ')
992 FORMAT('F',12,'-',12,'-',12,'X')
DECODE(12,FMT,NUMFLD) X
RETURN
END
SUBROUTINE ERRMSG(MSG,ISKIP,IUNIT1,IUNIT2)
C
C GENERAL ERROR MESSAGE OUTPUT AND EXIT ON VAX-11/780
C
C MSG*(*) = VARIABLE-LENGTH 'MESSAGE'
C ISKIP = 0 FOR NO BLANK LINE BEFORE OUTPUT TO IUNIT1 & IUNIT2
C          > 0 FOR ONE BLANK LINE BEFORE.
C IUNIT1 = 0 TO SUPPRESS OUTPUT ON IUNIT1 (>0 TO WRITE ON IUNIT1).
C IUNIT2 = 0 TO SUPPRESS OUTPUT ON IUNIT2 (>0 TO WRITE ON IUNIT2).
C
C MESSAGES ARE WRITTEN IN THE FORM:
C
C {ERRMSG}: _MSG_HERE_
C
C CHARACTER*(*) MSG
C I=LEN(MSG)
C DO 1 J=1,2
C   IF(J.EQ.1) THEN
C     JUNIT=IUNIT1
C   ELSE
C     JUNIT=IUNIT2
C   ENDIF
C   IF(JUNIT.GT.0) THEN
C     IF(ISKIP.EQ.0) THEN
C       WRITE(JUNIT,2) MSG
C     ELSE
C       WRITE(JUNIT,3) MSG
C     ENDIF
C   ENDIF
C CONTINUE
C CALL EXIT
2 FORMAT(1X,'{ERRMSG}: ',A<I>)
3 FORMAT(/1X,'{ERRMSG}: ',A<I>)
END
SUBROUTINE MINMAX(A,N,AMIN,AMAX)
DIMENSION A(1)
AMIN=A(1)
AMAX=AMIN
DO 1 I=2,N
  AMIN=AMIN1(AMIN,A(I))
  AMAX=AMAX1(AMAX,A(I))
1 CONTINUE
RETURN

```

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      END
      SUBROUTINE NLSOL(FCODE,PCODE,SUBZ,SUBEND)
C
C (NLSOL): GENERAL NONLINEAR LEAST-SQUARES SOLUTION (12/8/82)
C USING DENNIS ET AL (1979; SEE REF1 BELOW)
C ADAPTIVE NONLINEAR LEAST-SQUARES ALGORITHM.
C** THIS IS AN INTERFACE ROUTINE WRITTEN FOR THE VAX-11/780 BY
C W.L.ANDERSON, U.S.GEOLOGICAL SURVEY, DENVER, COLORADO.
C** THIS INTERFACE (NLSOL) HAS ADDITIONAL OPTIONS (BESIDE REF1) TO:
C (1) PERFORM EITHER UNCONSTRAINED OR UP TO 4-TYPES OF CONSTRAINED
C ADAPTIVE NONLINEAR REGRESSION FOR ARBITRARY NONLINEAR PROBLEMS.
C (I.E., PARTIAL OR FULL LOWER/HIGHER PARAMETER BOUNDS, ETC.)
C (2) HOLDING CERTAIN PARAMETERS FIXED (I.E., AS CONSTANTS) IN THE
C LEAST-SQUARES (THIS IS ANOTHER FORM OF CONSTRAINING SOLUTION
C SPACE).
C (3) PROVIDE FOR WEIGHTED OBSERVATIONS (I.E., WEIGHTED LEAST-SQUARES)
C (4) OBJECT (RUN)-TIME CONTROL OF READING THE DATA MATRIX, PLUS
C MANY OTHER I/O OPTIONS, ETC.
C (5) OPTIONALLY, ONE CAN USE EITHER ESTIMATED PARTIAL DERIVATIVES, OR
C ANALYTICAL PARTIAL DERIVATIVES (IF SUBROUTINE PCODE AVAILABLE).
C** THE USER ONLY NEEDS TO WRITE SUBROUTINES FCODE, PCODE, SUBZ, AND
C SUBEND (SEE DETAILS BELOW) EXACTLY AS USED IN SUBROUTINE 'MARQRT'
C (SEE REF2) OR 'IMSLMQ' (SEE REF3). ALSO, THE SAME PARAMETER FILE
C FOR005 AND OBJECT (RUN)-TIME DATA MATRIX FILE FOR010 AS USED BY
C EITHER MARQRT OR IMSLMQ MAY BE USED IN 'NLSOL'.
C** NLSOL CALLS NLITR WHICH CALLS 'NL2ITR' AS PUBLISHED BY DENNIS ET AL,
C (SEE REF1, P. 38), OR 'NL2SNO' (SEE REF1, P. 35).
C** REF1: DENNIS, J.E., ET AL, 1979, AN ADAPTIVE NONLINEAR LEAST-
C SQUARES ALGORITHM, NTIS REPORT AD-A079-716.
C REF2: ANDERSON, W.L., 1980, PROGRAM MARQHXY: INVERSION OF HX AND HY
C FREQUENCY SOUNDINGS FROM A GROUNDED WIRE SOURCE, USGS OPEN-
C FILE REPT. 80-901.
C REF3: ANDERSON, W.L., 1980, PROGRAM IMSLEXY: INVERSION OF EX AND EY
C FREQUENCY SOUNDINGS FROM A GROUNDED WIRE SOURCE, USGS OPEN-
C FILE REPT. 80-1073.
C*****
C**** THE USER MUST DECLARE THE CALLING PARAMETERS AS EXTERNAL IN THE
C CALLING PROGRAM (ANY DESIRED NAMES MAY BE USED).
C E.G.,
C
C [MAIN]:
C EXTERNAL MY_FCODE,MY_PCODE,MY_SUBZ,MY_SUBEND
C CALL NLSOL(MY_FCODE,MY_PCODE,MY_SUBZ,MY_SUBEND)
C STOP !<OR USE>: CALL_EXIT
C END
C [FCODE]:

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C      SUBROUTINE MY FCODE(Y,X,B,W,F,IN,IDER)                                00011380
C      USER WRITTEN TO EVALUATE THE NONLINEAR OBJECTIVE FUNCTION (F)          00011390
C      USED IN NLSOL AS THE WEIGHTED SUM OF (Y(IN)-F)**2, WHERE                00011400
C      Y= OBSERVED DEPENDENT VARIABLE ARRAY (DIM. N, WHERE N IS                00011410
C      GIVEN IN $PARMS NAMEDLIST INPUT--SEE BELOW).                          00011420
C      X= OBSERVED INDEPENDENT VARIABLE ARRAY (DIM. N,M, WHERE                 00011430
C      M IS IN $PARMS INPUT).                                                  00011440
C      B= CURRENT PARAMETER ESTIMATES (DIM. K, WHERE                         00011450
C      K IS IN $PARMS INPUT).                                                  00011460
C      W= WORK ARRAY (DIM. 5)--MAY BE USED TO PASS DATA TO PCODE.            00011470
C      F= (OUTPUT) THE FUNCTION VALUE EVALUATED FOR THE GIVEN                  00011480
C      Y,X, AND B ARRAYS AT THE OBSERVATION NO. 'IN'.                        00011490
C      IN= (INPUT) OBSERVATION NO. TO EVALUATE F (1.LE.IN.LE.N),              00011500
C      WHICH IS CONTROLLED EXTERNALLY BY 'NLSOL'. USUALLY,                   00011510
C      IN=1,2,...,N--BUT NOT ALWAYS.                                          00011520
C      IDER= 0 IF ANALYTICAL DERIVATIVES ARE USED (PCODE CALLED                00011530
C      AFTER FCODE).                                                           00011540
C      = 1 IF ESTIMATED DERIVATIVES ARE USED (PCODE NOT CALLED                00011550
C      AFTER FCODE).                                                           00011560
C      DIMENSION Y(1),X(500,5),B(1),W(5)                                     00011570
C>>>>> INSERT USER CODE HERE TO EVALUATE F <<<<<                          00011580
C      END                                                                    00011590
C [PCODE]: >> PCODE MAY BE A DUMMY NAME IF ONLY IDER=1 IS TO BE USED. <<    00011600
C      SUBROUTINE MY PCODE(P,X,B,W,F,IN,IP,IB)                               00011610
C      USER WRITTEN TO EVALUATE THE ANALYTICAL PARTIAL DERIVATIVES OF          00011620
C      F WITH RESPECT TO B(J),J=1,2,...,K, AT OBSERVATION 'IN', WHERE          00011630
C      P= (OUTPUT) PARTIAL DERIVATIVE ARRAY (DIM. K, WHERE                    00011640
C      K IS IN $PARMS INPUT).                                                  00011650
C      X,B,W ARE THE SAME AS USED IN FCODE (SEE ABOVE).                      00011660
C      F= LAST FUNCTION VALUE FROM FCODE AT OBSERVATION IN.                   00011670
C      (NOTE THAT F MAY NOT BE NEEDED, BUT IS AVAILABLE ANYWAY)               00011680
C      IN= (INPUT) OBSERVATION NO. TO EVALUATE P ARRAY, WHICH IS              00011690
C      CONTROLLED EXTERNALLY BY 'NLSOL' (1.LE.IN.LE.N).                      00011700
C      IP= (INPUT) THE NO. OF B-PARAMETERS HELD FIXED IN THE LEAST-           00011710
C      SQUARES (0.LE.IP.LE.K-1; USE IP=0 IF NONE).                           00011720
C      IB= ARRAY OF B-PARAMETER INDICES HELD FIXED IF IP.GT.0.               00011730
C      NOTE THAT THE INDICES IN IB ARRAY MAY BE IN ANY ORDER,                 00011740
C      BUT MUST BE BETWEEN 1 AND K (K IS IN $PARMS INPUT).                   00011750
C      DIMENSION P(1),X(500,5),B(1),W(5),IB(1)                             00011760
C>>>>> INSERT USER CODE HERE TO EVALUATE P <<<<<                          00011770
C      END                                                                    00011780
C [SUBZ]:                                                                    00011790
C      SUBROUTINE MY SUBZ(Y,X,B,W,NW,N,TITLE,IOUT)                            00011800
C      USER WRITTEN INITIALIZATION ROUTINE (CALLED ONCE BY 'NLSOL').          00011810
C      SUBZ MAY BE USED TO CHECK Y(IN),X(IN,M) AFTER INPUT VIA                00011820
C      OBJECT (RUN)-TIME INPUT (SEE BELOW) ON UNIT IALT. ALSO, SUBZ           00011830
C      MAY BE USED TO READ ADDITIONAL $INIT PARAMETERS, AND TO LOAD            00011840
C      ANY COMMON BLOCKS IF NEEDED IN THE USERS FCODE,PCODE.                 00011850
C      Y,X,B,W ARE THE SAME AS USED IN FCODE (SEE ABOVE).                   00011860
C      NW= USE ANY DUMMY INTEGER VARIABLE (THIS IS                           00011870
C      TO MAINTAIN COMPATIBILITY WITH 'MARQRT' OR 'IMSLMQ').                 00011880
C      N= NO. OF OBSERVATIONS IN Y(N),X(N,M) ARRAYS, WHERE                   00011890
C      K.GE.N.LE.500 (N,M,K ARE IN $PARMS INPUT).                           00011900
C      TITLE= (INPUT) 80-CHARACTER HEADING (SEE INPUT FOR005 BELOW).         00011910
C      IOUT= 1 IF TO WRITE OUTPUT ON BOTH FOR006 AND FOR016.                 00011920

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C          = 0 IF TO WRITE OUTPUT ONLY ON FOR006. 00011930
C          DIMENSION Y(1),X(500,5),B(1),W(5) 00011940
C          CHARACTER*80 TITLE 00011950
C>>>> INSERT USER CODE HERE FOR ANY INITIALIZATION DESIRED <<<< 00011960
C          END 00011970
C [SUBEND]: 00011980
C          SUBROUTINE MY SUBEND(Y,X,B,K,N,TITLE,IOUT) 00011990
C          USER WRITTEN TERMINATION ROUTINE (CALLED ONCE BY 'NLSOL'). 00012000
C          SUBEND MAY BE USED TO OUTPUT THE FINAL SOLUTION VECTOR B(I), 00012010
C          I=1,2,...,K, IN OTHER FORMS, ETC., AS DESIRED. (OR IT MAY BE A 00012020
C          DUMMY ROUTINE; I.E., JUST RETURNS.) 00012030
C          Y,X,K,N,TITLE,IOUT ARE THE SAME AS IN SUBZ AND FCODE. 00012040
C          B= (INPUT) IS THE FINAL SOLUTION VECTOR AS DETERMINED BY 00012050
C          'NLSOL' (SEE REF1 FOR DETAILS). 00012060
C          DIMENSION Y(1),X(500,5),B(1) 00012070
C          CHARACTER*80 TITLE 00012080
C>>>> INSERT USER CODE HERE FOR ANY TERMINATION SUMMARY DESIRED <<<< 00012090
C          END 00012100
C          ***** 00012110
C          ***** 00012120
C          ***** 00012130
C** INPUT ORDER ON FOR005 (PARAMETER FILE LOGICAL NAME): 00012140
C          00012150
C 1. TITLE (MAX. 80-CHARACTERS--ALWAYS READ BEFORE $PARMS INPUT). 00012160
C 2. $PARMS (SAME DEFINITIONS AS IN 'MARQRT', REF2, OR IN 'IMSLMQ', 00012170
C    REF3), WHICH INCLUDES: N,K,IP,M,IALT,ISTOP,IWT,IDER, 00012180
C    IPRT,ITER,IOUT,SP,B(),IB(); PLUS THE FOLLOWING PARAMETERS FROM 00012190
C    REF1 (NL2SOL), P.31-35: IV(),V(); IN ADDITION, THE LOWER AND 00012200
C    UPPER BOUND ARRAYS BL(),BH(), RESPECTIVELY, ARE REQUIRED IF 00012210
C    SP>2. 00012220
C 3. (OBJECT-RUN-TIME FORMAT STATEMENT) TO DESCRIBE THE FORMAT OF THE 00012230
C    DATA MATRIX ROW Y(I),(X(I,J),J=1,M*) READ ON FILE IALT, WHERE 00012240
C    M*=M (IF IWT=0) OR M*=M+1 (IF IWT>0), M.LE.4, AND I=1,2,...,N. 00012250
C (3A). INSERT DATA MATRIX HERE ONLY IF IALT=5. 00012260
C 4. $INIT OPTIONAL NAMELIST USED FOR READING PROBLEM-DEPENDENT 00012270
C    PARAMETERS USED IN SUBROUTINE SUBZ (SEE ABOVE). CURRENTLY, 00012280
C    THE FOLLOWING $INIT NAMES (AND DIM.) CAN BE USED: IOB,MM,X0,Y0, 00012290
C    L,EP,EPS,NEPS,METHOD,NFIN,IER,MEV,IOPT,NSIG,MAXFN,DELTA,PARM(4), 00012300
C    AND IRATIO(2). 00012310
C 5. OPTIONALLY, REPEAT STEPS 1-4, IF PARAMETER ISTOP=0 WAS USED 00012320
C    IN THE LAST STEP 2. 00012330
C          00012340
C** OUTPUT IS GIVEN ON FOR006 (ON-LINE USUALLY) AND ON FOR016(IF IOUT=1) 00012350
C    FOR016 CONTAINS ALL PRINTABLE OUTPUT SELECTED VIA $PARMS IPRT,IOUT. 00012360
C    NOTE: IPRT=0 GIVES ABBREVIATED OUTPUT ON FOR006 (BUT MORE ON FOR016) 00012370
C          IPRT=1 OR -2 GIVES DETAILED OUTPUT ON BOTH 6 AND 16. 00012380
C          IPRT=-1 GIVES MODERATE OUTPUT ON 6 (DETAILED ON 16). 00012390
C          00012400
C** TO RUN ON VAX (ELIMINATE <> DELIMITERS IN SUBSTITUTIONS): 00012410
C          00012420
C          $ASSIGN <PARAMETER FILE NAME> FOR005 00012430
C          $ASSIGN <DATA MATRIX FILE NAME> FOR010 00012440
C          $RUN <MAIN NAME> 00012450
C          00012460
C          ***** 00012470

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C 00012480
C$$$ 00012490
C$$ CHANGE THE FOLLOWING FORTRAN-77 PARAMETER STATEMENT ONLY IF 00012500
C$$ INCREASING THE DEFAULT DIMENSIONS FOR NLSOL: 00012510
C  PARAMETER (NDIM=500,MDIM=5,KDIM=20) 00012520
C$$ WHERE NDIM=MAX.OBS., MDIM=MAX.INDEP.VARS., KDIM=MAX.UNKNOWN PARMS. 00012530
C$$ DO NOT CHANGE THE FOLLOWING RELATED PARAMETER STATEMENT: 00012540
C  PARAMETER (K1DIM=KDIM-1,K2DIM=KDIM+KDIM,M1DIM=MDIM-1, 00012550
C 1 IVDIM=KDIM+60,NKVDIM=96+2*NDIM+(KDIM*(7*KDIM+4))/2) 00012560
C$$$ 00012570
C 00012580
C  REAL*4 L 00012590
C  DIMENSION B(KDIM),SQWT(NDIM),IB(K1DIM),C(KDIM),INDEX(KDIM), 00012600
C 1 IV(IVDIM),V(NKVDIM),CBOUND(K2DIM), 00012610
C 2 BL(KDIM),BH(KDIM),CL(KDIM),CH(KDIM),SE(KDIM), 00012620
C 3 W(KDIM),PARM(4),IRATIO(2),PRNT(5) 00012630
C  INTEGER SP,SCALEP,SY,SCALEY 00012640
C  CHARACTER*3 CHAR3 00012650
C  CHARACTER*6 CALLED 00012660
C  CHARACTER*80 TITLE 00012670
C  CHARACTER*132 LINE132 00012680
C  CHARACTER*72 FMT 00012690
C  COMMON/FIXDAT/Y(NDIM),X(NDIM,MDIM),BFX(KDIM),IIB(K1DIM),IIP, 00012700
C 1 IDER,K,XSP 00012710
C  COMMON/BOUNDS/BL (KDIM),BH (KDIM) 00012720
C  COMMON/REVCOM/R(NDIM) 00012730
C  EQUIVALENCE (SQWT(1),X(1,MDIM)),(N,NOBS),(K,KPARMS),(M,MVARS), 00012740
C 1 (CL(1),CBOUND(1)),(CH(1),CBOUND(KDIM+1)) 00012750
C  EXTERNAL FCODE,PCODE,CALCR 00012760
C** 00012770
C  THE FOLLOWING COMMON/NAME LIST/ IS TO SIMULATE ON VAX-11/780: 00012780
C  NAMELIST/PARMS/ & READ(5,PARMS) VIA 'CALL NAMELIST(5,'$PARMS',*)' 00012790
C  NAMELIST/INIT/ & READ(5,INIT) VIA 'CALL NAMELIST(5,'$INIT',*)' 00012800
C** SEE SUBROUTINE NAMELIST FOR MORE DETAILS, AND ALSO REF1-REF3 FOR 00012810
C  DETAILS ON EACH PARAMETER DEFINITION. 00012820
C** 00012830
C  COMMON/NAME_LIST/N,K,IP,M,IALT,ISTOP,IWT,IDER,IPRT,NITER,INON, 00012840
C 1 FF,T,E,TAU,XL,MODLAM,GAMCR,DEL,ZETA,IOUT,SP,SCALEP,SY,SCALEY, 00012850
C 2 B,IB, IOB,MM,XO,YO,L,EP,EPS,NEPS,METHOD,NFIN,IER,MEV, 00012860
C 3 IV,V,BL,BH, 00012870
C 4 IOPT,NSIG,MAXFN,DELTA,PARM, H,IRATIO 00012880
C** 00012890
C  NOTE THAT COMMON/NAME_LIST/ CONTAINS SOME PARAMETERS ONLY FOR 00012900
C  COMPATIBILITY WITH 'MARQT' OR 'IMSLMQ'; I.E., THE FOLLOWING LIST 00012910
C  OF PARAMETERS ARE CURRENTLY NOT USED DIRECTLY BY 'NLSOL': 00012920
C  INON,FF,T,TAU,XL,MODLAM,GAMCR,DEL,E,ZETA,SY,SCALEY,SCALEP, 00012930
C  IOPT,NSIG,MAXFN,DELTA,PARM. 00012940
C** 00012950
C  00012960
C** READ NLSOL TITLE LINE 00012970
C  READ(5,10,ERR=9000,END=9010) TITLE 00012980
C 10  FORMAT(A80) 00012990
C  00013000
C**PRESET DEFAULT PARMS (SOME MUST BE GIVEN IN $PARMS ELSE AN ERROR) 00013010
C  00013020

