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FROM THIS HOOD

A COMPUTER PROGRAM FOR ESTIMATING THE AERODYNAMIC CHARACTERISTICS OF NACA 16-SERIES AIRFOILS

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SUMMARY

A computer program has been written which provides a comprehensive data base on NACA 16-series airfoils. The geometry covered in the program is limited to cambers for a design-lift coefficient from 0.0 to 0.7 and thickness ratios from 4 to 21 per cent. The data include Mach numbers from 0.3 to 1.6, angles of attack from -4 to 8 degrees, and lift coefficients from 0.0 to 0.8. Extrapolation is used to obtain data from Mach numbers, angles of attack, and lift coefficients beyond those for which data were available. A subroutine to adjust the lift and drag coefficients beyond stall is included. The complete listing of the program is provided in the Appendix.

INTRODUCTION

After decades of neglect, propeller research in the United States has been reactivated due to the energy shortage. Most of the general aviation aircraft use propeller designs based on the technology that has not changed significantly since the 1940's and early 1950's. Propeller compressibility losses have caused current propeller-powered general aviation aircraft to be limited to maximum cruise speeds near Mach 0.5. The desire for improvements in swirl recovery and noise control required improved technology. Recent technological developments performed as part of NASA's Advanced Turboprop Project offer the potential of extending the limit to at least Mach 0.8. For advanced high-speed turboprop powered aircraft, compared to equivalent technology high-bypass-ratio turbofans, studies have shown that a large performance advantage may be obtained at cruise speeds up to Mach 0.8. These advantages could result in lower acquisition and reduced life cycle cost, large fuel savings, improved range, swirl recovery, and noise control, or other benefits for both future civil and military aircraft.

Airfoil research has become a major factor in the propeller performance research. The NACA 16-series airfoil sections are low-drag, high-critical-speed airfoils that could be effective in the advanced turboprop designs currently under study. These airfoil sections, which have proven useful for propellers, have relatively sharp leading and trailing edges, and have maximum thickness at mid-chord station. They are designed to work efficiently at high speed by delaying compressibility stall.

A comprehensive and easily accessible data bank on the aerodynamic characteristics of 16-series sections was needed to facilitate the studies performed. A literature survey revealed that data over a large range of cambers, thicknesses, angles of attack, and Mach numbers were not available, so a computer program was written to provide the needed data base. The requirements for the program included complete flexibility of input conditions, section Mach numbers to at least 1.1, easy accessibility, low-cost operation, and the ability to interpolate for nonstandard geometry. To fulfill these requirements, the program was written in a table "look-up" format, so that its only limitations would be the range of its data and the accuracy of the linear interpolation. The most comprehensive source for the aerodynamic characteristics of 16-series airfoils was reference 1, and these values make up the program's data declarations.

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The present paper discusses the use and limitations of the program. The program will shortly be made available to outside uses through COSMIC. Langley Research Center users will find it as the common permanent file system under user number 624435N, with the file name NACA16.

DISCUSSION

A preliminary program was written using values for only the 16-5XX airfoils with thickness ratios from 4 to 18 percent, nine Mach numbers from 0.3 to 1.3, and seven angles of attack from -4.0 to 8 degrees. A linear shift was used to account for other cambers. Extensive computation showed that the program's results were not as accurate as desired. By expanding the data tables in the program, better accuracy could be attained. More points on each curve were entered and more sections were represented. The capability to calculate the drag coefficient was added.