```

I=0	00013030
N=0	00013040
IP=0	00013050
M=0	00013060
IALT=10	00013070
ISTOP=1	00013080
ICALL=1	00013090
IWT=0	00013100
IDER=0	00013110
IPRT=0	00013120
NITER=10	00013130
ICUT=1	00013140
SP=0	00013150
DO 20 I=1,KDIM	00013160
IF(I.LT.KDIM) IB(I)=0	00013170
BL(I)=0.0	00013180
BH(I)=0.0	00013190
BH(I)=0.0	00013200
20 CONTINUE	00013210
22 IV(1)=10	00013220
C**	00013230
C PRESET NLTR	00013240
C**	00013250
CALL DEFAULT(IV,V)	00013260
C**	00013270
C** OVERRIDE FOR IV(15)=3 DEFAULT (MAY BE CHANGED VIA \$PARMS INPUT)	00013280
C**	00013290
IV(15)=3	00013300
C**	00013310
C READ \$PARMS ON FOR005 VIA 'CALL NAMLIST' ON VAX	00013320
C**	00013330
30 CALL NAMLIST(5,'\$PARMS',*9020)	00013340
C**	00013350
C SET EQUIVALENT PARAMETERS IN DIFFERENT COMMON'S	00013360
C**	00013370
ISP=SP	00013380
DO 32 I=1,KDIM	00013390
BFIX(I)=B(I)	00013400
BL(I)=BL(I)	00013410
BH(I)=BH(I)	00013420
IF(I.LT.KDIM) IIB(I)=IB(I)	00013430
32 CONTINUE	00013440
IIP=IP	00013450
IDER=IDER	00013460
K=K	00013470
C**	00013480
C TEST \$PARMS BEFORE PROCEEDING	00013490
C**	00013500
IF(IP.LT.0.OR.IP.GT.KDIM)CALL ERRMSG('IP<0 OR IP>19',0,0,16)	00013510
KIP=K-IP	00013520
IF(N.LT.1.OR.N.GT.NDIM.OR.N.LT.KIP)	00013530
1 CALL ERRMSG('N<1,N>500,OR N<K-IP',0,0,16)	00013540
IF(K.LT.1.OR.K.GT.KDIM.OR.KIP.LT.1)	00013550
1 CALL ERRMSG('K<1,K>20,OR K-IP<1',0,0,16)	00013560
IF(M.LT.1.OR.M.GT.MDIM)CALL ERRMSG('M<1 OR M>4',0,0,16)	00013570

	IF(IALT.EQ.6.OR.IALT.EQ.13.OR.IALT.EQ.16.OR.IALT.EQ.4)	00013580
1	CALL ERRMSG('IALT=4,6,13,OR 16',0,6,16)	00013590
	IF(ISTOP.EQ.0.AND.IALT.EQ.5)	00013600
1	CALL ERRMSG('ISTOP=0 BUT IALT=5',0,6,16)	00013610
	IF(IWT.LT.0.OR.IWT.GT.2)CALL ERRMSG('IWT<0 OR IWT>2',0,0,16)	00013620
	IF(IDER.LT.0.OR.IDER.GT.1)CALL ERRMSG('IDER<0 OR IDER>1',0,0,16)	00013630
	IF(SP.LT.0.OR.SP.GT.4)CALL ERRMSG('SP<0 OR SP>4',0,0,16)	00013640
	IF(IP.GT.0) THEN	00013650
	DO J=1,IP	00013660
	IF(IB(J).LT.1.OR.IB(J).GT.K) THEN	00013670
	ENCODE(3,43,CHAR3) J	00013680
	CALL ERRMSG('IP>0 AND IB(J)<1 OR IB(J)>K FOR J='//	00013690
1	CHAR3,0,6,16)	00013700
	ENDIF	00013710
	ENDDO	00013720
	ENDIF	00013730
	IF(SP.EQ.0.OR.SP.EQ.2) GO TO 41	00013740
	DO 40 I=1,KPARMS	00013750
	IF(SP.EQ.1) THEN	00013760
	IF(IP.GT.0) THEN	00013770
	DO 42 J=1,IP	00013780
	IF(I.EQ.IB(J)) GO TO 40	00013790
42	CONTINUE	00013800
	ENDIF	00013810
	IF(B(I).LE.0.) THEN	00013820
	ENCODE(3,43,CHAR3) I	00013830
43	FORMAT(I2,'.')	00013840
	CALL ERRMSG('SP=1 AND B(I)<=0 FOR I='//CHAR3,0,6,16)	00013850
	ENDIF	00013860
	ELSE IF(SP.GT.2) THEN	00013870
	IF(B(I).LT.BL(I).OR.B(I).GT.BH(I).OR.BL(I).GT.BH(I)) THEN	00013880
	ENCODE(3,43,CHAR3) I	00013890
	CALL ERRMSG('SP>2 AND B(I)<BL(I), '//	00013900
1	'B(I)>BH(I), OR BL(I)>BH(I)')//	00013910
2	' FOR I='//CHAR3,0,6,16)	00013920
	ENDIF	00013930
	IF(BL(I).EQ.BH(I)) THEN	00013940
	IF(IP.GT.0) THEN	00013950
	DO 45 J=1,IP	00013960
	IF(I.EQ.IB(J)) GO TO 40	00013970
45	CONTINUE	00013980
	ENDIF	00013990
	ENCODE(3,43,CHAR3) I	00014000
	CALL ERRMSG('SP>2 AND BL(I)=BH(I) BUT B(I) NOT HELD '//	00014010
1	'FIXED FOR I='//CHAR3,0,6,16)	00014020
	ENDIF	00014030
	ENDIF	00014040
40	CONTINUE	00014050
41	IF(IV(1).EQ.10) THEN	00014060
C**		00014070
C	NOTE CALL DFAULT(IV,V) WAS PRESET BEFORE \$PARMS READ	00014080
C**		00014090
	IV(18)=NITER	00014100
	IF(IPRT.GT.-3.AND.IPRT.LT.1) THEN	00014110
	IV(19)=-1	00014120

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ELSE
    IV(19)=IPRT
ENDIF
IF(IOUT.EQ.0) THEN
    IV(21)=0
ELSE
    IV(21)=16
ENDIF
ENDIF
IF(IP.GT.0) THEN
    DO 50 I=1,IP
        IF(IB(I).LE.0)CALL ERRMSG('IP>0 BUT SOME IB(I)<=0',0,0,16)
50    CONTINUE
ENDIF
C
C READ OBJECT(RUN)-TIME FORMAT FOR DATA MATRIX FROM FILE IALT.
C
    READ(5,60,ERR=9000,END=9010) FMT
60    FORMAT(A72)
    IF(IWT.EQ.0) THEN
        M1=MVAR5
    ELSE
        M1=MVAR5+1
    ENDIF
    DO 70 I=1,NOBS
        READ(IALT,FMT,ERR=9030,END=9040) Y(I),(X(I,J),J=1,M1)
        IF(IWT.EQ.0.OR.X(I,M1).EQ.0.0) THEN
            SQWT(I)=1.0
            GO TO 70
        ELSE IF(IWT.EQ.1) THEN
            SQWT(I)=1.0/X(I,M1)
        ELSE
            SQWT(I)=1.0/SQRT(ABS(X(I,M1)))
        ENDIF
70    CONTINUE
C
C INITIALIZE VIA CALL SUBZ (READ $INIT AND TEST, LOAD COMMON, ETC.)
C
    CALL SUBZ(Y,X,BFIX,PRNT,NPRNT,N,TITLE,IOUT)
    *****
C
C WRITE $PARMS ON FOR006 AND FOR016 (THE LATTER IF IOUT=1)
C
    CALL NONBLANK(TITLE,NB)
    WRITE(6,80) TITLE,N,K,IP,M,IALT,ISTOP,IWT,IDER,IPRT,NITER,IOUT,SP
80    FORMAT('1{NLSOL}: ',8X,A<NB>/' N=',4X,I6,T18,'K=',4X,I6,T34,'IP=',
1    3X,I6,T50,'M=',4X,I6,T66,'IALT=',1X,I6/' ISTOP=',I6,T18,'IWT=',
2    2X,I6,T34,'IDER=',17,T50,'IPRT=',17,T66,'NITER=',I6/' IOUT=',
3    5X,I2,T18,'SP=',3X,I6)
    IF(IOUT.NE.0)
        WRITE(16,80)TITLE,N,K,IP,M,IALT,ISTOP,IWT,IDER,IPRT,NITER,IOUT,SP
    IF(IP.GT.0) THEN
        WRITE(6,90) (IB(I),I=1,IP)
90    FORMAT('/' PARAMETERS HELD FIXED: IB=',20I3)
        IF(IOUT.NE.0) WRITE(16,90) (IB(I),I=1,IP)

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	ENDIF	00014680
	CALL NONBLANK(FMT,NB)	00014690
	WRITE(6,100) FMT	00014700
100	FORMAT(/' FMT=',A<NB>//)	00014710
	IF(IOUT.NE.0) WRITE(16,100) FMT	00014720
	IF(SP.GT.2) THEN	00014730
	WRITE(6,111) (BL(I),I=1,KPARMS)	00014740
111	FORMAT(/' PARAMETER LOWER BOUNDS: BL=///(5E16.8))	00014750
	IF(IOUT.NE.0) WRITE(16,111) (BL(I),I=1,KPARMS)	00014760
	ENDIF	00014770
	WRITE(6,110) (B(I),I=1,KPARMS)	00014780
110	FORMAT(/' INITIAL PARAMETERS: B=///(5E16.8))	00014790
	IF(IOUT.NE.0) WRITE(16,110) (B(I),I=1,KPARMS)	00014800
	IF(SP.GT.2) THEN	00014810
	WRITE(6,112) (BH(I),I=1,KPARMS)	00014820
112	FORMAT(/' PARAMETER HIGHER BOUNDS: BH=///(5E16.8))	00014830
	IF(IOUT.NE.0) WRITE(16,112) (BH(I),I=1,KPARMS)	00014840
	ENDIF	00014850
	DO 120 I=1,KDIM	00014860
120	INDEX(I)=I	00014870
	IF(IP.EQ.0) THEN	00014880
	DO 130 I=1,KPARMS	00014890
	IF(SP.GT.2) THEN	00014900
	CL(I)=BL(I)	00014910
	CH(I)=BH(I)	00014920
	ENDIF	00014930
130	C(I)=B(I)	00014940
	ELSE	00014950
	C	00014960
	REORDER B TO C WHEN IP>0 (AND BL,BH TO CL,CH, RESPECTIVELY)	00014970
	C	00014980
	IM=0	00014990
	DO 150 I=1,KPARMS	00015000
	DO 140 J=1,IP	00015010
	IF(I.EQ.IB(J)) GO TO 150	00015020
140	CONTINUE	00015030
	IM=IM+1	00015040
	C(IM)=B(I)	00015050
	IF(SP.GT.2) THEN	00015060
	CL(IM)=BL(I)	00015070
	CH(IM)=BH(I)	00015080
	ENDIF	00015090
	INDEX(IM)=I	00015100
150	CONTINUE	00015110
	WRITE(6,160) (I,I=1,KPARMS)	00015120
160	FORMAT(/' PARAMETER INDEX:',20I3)	00015130
	IF(IOUT.NE.0) WRITE(16,160) (I,I=1,KPARMS)	00015140
	WRITE(6,170) (INDEX(I),I=1,KIP)	00015150
170	FORMAT(' REORDERED AS...:',20I3)	00015160
	IF(IOUT.NE.0) WRITE(16,170) (INDEX(I),I=1,KIP)	00015170
	WRITE(6,180) (C(I),I=1,KIP)	00015180
180	FORMAT(/' REORDERED PARAMETERS:///(5E16.8))	00015190
	IF(IOUT.NE.0) WRITE(16,180) (C(I),I=1,KIP)	00015200
	ENDIF	00015210
	C	00015220

```

C PERFORM INITIAL PARAMETER TRANSFORMS VIA SP (SCALEP)
C
    IF(SP.EQ.0) GO TO 220
    DO 210 I=1,KIP
        GO TO (201,202,203,203),SP
    201 C(I)=ALOG(C(I))
        GO TO 210
    202 C(I)=ASINH(C(I))
        GO TO 210
    203 TEM=(C(I)-CL(I))/(CH(I)-CL(I))
        IF(SP.EQ.3) THEN
            C(I)=ASIN(SQRT(TEM))
        ELSE
            C(I)=ERFNV(2.0*TEM-1.0)
        ENDIF
    210 CONTINUE
C
C INTERFACE WITH NL2ITR USING MARQRT FCODE AND PCODE (IF IDER=0)
C
    220 ENCODE(6,222,CALLED) ICALL
    222 FORMAT(I3,'**')
        WRITE(6,221) CALLED
    221 FORMAT('0** NL2ITR (IDER=0) OR NL2SNO (IDER=1) CALLED:',A6/)
        IF(IOUT.NE.0) WRITE(16,221) CALLED
        IF(IDER.EQ.0) THEN
            CALL NL2ITR(NOBS,KIP,C,IV,V,CBOUND,FCODE,PCODE)
            *****
        ELSE
            CALL NL2SNO(NOBS,KIP,C,CALCR,IV,V,IDUMMY,CBOUND,FCODE)
            *****
        ENDIF
C
C GET INVERSE PARAMETER TRANSFORMATION OF SOLUTION VECTOR C
C
    IF(SP.EQ.0) GO TO 229
    DO 228 I=1,KIP
        GO TO (224,225,226,226),SP
    224 C(I)=EXP(C(I))
        GO TO 228
    225 C(I)=SINH(C(I))
        GO TO 228
    226 TEM=CH(I)-CL(I)
        IF(SP.EQ.3) THEN
            C(I)=CL(I)+TEM*SIN(C(I))**2
        ELSE
            C(I)=CL(I)+0.5*TEM*(1.0+ERF(C(I)))
        ENDIF
    228 CONTINUE
C
C OUTPUT SELECTED RESULTS ON FOR006 (ALL RESULTS ON FOR016 IF IOUT=1)
C
    229 IF(IOUT.NE.0.AND.IPRT.NE.0) THEN
        I=1
        REWIND 16
    230 READ(16,232.END=240) LINE132

```

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00015770

232	FORMAT(A)	00015780
	IF(I.EQ.1) THEN	00015790
C		00015800
C	VAX FUNCTION 'LIB\$INDEX' USED TO DISTINGUISH FROM ARRAY 'INDEX'	00015810
C		00015820
	IF(LIB\$INDEX(LINE132,'CALLED: '//CALLED).EQ.0) GO TO 230	00015830
	I=0	00015840
	GO TO 230	00015850
	ENDIF	00015860
	IF(LIB\$INDEX(LINE132,'OBS.Y(I)').NE.0) GO TO 236	00015870
	IF(LIB\$INDEX(LINE132,'COVARIANCE = SCALE').NE.0) GO TO 236	00015880
	CALL NONBLANK(LINE132,J)	00015890
	IF(J.LE.0) GO TO 230	00015900
	WRITE(6,234) LINE132	00015910
234	FORMAT(A<J>)	00015920
	GO TO 230	00015930
236	READ(16,232,END=240) LINE132	00015940
	GO TO 236	00015950
	ENDIF	00015960
240	IF(IOUT.NE.0) WRITE(16,250)	00015970
250	FORMAT(/3X,'I',4X,'OBS.Y(I)',6X,'CAL',11X,'RES',8X,	00015980
	1 'RES.ERR',6X,'X(I,1)',8X,	00015990
	2 'X(I,2)',8X,'X(I,3)',8X,'X(I,4)',8X,'WT(I)')	00016000
	IF(IPRT.EQ.-2) WRITE(6,250)	00016010
	SUMF2=0.0	00016020
	IF(IDER.NE.0) IADR=IV(50)-1	00016030
	DO 270 I=1,NOBS	00016040
	IF(IDER.EQ.0) THEN	00016050
	F2=R(I)	00016060
	ELSE	00016070
	F2=V(IADR+I)	00016080
	ENDIF	00016090
	RES=F2/SQRT(I)	00016100
	CAL=Y(I)-RES	00016110
	IF(CAL.NE.0.0) THEN	00016120
	PERR=100.0*RES/ABS(CAL)	00016130
	ELSE	00016140
	PERR=0.0	00016150
	ENDIF	00016160
	WT=SQRT(I)**2	00016170
	SUMF2=SUMF2+RES**2	00016180
	IF(IPRT.EQ.-2)WRITE(6,260) I,Y(I),CAL,RES,PERR,	00016190
	1 (X(I,J),J=1,4),WT	00016200
260	FORMAT(1X,I3,2E14.6,E11.3,6E14.6)	00016210
	IF(IOUT.NE.0) WRITE(16,260) I,Y(I),CAL,RES,PERR,	00016220
	1 (X(I,J),J=1,4),WT	00016230
270	CONTINUE	00016240
	IF(NOBS.EQ.KIP) THEN	00016250
	RMSERR=0.0	00016260
	ELSE	00016270
	RMSERR=SQRT(SUMF2/(NOBS-KIP))	00016280
	ENDIF	00016290
	WRITE(6,280) RMSERR	00016300
280	FORMAT('/' ** RMSERR=',E16.8)	00016310
	IF(IOUT.NE.0) WRITE(16,280) RMSERR	00016320

```

      IF(IV(26).LE.0) GO TO 380
C
C   A COVARIANCE MATRIX WAS COMPUTED (GET ADDITIONAL STATISTICS)
C
      IADR=IV(26)-1
      IF(IPRT.LT.-1) WRITE(6,290)
290  FORMAT(/' COVARIANCE MATRIX')
      DO 320 I=1,KIP
      DO 300 J=1,I
300    W(J)=V(IADR+LOC(J,I))
      SE(I)=SQRT(ABS(W(I)))
      IF(IPRT.LT.-1) WRITE(6,310) INDEX(I),(W(J),J=1,I)
310    FORMAT(1X,I2,10E12.4/(3X,10E12.4))
320  CONTINUE
C
C   GET CORRELATION COEFFICIENT MATRIX
C
      IF(IOUT.NE.0) WRITE(16,330)
330  FORMAT(/' CORRELATION MATRIX')
      IF(IPRT.LT.0) WRITE(6,330)
      DO 350 I=1,KIP
      IF(SE(I).EQ.0.0) THEN
        W(I)=1.0
      ENDIF
      DO 340 J=1,I
      IF(SE(J).NE.0.0) W(J)=V(IADR+LOC(J,I))/(SE(I)*SE(J))
340  CONTINUE
      IF(IOUT.NE.0) WRITE(16,310) INDEX(I),(W(J),J=1,I)
      IF(IPRT.LT.0) WRITE(6,310) INDEX(I),(W(J),J=1,I)
350  CONTINUE
C
C   PRINT PARAMETER STANDARD ERRORS (SE) AND RELATIVE ERRORS
C
      WRITE(6,360)
360  FORMAT(/' **PARAM SOL.   STD_ERROR   REL_ERROR   % ERROR **'/)
      IF(IOUT.NE.0) WRITE(16,360)
      DO 370 I=1,KIP
      RELERR=0.0
      IF(C(I).NE.0.0) RELERR=SE(I)/C(I)
      PERR=100.*RELERR
      WRITE(6,310) INDEX(I),C(I),SE(I),RELERR,PERR
      IF(IOUT.NE.0) WRITE(16,310) INDEX(I),C(I),SE(I),RELERR,PERR
370  CONTINUE
C
C   PUT SOLUTION C AND BFIX TOGETHER (IF IP>0)
C
380  DO 390 I=1,KIP
390  W(I)=C(I)
      IF(IP.EQ.0) GO TO 420
      IM=0
      DO 410 I=1,KPARMS
      W(I)=BFIX(I)
      DO 400 J=1,IP
      IF(I.EQ.IB(J)) GO TO 410
400  CONTINUE

```

```

IM=IM+1
W(1)=C(IM)
410 CONTINUE
420 CALL SUBEND(Y,X,W,K,N,TITLE,IOUT)
*****
IF(ISTOP.NE.1) THEN
    READ(5,10,ERR=9000,END=9010) TITLE
    IF(IALT.NE.5) REWIND IALT
    ICALL=ICALL+1
    GO TO 22
ENDIF
**** RETURN FROM NLSOL

RETURN
9000 CALL ERRMSG('ERR=9000 READING FOR005',0,6,16)
9010 CALL ERRMSG('PREMATURE E.O.F (END=9010) READING FOR005',0,6,16)
9020 CALL ERRMSG('END *9020 READING FOR005 IN (NAMELIST)',0,6,16)
9030 CALL ERRMSG('END=9030 READING FILE IALT',0,6,16)
9040 CALL ERRMSG('PREMATURE E.O.F (END=9040) READING FILE IALT',
1 0,6,16)
CC **** END OF SUBROUTINE NLSOL

END
SUBROUTINE NLITR(N,KIP,C,IV,V,CBOUND,FCDL,PCDLE)
****CALCULATES BOTH THE RESIDUAL VECTOR R(N) & ANALYTICAL JACOBIAN
JAC(N,KIP) BY 'REVERSE COMMUNICATION VIA INTERNAL CALL NL2ITR'
(SEE REF1, P. 38).

N = NO. OBSERVATIONS <=500 (SEE NDIM BELOW)
KIP = NO. ADJUSTABLE PARAMETERS -K-IIP WHERE
      K=TOTAL PARAMETERS, IIP=NO. PARAMETERS HELD FIXED
      IN IIB(IIP) VIA COMMON/FIXDAT/
C() = I/O PARAMETER VECTOR (SUPPLIED BY NL2ITR)
      WHICH ARE THE UNCONSTRAINED PARAMETERS IN NL2ITR.
IV() = SAME CONTROL INFORMATION SET BY NLSOL (OR NL2ITR).
V() = SAME CONTROL INFORMATION SET BY NLSOL (OR NL2ITR).
CBOUND = INPUT ARRAY OF LOW AND HIGH BOUNDS USED ONLY WHEN SP>2.
FCDL = EXTERNAL FUNCTION NAME (SAME AS USED IN 'MARQRT' OR
      'MSLMQ' TO COMPUTE THE NONLINEAR OBJECTIVE FUNCTION).
PCDL = EXTERNAL ANALYTIC DERIVATIVE NAME (SAME AS USED IN
      'MARQRT' WHEN IDER=0) CORRESPONDING TO EACH FCDL CALL.

****SEE REF1 (P.38) FOR MORE DETAILS ON CALLING NL2ITR.
****OTHER DATA IN COMMON/FIXDAT/ MUST BE PRESET.

CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CSS CHANGE THE FOLLOWING FORTRAN-77 PARAMETER STATEMENT ONLY IF
CSS INCREASING THE DEFAULT DIMENSIONS FOR NLSOL:
PARAMETER (NDIM=500,MDIM=5,KDIM=20)
CSS WHERE NDIM=MAX.OBS., MDIM=MAX.INDEP.VARS., KDIM=MAX.UNKNOWN PARMS.
```

[illegible]


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80      IF(IIP.EQ.O) THEN                                00017980
          DO 90 J=1,KIP                                  00017990
              JAC(I,J)=-SQWT(I)*PART(J)                  00018000
          ELSE                                             00018010
              IM=O                                         00018020
              DO 110 K=1,KPARMS                            00018030
                  DO 100 J=1,IIP                          00018040
                      IF(K.EQ.IIB(J)) GO TO 110           00018050
              CONTINUE                                     00018060
              IM=IM+1                                       00018070
              JAC(I,IM)=-SQWT(I)*PART(K)                 00018080
              CONTINUE                                      00018090
          ENDDIF                                           00018100
120     CONTINUE                                          00018110
C                                              00018120
C                                              00018130
C      CALL NL2ITR(D,IV,JAC,N,NN,KIP,R,V,C)               00018140
C      *****                                           00018150
C      IF(IV(1).EQ.1.OR.IV(1).EQ.2) GO TO 10             00018160
C      RETURN                                              00018170
C      END                                                 00018180
C      SUBROUTINE INTRAN(KIP,C,CBOUND,BIP)                00018190
C**INVERSE PARAMETER TRANSFORMATION USED IN 'NLSOL','NLITR'. 00018200
C                                                         00018210
C      CALCULATES CONSTRAINED PARAMETERS FOR FCODE OR PCODE BACK FROM THE 00018220
C      UNCONSTRAINED PARAMETERS IN 'NL2ITR' OR 'NL2SNO'   00018230
C                                                         00018240
C      KIP = NO. ADJUSTABLE PARAMETERS = K-IIP (IIP IN COMMON/FIXDAT)    00018250
C      C() = INPUT UNCONSTRAINED VECTOR (DIM. KIP)         00018260
C      CBOUND = INPUT CONSTRAINED BOUNDS, IF ANY.          00018270
C      BIP() = OUTPUT CONSTRAINED VECTOR (DIM. KPARMS--IN COMMON).       00018280
C                                                         00018290
C$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ 00018300
C$$ CHANGE THE FOLLOWING FORTRAN-77 PARAMETER STATEMENT ONLY IF 00018310
C$$ INCREASING THE DEFAULT DIMENSIONS FOR NLSOL:          00018320
C      PARAMETER (NDIM=500,MDIM=5,KDIM=20)                00018330
C$$ WHERE NDIM=MAX.OBS., MDIM=MAX.INDEP.VARS., KDIM=MAX.UNKNOWN PARMS. 00018340
C$$ DO NOT CHANGE THE FOLLOWING RELATED PARAMETER STATEMENT: 00018350
C      PARAMETER (KIDIM=KDIM-1)                           00018360
C$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$ 00018370
C                                                         00018380
C      INTEGER SP                                           00018390
C      DIMENSION C(1),CBOUND(1),BIP(1),CTEM(KDIM)        00018400
C      COMMON/FIXDAT/Y(NDIM),X(NDIM,MDIM),BFIX(KDIM),IIB(KIDIM),IIP,    00018410
C      IIDER,KPARMS,SP                                       00018420
C      IF(SP.EQ.O) THEN                                      00018430
          DO 10 I=1,KIP                                     00018440
              CTEM(I)=C(I)                                   00018450
          ELSE                                               00018460
              DO 50 I=1,KIP                                 00018470
                  GO TO (20,30,40,40),SP                   00018480
              CTEM(I)=EXP(C(I))                             00018490
                  GO TO 50                                  00018500
              CTEM(I)=SINH(C(I))                            00018510
          ENDIF                                             00018520

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      GO TO 50
      DIF=CBOUND(KDIM+1)-CBOUND(I)
      IF(SP.EQ.3) THEN
        CTEM(I)=CBOUND(I)+DIF*SIN(C(I))**2
      ELSE
        CTEM(I)=CBOUND(I)+0.5*DIF*(1.0-ERF(C(I)))
      ENDIF
50    CONTINUE
      ENDIF
      IF(IIP.EQ.0) THEN
        DO 60 I=1,KIP
          BIP(I)=CTEM(I)
60    ELSE
          IM=0
          DO 80 I=1,KPARMS
            BIP(I)=BFIX(I)
          DO 70 J=1,IIP
            IF(I.EQ.IIB(J)) GO TO 80
70    CONTINUE
            IM=IM+1
            BIP(I)=CTEM(IM)
80    CONTINUE
          ENDIF
          RETURN
        END
        SUBROUTINE CALCR(N,KIP,C,NF,R,LASTNF,CBOUND,FCODE)
C**CALCULATES RESIDUAL VECTOR R(N) FOR 'NL2SNO' WHEN IDER=1.
C
C   N = NO. OBSERVATIONS <=500 (SEE NDIM BELOW)
C   KIP = NO. ADJUSTABLE PARAMETERS =K-IIP WHERE
C       K=TOTAL PARAMETERS, IIP=NO. PARAMETERS HELD FIXED
C       IN IIB(IIP) VIA COMMON/FIXDATA/
C   C() = INPUT PARAMETER VECTOR (SUPPLIED BY NL2SNO)
C       WHICH ARE THE UNCONSTRAINED PARAMETERS IN NL2SNO.
C   NF = INVOCATION COUNT (INPUT)FOR USE BY NL2SNO OR NL2SOL.
C   R() = OUTPUT WEIGHTED RESIDUAL VECTOR (DIM. N)
C   LASTNF = LAST NF (ON EXIT FOR POSSIBLE USE IN CALCJ OR NL2SOL).
C   CBOUND = INPUT ARRAY OF LOW AND HIGH BOUNDS USED ONLY WHEN SP>2.
C   FCODE = EXTERNAL FUNCTION NAME (SAME AS USED IN 'MARQRT' OR
C           'IMSLMQ' TO COMPUTE THE NONLINEAR OBJECTIVE FUNCTION).
C**OTHER DATA IN COMMON/FIXDATA/ MUST BE PRESET.
C
C$$$
C$$$ CHANGE THE FOLLOWING FORTRAN-77 PARAMETER STATEMENT ONLY IF
C$$$ INCREASING THE DEFAULT DIMENSIONS FOR NLSOL:
C$$$   PARAMETER (NDIM=500,MDIM=5,KDIM=20)
C$$$ WHERE NDIM=MAX.OBS., MDIM=MAX.INDEP.VARS., KDIM=MAX.UNKNOWN PARMS.
C$$$ DO NOT CHANGE THE FOLLOWING RELATED PARAMETER STATEMENT:
C$$$   PARAMETER (KIDIM=KDIM-1)
C$$$
C
      INTEGER SP

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        DIMENSION C(1),R(1),CBOUND(1),PRNT(5),SQWT(NDIM),BIP(KDIM)
        COMMON/FIXDAT/Y(NDIM),X(NDIM,MDIM),BFI(KDIM),IIB(KDIM),IIP,
        1 IDER,KPARMS,SP
        EQUIVALENCE (SQWT(1),X(1,MDIM))
C
C   GET INVERSE PARAMETER TRANSFORMATION (C TO BIP)
C
        CALL INTRAN(KIP,C,CBOUND,BIP)
C
C   COMPUTE RESIDUAL VECTOR R(N) USING BIP IN FCODE
C
        DO 10 I=1,N
            CALL FCODE(Y,X,BIP,PRNT,F,I,IDER)
            *****
            R(I)=SQWT(I)*(Y(I)-F)
10      CONTINUE
        LASTNF=NF
        RETURN
        END
        SUBROUTINE NONBLANK(C,NB)
C--DETERMINE NON-BLANK CHAR LENGTH (=NB ON EXIT) OF C*(*)
C   NOTE THAT NB WILL BE IN [0,LEN(C)].
C
        CHARACTER*(*) C
        L=LEN(C)
        DO 10 I=L,1,-1
            NB=I
            IF(C(I:I).NE.' ') RETURN
10      CONTINUE
        NB=0
        RETURN
        END
        SUBROUTINE PROCINFO(ABS_VALUES,INCR_VALUES)
C
C** SUBROUTINE TO OBTAIN ABSOLUTE AND INCREMENTAL VALUES OF PROCESS
C   PARAMETERS: CPU TIME, BUFFERED I/O COUNT, DIRECT I/O COUNT, AND
C   PAGE FAULTS.
C
        IMPLICIT INTEGER*2(W),INTEGER*4(L)
        PARAMETER (JPI$ CPUTIM = '00000407'X,
        1 JPI$ BUFIO = '0000040C'X,JPI$ DIRIO = '0000040B'X,
        2 JPI$ PAGEFLTS= '0000040A'X)
        INTEGER*4 ABS_VALUES(4),INCR_VALUES(4),LCL_VALUES(4)
        COMMON/ITEMLIST/
        1 W_LEN1,W_CODE1,L_ADDR1,L_LENADDR1,
        2 W_LEN2,W_CODE2,L_ADDR2,L_LENADDR2,
        3 W_LEN3,W_CODE3,L_ADDR3,L_LENADDR3,
        4 W_LEN4,W_CODE4,L_ADDR4,L_LENADDR4,
        5 W_LEN5,W_CODE5
        DATA W_LEN1,W_LEN2,W_LEN3,W_LEN4,W_LEN5/5*4/
        DATA W_CODE1/JPI$ CPUTIM/,
        1 W_CODE2/JPI$ BUFIO/,
        2 W_CODE3/JPI$ DIRIO/,
        3 W_CODE4/JPI$ PAGEFLTS/,
        4 W_CODE5/0/

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DATA L_LENADDR1,L_LENADDR2,L_LENADDR3,L_LENADDR4,4*0/ 00019630
L_ADDR1=%LOC(LCL_VALUES(1)) 00019640
L_ADDR2=%LOC(LCL_VALUES(2)) 00019650
L_ADDR3=%LOC(LCL_VALUES(3)) 00019660
L_ADDR4=%LOC(LCL_VALUES(4)) 00019670
C** PERFORM THE SYSTEM SERVICE CALL 00019680
CALL SYSSGETUPI(,,,W_LEN1,,,) 00019690
C** ASSIGN THE NEW VALUES TO THE ARGUMENTS 00019700
DO I=1,4 00019710
    INCR_VALUES(I)=LCL_VALUES(I)-ABS_VALUES(I) 00019720
    ABS_VALUES(I)=LCL_VALUES(I) 00019730
END DO 00019740
RETURN 00019750
END 00019760
REAL FUNCTION RFLAGS(N,FUN,TOL,TO,TM,T,NEW) 00019770
C--FOURIER TRANSFORM LAG CONVOLUTION & SPLINE INTERPOLATION 00019780
C GIVES FOURIER COSINE OR SINE TRANSFORMS VIA RLAGF0,RLAGF1 00019790
C REF: ANDERSON,1975,NTIS REPT. PB-242-600,P.76-87. 00019800
C 00019810
C N = 0 FOR COSINE TRANSFORM (VIA RLAGF0) 00019820
C N = 1 FOR SINE TRANSFORM (VIA RLAGF1) 00019830
C FUN = EXTERNAL REAL KERNEL FUNCTION. 00019840
C TOL = TOLERANCE REQUESTED FOR RLAGF0 OR RLAGF1 00019850
C TO = TMIN TO USE (E.G., LET TO=.5*TMIN, TMIN=TRUE) 00019860
C TM = TMAX TO USE (TM>TO) 00019870
C T = TRANSFORM PARAMETER (TO<=T<=TM) FOR THIS CALL (NEW=1 OR 0) 00019880
C NEW = 1 REQUIRED FOR 1ST CALL OR TO RESET SPLINE COEFFICIENTS. 00019890
C NEW = 0 FOR ALL CALLS AFTER 1ST--USES SPLINE INTERPOLATION ONLY. 00019900
C 00019910
REAL ARG(200),Y(200),AR(200),BR(200),CR(200), 00019920
& D(2),W1(200),W2(200) 00019930
EXTERNAL FUN 00019940
DATA D/2*0.0/ 00019950
IF(NEW.EQ.0) GO TO 3 00019960
NT=AIN(5.*ALOG(TM/TO))+5 00019970
IF(NT.GT.200)CALL ERRMSG('IN RFLAGS: NT>200 ',4,5,16) 00019980
NT1=NT+1 00019990
X0=ALOG(TO)+.2*NT 00020000
NU=1 00020010
DO 1 J=1,NT 00020020
    I=NT1-J 00020030
    X=X0-.2*J 00020040
    EX=EXP(X) 00020050
    ARG(I)=EX 00020060
    IF(N.EQ.0) Y(I)=RLAGF0(X,FUN,TOL,L,NU)/EX 00020070
    IF(N.NE.0) Y(I)=RLAGF1(X,FUN,TOL,L,NU)/EX 00020080
    NU=0 00020090
CALL SPLIN1(NT,0.0,ARG,Y,AR,BR,CR,0,D,W1,W2) 00020100
2 IF(NT.LT.0) CALL ERRMSG('IN RFLAGS: NT<0 AFTER SPLIN1 ',6,6,16) 00020110
3 IF(T.LT.TO) CALL ERRMSG('IN RFLAGS: T<TO',3,6,16) 00020120
IF(T.GT.TM) CALL ERRMSG('IN RFLAGS: T>TM',3,6,16) 00020130
CALL SPOINT(NT,ARG,Y,AR,BR,CR,T,X) 00020140
RFLAGS=X 00020150
RETURN 00020160
END 00020170

```

```

SUBROUTINE SPLIN1(M,H,X,Y,A,B,C,IT,D,P,S)
C--ONE DIMENSIONAL CUBIC SPLINE COEFFICIENT DETERMINATION.
C
C      BY W.L.ANDERSON, U.S. GEOLOGICAL SURVEY, DENVER, COLORADO
C
C  PARS--- M= NUMBER OF DATA POINTS .GT. 2
C          H= EQUAL INTERVAL OPTION WHEN H.GT.0. (USE DUMMY X HERE),
C            UNEQUAL INTERVALS IF H=0. (X REQUIRED STORAGE)
C          X= INDEP.VAR WHEN H=0. (DIM .GE. M).
C          Y= DEPENDENT VARIABLE (DIM .GE. M).
C          A,B,C=COEFF.ARRAYS (EACH DIM .GE. M)
C            RESULTS ARE RETURNED IN 1ST(M-1) ELEMENTS OF A,B,&C.
C            ALSO USED AS WORK ARRAYS DURING EXECUTION.
C          IT= TYPE OF BOUNDARY CONDITION SUPPLIED IN D ARRAY. USE
C            IT=1 IF 1ST DERIVATIVES GIVEN AT END POINTS, OR
C            IT=0 IF 2ND DERIVATIVES GIVEN AT END POINTS.
C          D= BOUNDARY ARRAY (DIM 2) AT POINT 1 AND M RESPECTIVELY.
C          P,S= WORK ARRAYS (EACH DIM=M).
C--ERROR RETURN WITH M=-(ABS(M)) IF ANY PARM OUT OF RANGE.
C THE RESULTING CUBIC SPLINE IS OF THE FORM:
C   Y=Y(I)+A(I)*(X-X(I))+B(I)*(X-X(I))**2+C(I)*(X-X(I))**3
C   FOR I=1,2,...,M-1
C
C      REAL*4 X(1),Y(1),A(1),B(1),C(1),D(2),P(1),S(1),MUL
C      IF(IT.LT.0.OR.IT.GT.1.OR.H.LT.0..OR.M.LT.3) GO TO 999
C      N=M-1
C      IF(IT.EQ.0) GO TO 20
C--1ST DERIVATIVE BOUNDARIES GIVEN
C      NE=N-1
C      IF(H) 999,11,1
C--EQUAL SPACING H .GT. 0. AND IT=1
C      1 HH=3.0/H
C      DO 2 I=1,NE
C        B(I)=4.0
C        C(I)=1.0
C        A(I)=1.0
C      2 P(I)=HH*(Y(I+2)-Y(I))
C        P(1)=P(1)-D(1)
C        P(NE)=P(NE)-D(2)
C--SOLUTION OF TRIDIAGONAL MATRIX EQ. OF ORDER NE
C      3 C(1)=C(1)/B(1)
C        P(1)=P(1)/B(1)
C        DO 4 I=2,NE
C          MUL=1.0/(B(I)-A(I)*C(I-1))
C          C(I)=MUL*C(I)
C        4 P(I)=MUL*(P(I)-A(I)*P(I-1))
C--OBTAIN SPLINE COEFFICIENTS
C      A(NE+IT)=P(NE)
C      I=NE-1
C      5 A(I+IT)=P(I)-C(I)*A(I+IT+1)
C      I=I-1
C      IF(I.GE.1) GO TO 5
C      IF(IT.EQ.0) GO TO 6
C      A(1)=D(1)

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```

      A(M)=D(2)
      6 IF(H.EQ.0.) GO TO 14
      HH=1.0/H
      DO 7 I=1,N
      MUL=HH*(Y(I+1)-Y(I))
      B(I)=HH*(3.0*MUL-(A(I+1)+2.0*A(I)))
      7 C(I)=HH*HH*(-2.0*MUL+A(I+1)+A(I))
      RETURN
C--UNEQUAL SPACING H=0.. AND IT=1
      11 DO 12 I=1,N
      12 S(I+1)=X(I+1)-X(I)
      DO 13 I=1,NE
      B(I)=2.0*(S(I+1)+S(I+2))
      C(I)=S(I+1)
      A(I)=S(I+2)
      13 P(I)=3.0*(S(I+1)**2*(Y(I+2)-Y(I+1))+S(I+2)**2*(Y(I+1)-Y(I)))/
      * (S(I+1)*S(I+2))
      P(1)=P(1)-S(3)*D(1)
      P(NE)=P(NE)-S(N)*D(2)
      GO TO 3
      14 DO 15 I=1,N
      HH=1.0/S(I+1)
      MUL=(Y(I+1)-Y(I))*HH**2
      B(I)=3.0*MUL-(A(I+1)+2.0*A(I))*HH
      15 C(I)=-2.0*MUL*HH+(A(I+1)+A(I))*HH**2
      RETURN
C--2ND DERIVATIVE BOUNDARIES GIVEN
      20 NE=N+1
      IF(H) 999,31,21
C--EQUAL SPACING H .GT. 0 AND IT=0
      21 HH=3.0/H
      DO 22 I=2,N
      B(I)=4.0
      C(I)=1.0
      A(I)=1.0
      22 P(I)=HH*(Y(I+1)-Y(I-1))
      B(1)=2.0
      B(NE)=2.0
      C(1)=1.0
      C(NE)=1.0
      A(NE)=1.0
      P(1)=HH*(Y(2)-Y(1))-0.5*H*D(1)
      P(NE)=HH*(Y(M)-Y(N))+0.5*H*D(2)
      GO TO 3
C--UNEQUAL SPACING H=0 AND IT=0
      31 DO 32 I=1,N
      32 S(I+1)=X(I+1)-X(I)
      N1=N-1
      DO 33 I=1,N1
      B(I+1)=2.0*(S(I+1)+S(I+2))
      C(I+1)=S(I+1)
      A(I+1)=S(I+2)
      33 P(I+1)=3.0*(S(I+1)**2*(Y(I+2)-Y(I+1))+S(I+2)**2*(Y(I+1)-Y(I)))/
      * (S(I+1)*S(I+2))
      B(1)=2.0

```

```

      B(NE)=2.0
      C(1)=1.0
      C(NE)=1.0
      A(NE)=1.0
      P(1)=3.0*(Y(2)-Y(1))/S(2)-0.5*S(2)*D(1)
      P(NE)=3.0*(Y(M)-Y(N))/S(M)+0.5*S(M)*D(2)
      GO TO 3
999 M=-IABS(M)
      RETURN
      END
      SUBROUTINE SPOINT(M,X,Y,A,B,C,XX,YY)
C--GIVEN CUBIC SPLINE COEFF'S A,B,C,AND M OBS.DATA ARRAYS X,Y
C SPOINT EVALUATES THE PIECEWISE CUBIC SPLINE ORDINATE YY AT THE
C ABSCISSA XX, WHERE XX IS IN THE CLOSED INTERVAL (X(1),X(M)).
C NOTE: IF COMPUTING OVER EQUAL INTERVALS, USE THE SUBR 'CUBIC'
C WHICH REQUIRES ONLY ONE CALL.
C
      DIMENSION X(1),Y(1),A(1),B(1),C(1)
      IF(XX.LT.X(1).OR.XX.GT.X(M)) GO TO 9
      M1=M-1
      DO 1 I=1,M1
        J=I
        IF(XX.LE.X(I+1)) GO TO 2
      1 CONTINUE
      9 WRITE(6,60) XX,X(1),X(M)
60  FORMAT('OERROR IN SPOINT CALL--XX=',E16.8,' NOT IN CLOSED INTERVAL
      * (' ,E16.8,' ,',E16.8,')')
      RETURN
      2 Z=XX-X(J)
      YY=Y(J)+((C(J)*Z+B(J))*Z+A(J))*Z
      RETURN
      END
      REAL*4 FUNCTION SQJ1(B,FUN,TOL,NF)
C=====
C** THIS IS A REAL*4 VERSION WRITTEN FOR THE VAX-11/780 BY
C W.L.ANDERSON, U.S.GEOLOGICAL SURVEY, DENVER, COLORADO, USA.
C=====
C SUBPROGRAM SQJ1 WILL COMPUTE THE FOLLOWING INFINITE INTEGRAL:
C THE REAL*4 HANKEL TRANSFORM-SQUARE OF ORDER-1 FOR BOUNDED CONTINUOUS
C KERNEL FUNCTIONS AND A FIXED TRANSFORM ARGUMENT B.GT.0. THE
C METHOD IS SIMILAR TO THE NEW=1 CASE FOR SINGLE-POWER JO,J1-FILTERS
C DESIGNED AND PUBLISHED IN THE FOLLOWING REFERENCE:
C
C--REF: ANDERSON, W.L., 1979, GEOPHYSICS, VOL. 44, NO. 7, P. 1287-1305.
C
C--SPECIFICALLY, SQJ1 EVALUATES THE INTEGRAL FROM 0 TO INFINITY OF
C FUN(G)*[J1(G*B)]**2 *DG, DEFINED AS THE J1**2 HANKEL TRANSFORM OF
C ORDER N=1 AND TRANSFORM ARGUMENT B.GT.0. THE METHOD IS BY
C ADAPTIVE DIGITAL FILTERING OF THE REAL*4 KERNEL FUNCTION FUN (SEE
C THE ABOVE REFERENCE FOR ADDITIONAL INFORMATION).
C
C--PARAMETERS (ALL INPUT, EXCEPT NF)
C
C B = REAL*4 TRANSFORM ARGUMENT B>0.0 OF THE HANKEL TRANSFORM.
C FUN(G)= EXTERNAL DECLARED REAL*4 FUNCTION NAME (USER SUPPLIED)

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C      OF A REAL*4 ARGUMENT >0. THIS REFERENCE MUST BE SUPPLIED. 00021630
C      IF PARAMETERS OTHER THAN G ARE REQUIRED IN FUN, USE COMMON 00021640
C      IN THE CALLING PROGRAM AND IN SUBPROGRAM FUN. FUN(G) 00021650
C      MUST BE A CONTINUOUS BOUNDED FUNCTION FOR G.GT.0. 00021660
C      THE VALUE OF G IN FUN(G) MUST NOT BE CHANGED BY THE USER. 00021670
C      (G>0.0 WILL BE ASSIGNED AN ABSCISSA VALUE BY SQJ1.) 00021680
C      TOL = REQUESTED REAL*4 TRUNCATION TOLERANCE USED AT THE FILTER 00021690
C      TAILS FOR ADAPTIVE FILTERING. A TRUNCATION CRITERION IS 00021900
C      DEFINED DURING CONVOLUTION IN A FIXED ABSCISSA RANGE AS 00021910
C      THE MAX. ABSOLUTE CONVOLVED PRODUCT TIMES TOL. TYPICALLY, 00021920
C      TOL.LE.0.00001E0 WOULD GIVE ABOUT .01 PER CENT ACCURACY 00021930
C      FOR WELL-BEHAVED KERNELS AND MODERATE VALUES OF B. FOR 00021940
C      VERY LARGE OR SMALL B, A VERY SMALL TOL SHOULD BE USED. 00021950
C      IN GENERAL, DECREASING THE TOLERANCE WOULD PRODUCE HIGHER 00021960
C      ACCURACY IN THE CONVOLUTION SINCE MORE FILTER WEIGHTS ARE 00021970
C      USED (UNLESS EXPONENT UNDERFLOWS OCCUR IN THE KERNEL 00021980
C      EVALUATION -- SEE NOTE (1) BELOW). 00021990
C      FOR MAXIMUM ACCURACY POSSIBLE, TOL=0.0E0 MAY BE USED. 00022000
C      NF = TOTAL NUMBER OF FUNCTION CALLS USED DURING CONVOLUTION. 00022010
C      NF IS IN THE RANGE 39.LE.NF.LE.441. USUALLY, 00022020
C      NF IS MUCH LESS THAN 441 FOR TOL>0. 00022030
C 00022040
C=====00022050
C--SUBPROGRAM USAGE-- 00022060
C FUNCTION SQJ1 IS CALLED AS FOLLOWS (ASSUMES B>0.0, TOL>=0.0): 00022070
C 00022080
C      ... 00022090
C      EXTERNAL FUN 00022100
C      ... 00022110
C      ANS=SQJ1(B,FUN,TOL,NF1) 00022120
C      ... 00022130
C      END 00022140
C      REAL*4 FUNCTION FUN(G) 00022150
C      ...USER SUPPLIED CODE FOR EVALUATION OF FUN(G), G.GT.0. 00022160
C      END 00022170
C=====00022180
C--NOTES 00022190
C      (1). EXP-UNDERFLOW MAY OCCUR IN EXECUTING THIS SUBPROGRAM. 00022200
C      THIS IS OK PROVIDED THE MACHINE SYSTEM CONDITIONALLY SETS 00022210
C      EXP-UNDERFLOW TO 0.0D0. 00022220
C      (2). ANSI FORTRAN (AMERICAN STANDARD X3.9-1978) IS USED, EXCEPT 00022230
C      DATA STATEMENTS MAY NEED TO BE CHANGED FOR SOME COMPILERS. 00022240
C      (3). THE FILTER ABSCISSA CORRESPONDING TO EACH FILTER WEIGHT 00022250
C      IS GENERATED IN DOUBLE-PRECISION (TO REDUCE ROUND-OFF), 00022260
C      BUT IS USED IN SINGLE-PRECISION IN FUNCTION FUN. 00022270
C      (4). NO CHECKS ARE MADE ON CALLING PARAMETERS (TO SAVE TIME), 00022280
C      HENCE UNPREDICTABLE RESULTS COULD OCCUR IF SQJ1 00022290
C      IS CALLED INCORRECTLY (OR IF FUNCTION FUN IS IN ERROR). 00022300
C=====00022310
C      DOUBLE PRECISION E,ER,Y1,Y 00022320
C      DIMENSION WT(441) 00022330
C      EQUIVALENCE (C,T),(CMAX,TMAX) 00022340
C-----E=DEXP(.2D0), ER=1.0D0/E 00022350
C      DATA E/1.221402756160169834 D0/,ER/.316730753077981659 D0/ 00022360
C--J1**2 TRANSFORM FILTER WEIGHT ARRAY WT: 00022370

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DATA
*WT( 1)/-1.347588263343194E-23/,WT( 2)/-1.004450143483504E-25/,00022380
*WT( 3)/ 1.683503939595247E-25/,WT( 4)/-2.282980314410168E-25/,00022390
*WT( 5)/ 2.923585715694195E-25/,WT( 6)/-3.675806489042468E-25/,00022400
*WT( 7)/ 4.593049803693359E-25/,WT( 8)/-5.727028100634057E-25/,00022410
*WT( 9)/ 7.135771935139985E-25/,WT(10)/-8.888811014230883E-25/,00022420
*WT(11)/ 1.107156069674981E-24/,WT(12)/-1.378989609333908E-24/,00022430
*WT(13)/ 1.717546562904475E-24/,WT(14)/-2.139214301317015E-24/,00022440
*WT(15)/ 2.664399191263380E-24/,WT(16)/-3.318515490721890E-24/,00022450
*WT(17)/ 4.133215669675101E-24/,WT(18)/-5.147922382202117E-24/,00022460
*WT(19)/ 6.411736449429337E-24/,WT(20)/-7.985813510726213E-24/,00022470
*WT(21)/ 9.946324264352379E-24/,WT(22)/-1.238814130360626E-23/,00022480
*WT(23)/ 1.542943057770673E-23/,WT(24)/-1.921736946991326E-23/,00022490
*WT(25)/ 2.393526835149547E-23/,WT(26)/-2.981144052786852E-23/,00022500
*WT(27)/ 3.713025019486333E-23/,WT(28)/-4.624587308718179E-23/,00022510
*WT(29)/ 5.759943567573909E-23/,WT(30)/-7.174036219523911E-23/,00022520
*WT(31)/ 8.935296256138077E-23/,WT(32)/-1.112895477589067E-22/,00022530
*WT(33)/ 1.386116753020867E-22/,WT(34)/-1.726415206560751E-22/,00022540
*WT(35)/ 2.150258605026952E-22/,WT(36)/-2.678157641135945E-22/,00022550
*WT(37)/ 3.335658490307941E-22/,WT(38)/-4.154579043649808E-22/,00022560
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*WT(39)/ 5.174548642169893E-22/,WT(40)/-6.444925823915958E-22/,00022570
*WT(41)/ 8.027186890075815E-22/,WT(42)/-9.997900876036018E-22/,00022580
*WT(43)/ 1.245243489344099E-21/,WT(44)/-1.550956915200967E-21/,00022590
*WT(45)/ 1.931724499103375E-21/,WT(46)/-2.405972408035303E-21/,00022600
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*WT(49)/ 4.648651704078530E-21/,WT(50)/-5.789918678280031E-21/,00022620
*WT(51)/ 7.211372338845832E-21/,WT(52)/-8.981799902919285E-21/,00022630
*WT(53)/ 1.118687618908690E-20/,WT(54)/-1.393330960673053E-20/,00022640
*WT(55)/ 1.735400600656860E-20/,WT(56)/-2.161450028230063E-20/,00022650
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*WT(63)/ 1.004993814299769E-19/,WT(64)/-1.251724763687751E-19/,00022690
*WT(65)/ 1.559029380806346E-19/,WT(66)/-1.941778800516568E-19/,00022700
*WT(67)/ 2.418495094800596E-19/,WT(68)/-3.012247595873759E-19/,00022710
*WT(69)/ 3.751769271050626E-19/,WT(70)/-4.672847173158759E-19/,00022720
*WT(71)/ 5.820054253400369E-19/,WT(72)/-7.248906342833808E-19/,00022730
*WT(73)/ 9.028548683470782E-19/,WT(74)/-1.124510201604046E-18/,00022740
*WT(75)/ 1.400583014884058E-18/,WT(76)/-1.744433068534399E-18/,00022750
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*WT(101)/ 4.219788649509144E-16/,WT(102)/-5.255767622638629E-16/,00022880
*WT(103)/ 6.546084554824806E-16/,WT(104)/-8.153180672284374E-16/,00022890

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*WT(105)/ 1.015482683193536E-15/, WT(106)/ -1.264788701627155E-15/, 00022930
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*WT(151)/ 2.469241780034636E-11/, WT(152)/ -3.075450410688651E-11/, 00023170
DATA 00023180
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*WT(163)/ 3.441298524411762E-10/, WT(164)/ -4.285828501125686E-10/, 00023240
*WT(165)/ 5.338614271394212E-10/, WT(166)/ -6.648188696939778E-10/, 00023250
*WT(167)/ 3.282322996645696E-10/, WT(168)/ -1.031208263660785E-09/, 00023260
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*WT(171)/ 1.994131320471997E-09/, WT(172)/ -2.479741335832154E-09/, 00023280
*WT(173)/ 3.095744008520559E-09/, WT(174)/ -3.842619853134365E-09/, 00023290
*WT(175)/ 4.809953067374334E-09/, WT(176)/ -5.947178675707624E-09/, 00023300
*WT(177)/ 7.486760702417851E-09/, WT(178)/ -9.179902118256913E-09/, 00023310
*WT(179)/ 1.169762997406174E-08/, WT(180)/ -1.408838665765728E-08/, 00023320
*WT(181)/ 1.842372041425834E-08/, WT(182)/ -2.134962991708034E-08/, 00023330
*WT(183)/ 2.950136491767512E-08/, WT(184)/ -3.144119891760005E-08/, 00023340
*WT(185)/ 4.882266264702902E-08/, WT(186)/ -4.320270488285106E-08/, 00023350
*WT(187)/ 3.588959358375533E-08/, WT(188)/ -4.852194659790488E-08/, 00023360
*WT(189)/ 1.669435673170516E-07/, WT(190)/ -1.385910316986003E-08/, 00023370
DATA 00023380
*WT(191)/ 3.708738131945973E-07/, WT(192)/ 1.823797026421996E-07/, 00023390
*WT(193)/ 3.467983934893969E-07/, WT(194)/ 3.597040523684165E-07/, 00023400
*WT(195)/ 2.701748498631580E-06/, WT(196)/ 3.734876413066559E-06/, 00023410
*WT(197)/ 3.282486621513228E-06/, WT(198)/ 1.324461998560607E-05/, 00023420
*WT(199)/ 2.641448646264069E-05/, WT(200)/ 4.523524985049475E-05/, 00023430
*WT(201)/ 3.588684980817776E-05/, WT(202)/ 1.517873902314913E-04/, 00023440
*WT(203)/ 2.813826579228376E-04/, WT(204)/ 5.038194131853568E-04/, 00023450
*WT(205)/ 3.213190246955773E-04/, WT(206)/ 1.653407812381240E-03/, 00023460
*WT(207)/ 2.987499535105453E-03/, WT(208)/ 5.321388722355372E-03/, 00023470

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*WT(209)/ 3.440908759758161E-03/, WT(210)/ 1.043047423780764E-02/, 00023480
*WT(211)/ 2.808662670906598E-02/, WT(212)/ 4.626203993573857E-02/, 00023490
*WT(213)/ 7.253448218727225E-02/, WT(214)/ 1.043469122586500E-01/, 00023500
*WT(215)/ 1.315642401108199E-01/, WT(216)/ 1.297016728924245E-01/, 00023510
*WT(217)/ 7.958314538535249E-02/, WT(218)/ 5.959581319466263E-03/, 00023520
*WT(219)/ 3.537761733766417E-02/, WT(220)/ 1.209369201455565E-01/, 00023530
*WT(221)/ 3.996142046468204E-02/, WT(222)/ 6.204935352917316E-02/, 00023540
*WT(223)/ 7.416825136755058E-02/, WT(224)/ 5.350601024506145E-02/, 00023550
*WT(225)/ 7.257325296747682E-02/, WT(226)/ 5.551076116171530E-02/, 00023560
*WT(227)/ 7.378792584731115E-02/, WT(228)/ 4.699105146655452E-02/, 00023570
DATA
*WT(229)/ 3.712542002484704E-02/, WT(230)/ -8.710790311395239E-03/, 00023580
*WT(231)/ 2.243194656925174E-01/, WT(232)/ -2.943323232952508E-01/, 00023590
*WT(233)/ 3.579845401683572E-01/, WT(234)/ -1.682517936763538E+00/, 00023600
*WT(235)/ 3.850205803583565E+00/, WT(236)/ -7.990070788264109E+00/, 00023610
*WT(237)/ 1.672259034426730E+01/, WT(238)/ -3.296742939854201E+01/, 00023620
*WT(239)/ 5.113461761572366E+01/, WT(240)/ -9.893170516119710E+01/, 00023630
*WT(241)/ 1.202968925957973E+02/, WT(242)/ -1.055273972563466E+02/, 00023640
*WT(243)/ 5.683237989195774E+01/, WT(244)/ -2.793810874106434E+01/, 00023650
*WT(245)/ 1.590990990202553E+00/, WT(246)/ 1.160669943373125E+01/, 00023660
*WT(247)/ -1.590041269652672E+01/, WT(248)/ 1.551471062170340E+01/, 00023670
*WT(249)/ -1.322642619402104E+01/, WT(250)/ 1.051035957858022E+01/, 00023680
*WT(251)/ -3.018476352610196E+00/, WT(252)/ 5.966975882060087E+00/, 00023690
*WT(253)/ -4.371574296080611E+00/, WT(254)/ 3.171154372941820E+00/, 00023700
*WT(255)/ -2.285863933761940E+00/, WT(256)/ 1.641078862938996E+00/, 00023710
*WT(257)/ -1.175142006825595E+00/, WT(258)/ 8.401183229994065E-01/, 00023720
*WT(259)/ -5.999848865403200E-01/, WT(260)/ 4.282092044767511E-01/, 00023730
*WT(261)/ -3.054871785604701E-01/, WT(262)/ 2.178803108055725E-01/, 00023740
*WT(263)/ -1.553720956115054E-01/, WT(264)/ 1.107858980261850E-01/, 00023750
*WT(265)/ -7.898940980104745E-02/, WT(266)/ 5.631660644909182E-02/, 00023760
DATA
*WT(267)/ -4.015075436876059E-02/, WT(268)/ 2.862493689156548E-02/, 00023770
*WT(269)/ -2.040757592276983E-02/, WT(270)/ 1.454909156012523E-02/, 00023780
*WT(271)/ -1.037239010986780E-02/, WT(272)/ 7.394705684860287E-03/, 00023790
*WT(273)/ -5.271841981221853E-03/, WT(274)/ 3.758404609682646E-03/, 00023800
*WT(275)/ -2.679442677158320E-03/, WT(276)/ 1.910228325289486E-03/, 00023810
*WT(277)/ -1.361839769584138E-03/, WT(278)/ 9.708825536314996E-04/, 00023820
*WT(279)/ -6.921613621151932E-04/, WT(280)/ 4.934554956175334E-04/, 00023830
*WT(281)/ -3.517941529895520E-04/, WT(282)/ 2.508009847086945E-04/, 00023840
*WT(283)/ -1.788009630614640E-04/, WT(284)/ 1.274707284368542E-04/, 00023850
*WT(285)/ -9.087639280562825E-05/, WT(286)/ 6.478757008493505E-05/, 00023860
*WT(287)/ -4.618833453535555E-05/, WT(288)/ 3.292857322377349E-05/, 00023870
*WT(289)/ -2.347542826480734E-05/, WT(290)/ 1.673609507212648E-05/, 00023880
*WT(291)/ -1.193149173068922E-05/, WT(292)/ 8.506195399309457E-06/, 00023890
*WT(293)/ -6.064234196352591E-06/, WT(294)/ 4.323311969745620E-06/, 00023900
*WT(295)/ -3.082174233732943E-06/, WT(296)/ 2.197342702408592E-06/, 00023910
*WT(297)/ -1.566528880471568E-06/, WT(298)/ 1.116809285437889E-06/, 00023920
*WT(299)/ -7.361953306989225E-07/, WT(300)/ 5.676233291497361E-07/, 00023930
*WT(301)/ -4.046698484300778E-07/, WT(302)/ 2.884971033054787E-07/, 00023940
*WT(303)/ -2.056752657469096E-07/, WT(304)/ 1.466299469054255E-07/, 00023950
DATA
*WT(305)/ -1.045353764411399E-07/, WT(306)/ 7.452532827238916E-08/, 00023960
*WT(307)/ -5.313057400462258E-08/, WT(308)/ 3.787783240273793E-08/, 00023970
*WT(309)/ -2.700385257281518E-08/, WT(310)/ 1.925157823238107E-08/, 00024000
*WT(311)/ -1.372482920494806E-08/, WT(312)/ 9.784700996002279E-09/, 00024010
00024020

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*AT(313)/-6.375706010727724E-09/,WT(314)/ 4.373116173757300E-09/, 00024030
*AT(315)/-3.545433871615285E-09/,WT(316)/ 2.527609620402724E-09/, 00024040
*AT(317)/-1.501982669573813E-09/,WT(318)/ 1.284668928003203E-09/, 00024050
*AT(319)/-9.158657752100248E-10/,WT(320)/ 6.529387454724082E-10/, 00024060
*AT(321)/-4.654928886728159E-10/,WT(322)/ 3.318590463615230E-10/, 00024070
*AT(323)/-2.365888487920329E-10/,WT(324)/ 1.686688489730136E-10/, 00024080
*AT(325)/-1.202473436963784E-10/,WT(326)/ 3.572663911302267E-11/, 00024090
*AT(327)/-6.111625184307596E-11/,WT(328)/ 4.357097938028586E-11/, 00024100
*AT(329)/-3.106260915694127E-11/,WT(330)/ 2.214514572223416E-11/, 00024110
*AT(331)/-1.578771044574020E-11/,WT(332)/ 1.125536965276491E-11/, 00024120
*AT(333)/-6.024174655104147E-12/,WT(334)/ 5.720592115753784E-12/, 00024130
*AT(335)/-4.078322763576438E-12/,WT(336)/ 2.907516604461514E-12/, 00024140
*AT(337)/-2.072825839268808E-12/,WT(338)/ 1.477758356855950E-12/, 00024150
*AT(339)/-1.053523031162099E-12/,WT(340)/ 7.510773138515030E-13/, 00024160
*AT(341)/-5.354578065181299E-13/,WT(342)/ 3.317384139735767E-13/, 00024170
DATA
*AT(343)/-2.721488321379581E-13/,WT(344)/ 1.940202613174297E-13/, 00024180
*AT(345)/-1.383208647487461E-13/,WT(346)/ 9.861166815737169E-14/, 00024190
*AT(347)/-7.030219999306174E-14/,WT(348)/ 5.011982269661039E-14/, 00024200
*AT(349)/-3.573140851051000E-14/,WT(350)/ 2.547362471478360E-14/, 00024210
*AT(351)/-1.316064866065287E-14/,WT(352)/ 1.294708403175416E-14/, 00024220
*AT(353)/-9.230231147441696E-15/,WT(354)/ 6.580413537615677E-15/, 00024230
*AT(355)/-4.691306385976846E-15/,WT(356)/ 3.344524699139429E-15/, 00024240
*AT(357)/-2.384377515096891E-15/,WT(358)/ 1.699869681321967E-15/, 00024250
*AT(359)/-1.211870567970942E-15/,WT(360)/ 8.639663908659455E-16/, 00024260
*AT(361)/-6.159386524219969E-16/,WT(362)/ 4.391147937677918E-16/, 00024270
*AT(363)/-3.130535830922384E-16/,WT(364)/ 2.231820637286411E-16/, 00024280
*AT(365)/-1.591108879130287E-16/,WT(366)/ 1.134332850476810E-16/, 00024290
*AT(367)/-8.086882252666564E-17/,WT(368)/ 5.765297596814659E-17/, 00024300
*AT(369)/-4.110194181301590E-17/,WT(370)/ 2.930238365717713E-17/, 00024310
*AT(371)/-2.089024630262032E-17/,WT(372)/ 1.489306793905684E-17/, 00024320
*AT(373)/-1.061756139317321E-17/,WT(374)/ 7.569468587565003E-18/, 00024330
*AT(375)/-5.396423206478743E-18/,WT(376)/ 3.847216364856985E-18/, 00024340
*AT(377)/-2.742756302043894E-18/,WT(378)/ 1.955364975352951E-18/, 00024350
*AT(379)/-1.394018194041768E-18/,WT(380)/ 9.938230201715542E-19/, 00024360
DATA
*AT(381)/-7.085160004787920E-19/,WT(382)/ 5.051150081588374E-19/, 00024370
*AT(383)/-3.601064355624574E-19/,WT(384)/ 2.567269687909788E-19/, 00024380
*AT(385)/-1.830257112802977E-19/,WT(386)/ 1.304826335452211E-19/, 00024390
*AT(387)/-9.302363879800099E-20/,WT(388)/ 6.631838383372175E-20/, 00024400
*AT(389)/-4.727968171282729E-20/,WT(390)/ 3.370661607632613E-20/, 00024410
*AT(391)/-2.403011031353726E-20/,WT(392)/ 1.713153881218087E-20/, 00024420
*AT(393)/-1.221341134602363E-20/,WT(394)/ 8.707181429542280E-21/, 00024430
*AT(395)/-6.207521077792512E-21/,WT(396)/ 4.425463988342000E-21/, 00024440
*AT(397)/-3.155000395835719E-21/,WT(398)/ 2.249261679409591E-21/, 00024450
*AT(399)/-1.603543051536933E-21/,WT(400)/ 1.143197379660655E-21/, 00024460
*AT(401)/-8.150078813546612E-22/,WT(402)/ 5.310351225960625E-22/, 00024470
*AT(403)/-4.142313344616877E-22/,WT(404)/ 2.953136303480927E-22/, 00024480
*AT(405)/-2.105348607743343E-22/,WT(406)/ 1.500944116463614E-22/, 00024490
*AT(407)/-1.070052322309586E-22/,WT(408)/ 7.628611471159240E-23/, 00024500
*AT(409)/-5.438585792837309E-23/,WT(410)/ 3.877274007553577E-23/, 00024510
*AT(411)/-2.764184653475325E-23/,WT(412)/ 1.970641801694714E-23/, 00024520
*AT(413)/-1.404909843147521E-23/,WT(414)/ 1.001588663330109E-23/, 00024530
*AT(415)/-7.140532395899525E-24/,WT(416)/ 5.090636832712442E-24/, 00024540
*AT(417)/-3.629226189021914E-24/,WT(418)/ 2.587357217905591E-24/, 00024550

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DATA
*WT(419)/-1.344586958423563E-24/,WT(420)/ 1.315049505312082E-24/,
*WT(421)/-3.375296774269097E-25/,WT(422)/ 6.683863590894837E-25/,
*WT(423)/-4.765072157206098E-25/,WT(424)/ 3.397118112049352E-25/,
*WT(425)/-2.421872841072187E-25/,WT(426)/ 1.726603263516931E-25/,
*WT(427)/-1.230938988644950E-25/,WT(428)/ 3.775817915630044E-26/,
*WT(429)/-9.256819583036690E-26/,WT(430)/ 4.461171435353558E-26/,
*WT(431)/-3.181251616647806E-26/,WT(432)/ 2.269032542804270E-26/,
*WT(433)/-1.613955905684386E-26/,WT(434)/ 1.155727651063629E-26/,
*WT(435)/-8.256240401524400E-27/,WT(436)/ 5.903135682837950E-27/,
*WT(437)/-4.224588415734394E-27/,WT(438)/ 3.025918616503642E-27/,
*WT(439)/-2.168627753535370E-27/,WT(440)/ 1.554288235465150E-27/,
*WT(441)/-4.937813102320317E-28/
00024560
00024590
00024600
00024610
00024620
00024630
00024640
00024650
00024660
00024670
00024680
00024690
00024700
00024710
00024720
00024730
00024740
00024750
00024760
00024770
00024780
00024790
00024800
00024810
00024820
00024830
00024840
00024850
00024860
00024870
00024880
00024890
00024900
00024910
00024920
00024930
00024940
00024950
00024960
00024970
00024980
00024990
00025000
00025010
00025020
00025030
00025040
00025050
00025060
00025070
00025080
00025090
00025100
00025110
00025120

C
C FOLLOWING CODE FOR STARTING WEIGHT=214 FROM TOTAL WTS=441.
C
      NONE=0
C-----INITIALIZE KERNEL ABSCISSA GENERATION FOR GIVEN B
      Y1=0.131425823982233791D1/DBLE(B)
      100 SQJ1=0.0E0
      CMAX=0.0E0
      NF=0
      Y=Y1
C-----BEGIN RIGHT-SIDE CONVOLUTION AT WEIGHT 214
      ASSIGN 110 TO M
      I=214
      Y=Y*E
      GO TO 200
      110 TMAX=AMAX1(ABS(T),TMAX)
      I=I+1
      Y=Y*E
      IF(I.LE.250) GO TO 200
      IF(TMAX.EQ.0.0E0) NONE=1
C-----ESTABLISH TRUNCATION CRITERION (CMAX=TMAX)
      CMAX=TOL*CMAX
      ASSIGN 120 TO M
      GO TO 200
C-----CHECK FOR FILTER TRUNCATION AT RIGHT END
      120 IF(ABS(T).LE.TMAX) GO TO 130
      I=I+1
      Y=Y*E
      IF(I.LE.441) GO TO 200
      130 Y=Y1
C-----CONTINUE WITH LEFT-SIDE CONVOLUTION AT WEIGHT 213
      ASSIGN 140 TO M
      I=213
      GO TO 200
C-----CHECK FOR FILTER TRUNCATION AT LEFT END
      140 IF(ABS(T).LE.TMAX.AND.
      * NONE.EQ.0) GO TO 190
      I=I-1
      Y=Y*E
      IF(I.GT.0) GO TO 200
C-----NORMALIZE BY B TO ACCOUNT FOR INTEGRATION RANGE CHANGE
      190 SQJ1=SQJ1/B

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RETURN
200 C=FUN(SNGL(Y))*WT(I)
NF=NF+1
SQJ1=SQJ1+C
GO TO M,(110,120,140)
END
SUBROUTINE WARN(MSG,ISKIP,IUNIT1,IUNIT2,*)
00025130
00025140
00025150
00025160
00025170
00025180
00025190
00025200
00025210
00025220
00025230
00025240
00025250
00025260
00025270
00025280
00025290
00025300
00025310
00025320
00025330
00025340
00025350
00025360
00025370
00025380
00025390
00025400
00025410
00025420
00025430
00025440
00025450
00025460
00025470
00025480
00025490
00025500
00025510
00025520
00025530
00025540
00025550
00025560
00025570
00025580
00025590
00025600
00025610
00025620
00025630
00025640
00025650
00025660
00025670

GENERAL WARNING MESSAGE OUTPUT AND RETURN 1 ON VAX-11/780

MSG*(*) = VARIABLE-LENGTH 'MESSAGE'
ISKIP = 0 FOR NO BLANK LINE BEFORE OUTPUT TO IUNIT1 & IUNIT2
        > 0 FOR ONE BLANK LINE BEFORE.
IUNIT1 = 0 TO SUPPRESS OUTPUT ON IUNIT1 (>0 TO WRITE ON IUNIT1).
IUNIT2 = 0 TO SUPPRESS OUTPUT ON IUNIT2 (>0 TO WRITE ON IUNIT2).

MESSAGES ARE WRITTEN IN THE FORM:
(WARN): _MSG_HERE_

CHARACTER*(*) MSG
I=LEN(MSG)
DO 1 J=1,2
  IF(J.EQ.1) THEN
    JUNIT=IUNIT1
  ELSE
    JUNIT=IUNIT2
  ENDIF
  IF(JUNIT.GT.0) THEN
    IF(ISKIP.EQ.0) THEN
      WRITE(JUNIT,2) MSG
    ELSE
      WRITE(JUNIT,3) MSG
    ENDIF
  ENDIF
CONTINUE
RETURN 1
FORMAT(1X,'(WARN): ',A<I>)
FORMAT(/1X,'(WARN): ',A<I>)
END
REAL FUNCTION ASINH(X)
C--INVERSE HYPERBOLIC SIN FUNCTION
REAL*8 X2
X2=X
ASINH=DLOG(X2+DSQRT(X2*X2+1.0D0))
RETURN
END
FUNCTION ERF(X)
C
C ERF COMPUTES THE ERROR FUNCTION TO ABOUT 7-PLACES.
C SEE MATH. OF COMP., V.22,N.101,JAN,1968.
C ALSO, SEE ERFINV(X).
C
DIMENSION A1(19),A2(19)

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DATA A1/.70322500,.33050152,.20133975,.10863025,
1 .46775523E-1,.15398573E-1,.38015077E-2,.69718379E-3,
2 .94490927E-4,.94328117E-5,.69192752E-6,.37225234E-7,
3 .14666061E-8,.42261614E-10,.88978652E-12,.13676044E-13,
4 .15334234E-15,.12536751E-17,.74517E-20/
DATA A2/.24725517,.14422723,.86989455E-1,.43977338E-1,
1 .17243963E-1,.50790696E-2,.11086065E-2,.17822802E-3,
2 .21040458E-4,.18206632E-5,.11533099E-6,.53427503E-8,
3 .18084859E-9,.44696823E-11,.80606884E-13,.10601364E-14,
4 .10164928E-16,.710005E-19,0.0/
IF(X.EQ.0.0) THEN
  ERF=0.0
  RETURN
ENDIF
B=2.*X/5.
S=SIN(B)
C=COS(B)
C2=C+C
ALP=C2*C-1.
SUM=0.0
DO 10 N=1,19
  SUM=SUM+(A1(N)+C2*A2(N))*ALP**(N-1)
10 CONTINUE
ERF=B/3.1415927+S*SUM
RETURN
END
FUNCTION ERFINV(Y)
C
C ERFINV COMPUTES THE INVERSE ERROR FUNCTION TO ABOUT 7-PLACES.
C SEE MATH. OF COMP., V.22,N.101,JAN,1968.
C ALSO, SEE ERF(X).
C
  CHARACTER*16 XX
  DIMENSION T3(1:38),T4(0:26),T5(0:37),T6(0:25)
  DATA T3/.12046752,.16078199E-1,.26867044E-2,.49963473E-3,
1 .98898219E-4,.20391813E-4,.43272716E-5,.93808141E-6,
2 .20673472E-6,.46159699E-7,.10416680E-7,.23715100E-8,
3 .54392841E-9,.12554899E-9,.29138180E-10,.67949422E-11,
4 .15912343E-11,.37402505E-12,.88208776E-13,.20865090E-13,
5 .49488041E-14,.11766395E-14,.28038557E-15,.66950664E-16,
6 .16016550E-16,.38382583E-17,.9212851E-18,.2214615E-18,
7 .533091E-19,.128488E-19,.31006E-20,.7491E-21,.1612E-21,
8 .439E-22,.106E-22,.26E-23,.6E-24,.2E-24/
  DATA T4/.91215880,-.16266282E-1,.43355647E-3,.21443857E-3,
1 .26257511E-5,-.30210911E-5,-.12406061E-7,.62406609E-7,
2 -.54012479E-9,-.14232079E-8,.34384028E-10,.33584870E-10,
3 -.14584289E-11,-.31021743E-12,.52532409E-13,.19711541E-13,
4 -.17494334E-14,-.48005966E-15,.55730299E-16,.11632505E-16,
5 -.17262489E-17,-.2784973E-18,.524481E-19,.65270E-20,
6 -.15707E-20,-.1475E-21,.450E-22/
  DATA T5/.95667971,-.23107004E-1,-.43742361E-2,-.57650342E-3,
1 -.10961022E-4,.25108547E-4,.10562336E-4,.27544123E-5,
2 .43248450E-6,-.20530336E-7,-.43891537E-7,-.17684010E-7,
3 -.39912890E-8,-.18693241E-9,.27292274E-9,.13281721E-9,
4 .31834248E-10,.16700608E-11,-.20364650E-11,-.96484681E-12,
00025600
00025690
00025700
00025710
00025720
00025730
00025740
00025750
00025760
00025770
00025780
00025790
00025800
00025810
00025820
00025830
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00025990
00026000
00026010
00026020
00026030
00026040
00026050
00026060
00026070
00026080
00026090
00026100
00026110
00026120
00026130
00026140
00026150
00026160
00026170
00026180
00026190
00026200
00026210
00026220

```

```

5  -.21956727E-12,-.95689813E-14,.13703257E-13,.52538505E-14,      00026230
6  .14584615E-14,.10781240E-15,-.70922999E-16,-.39141178E-16,      00026240
7  -.11165921E-16,-.15770360E-17,.2853149E-18,.2716602E-18,      00026250
8  .957770E-19,.176835E-19,-.9828E-21,-.20464E-20,-.802E-21,      00026260
9  -.1650E-21/      00026270
DATA T6/.98857506,.10857705E-1,-.17511651E-2,.21196993E-4,      00026280
1  .15664871E-4,-.51904169E-5,-.37135790E-7,.12174309E-8,      00026290
2  -.17681155E-9,-.11937218E-10,.38025054E-12,-.56018632E-13,      00026300
3  -.87917055E-14,-.35068693E-15,-.69722150E-16,-.10956794E-16,      00026310
4  -.11536390E-17,-.1326235E-18,-.263938E-19,.5341E-21,      00026320
5  -.2261E-20,.9552E-21,-.525E-21,.2487E-21,-.1134E-21,.42E-22/      00026330
X=Y      00026340
X1=ABS(X)      00026350
IF(X1.GE.1.0) THEN      00026360
  ENCODE(16,1,XX) X1      00026370
  FORMAT(E16.8)      00026380
1  IF(X1.GT.1.000001)CALL ERRMSG('ABS(X)='//XX//      00026390
  ' >1.000001 IN [ERFINV]',0,6,0)      00026400
  CALL WARN('ABS(X)='//XX//      00026410
  ' >=1.0 IN [ERFINV]; X=0.9999998*SIGN(1.,X) USED.',0,6,0,*2)      00026420
2  X=0.9999998*SIGN(1.,X)      00026430
  ENDIF      00026440
  X1=1.-X      00026450
  IF(X.GE.0.8.AND.X.LE.0.9975) THEN      00026460
    BETA=SQRT(-ALOG(1.-X*X))      00026470
    R=0.0      00026480
    DO 10 N=0,26      00026490
10    R=R+T4(N)*TCHEB(N,-1.54881304*BETA+2.5654901)      00026500
    ERFINV=BETA*R      00026510
    ELSE IF(X1.GE.5E-16.AND.X1.LE.25E-4) THEN      00026520
    BETA=SQRT(-ALOG(1.-X*X))      00026530
    R=0.0      00026540
    DO 20 N=0,37      00026550
20    R=R+T5(N)*TCHEB(N,-.55945763*BETA+2.2879157)      00026560
    ERFINV=BETA*R      00026570
    ELSE IF(X1.LT.5E-16) THEN      00026580
    BETA=SQRT(-ALOG(1.-X*X))      00026590
    SBETA=SQRT(BETA)      00026600
    R=0.0      00026610
    DO 30 N=0,25      00026620
30    R=R+T6(N)*TCHEB(N,-9.1999924/SBETA+2.7949908)      00026630
    ERFINV=BETA*R      00026640
    ELSE      00026650
    R=0.0      00026660
    A=X*X/.32-1.      00026670
    DO 40 N=1,38      00026680
40    R=R+T3(N)*TCHEB(N,A)      00026690
    ERFINV=X*(.99286538+R)      00026700
  ENDIF      00026710
  RETURN      00026720
  END      00026730
  INTEGER FUNCTION LOC(I,J)      00026740
C--GETS ACTUAL ADDR OF A(I,J)=A(J,I) SYMMETRIC MATRIX      00026750
C  STORED AS THE VECTOR A(LOC(I,J)) OF N*(N+1)/2 ELEMENTS--      00026760
C  WHERE ANY I,J.LE.N MAY BE USED (N NOT EXPLICITLY NEEDED)...      00026770

```


Program NL2SOL
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```
10 LOC=I+(J-1)*N  
RETURN  
20 LOC=J+(I-1)*N  
RETURN  
END
```

```
SUBROUTINE NL2SOL(N, P, A, CALCO, IV, V, IIPARM, IEPARM,  
1 UPARM)
```

```
00025510  
00025510  
00025510  
00025510  
00025510  
00025510  
00025510  
00025510  
00025510  
00025510
```

55555 Because of the length of NL2SOL and related subprograms, the rest
of the listing has been suppressed; however, the complete code is
available on the distributed tape.

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