Digitizing equipment was used to enter the values from the graphic form of reference 1 into the data tables. This method was accurate and efficient, enabling many points to be entered in a short time directly from the curve, and allowing complete freedom in representing the curve (i.e., the values $f(x)$ could be entered for any x). A total of 100 graphs were digitized. The values were then used to generate tables corresponding to a standard set of Mach numbers; 26 values of Mach number from .3 to 1.6 are used. These are used as the data declaration in the subroutine and have the following format:

CLXXX (row, column) = a function of angle of attack (row), and Mach number
(column)

CDXXX (row, column) = a function of lift coefficient (row), and Mach number
(column)

ALPXXX (row, column) = a function of lift coefficient (row), and Mach number
(column)

where the first X in XXX notation represents the design lift coefficient in tenths (i.e., 7 = 0.7 design-lift coefficient) and the remaining two XX in this notation represents the airfoil thickness-to-chord ratio (thus, 706 signifies a 0.7 design-lift coefficient and a 0.06 thickness-to-chord ratio). The values for the lift coefficient were tabulated for selected angles of attack and Mach number and the values for drag coefficient and angle of attack (ALP) were tabulated for selected values of lift coefficient and Mach number in the above-mentioned data declarations.

The improvement achieved by augmenting the data is illustrated in figures 1 through 6. Figure 1 shows the points that made up one of the tables in the first version of the program. Figure 2 shows the points that were digitized, and figure 3 presents the points that make up the data table in the upgraded version. In figure 4, the improved representation is demonstrated; it compares the curves represented by the data tables in each version of the program. Clearly, the addition of more data points improved the accuracy of the interpolation. A graph of the points in a representative drag coefficient table is presented in figure 5, and a similar representation of an angle-of-attack curve is shown in figure 6.

The main program controls the input and output. Figure 7 provides a brief flow-chart of the program. All of the table look-ups and interpolations are done in the subroutines. The subroutine IBI performs the table look-up and returns the value for

the desired aerodynamic characteristic. A linear interpolation between thickness ratios occurs in the subroutines AER00, AER01, AER02....AER0X (where X represents the camber of the airfoil). Subroutine CAMBER interpolates between design-lift coefficients. Warning messages are printed if the data limits have been exceeded.

An additional subroutine (COMPUT) was written to account for the nonlinear behavior of lift coefficient beyond the stall angle. The method uses the graphs of reference 1, and the procedure is a "table look-up" using first-order interpolation. Essentially, the lift coefficient becomes a function of Reynolds number as well as of Mach number, angle of attack, and geometry. The drag coefficient is also adjusted in this subroutine.

LIMITATIONS AND ERROR

The primary limitation in the use of the program arises from the sparseness of data. The geometry for which the program can be used is limited to cambers for design lift coefficients up to 0.7 and thickness ratios between 4 and 21 percent. Data were unavailable for Mach numbers below .3 and above 1.6; angles of attack below -4 degrees and above 8 degrees, and lift coefficients (for drag calculations) below 0.0 and above 0.8; however, the program is capable of extrapolating for conditions beyond these limits and of modifying the coefficients at angles of attack beyond stall. No wind-tunnel data at these conditions were available for comparison, so it is difficult to estimate the accuracy of the program's output.

Some studies were done to evaluate the program in the range for which data were available. First, the program was compared with the graphs of reference 1 from which the program's data were derived. The average error was less than 5 percent for both low and transonic Mach numbers demonstrating that the errors due to linear interpolation and digitizing are minimal. Next, two sources of wind-tunnel data (refs. 2 and 3) were found and compared to each other. Some discrepancies were found. The error ranged from 0 to 68 percent, with the average at approximately 12 percent. The program produced results close to the data from reference 2, particularly at low speed. The lift coefficient was more accurate than the drag coefficient. The error was significantly higher in the comparison between the program and reference 3. The only trend observed in this study was that the drag coefficient was markedly more accurate at low speed while the lift coefficient was more accurate at transonic speed.

CONCLUDING REMARKS

A computer program has been written which provides a comprehensive data base on NACA 16-series airfoils. The geometry covered in the program is limited to cambers for a design-lift coefficient from 0.0 to 0.7 and thickness ratios from 4 to 21 percent. The data include Mach numbers from 0.3 to 1.6, angles of attack from -4 to 8 degrees, and lift coefficients from 0.0 to 0.8. Extrapolation is used to obtain data from Mach numbers, angles of attack, and lift coefficients beyond those for which data were available. A subroutine to adjust the lift and drag coefficients beyond stall is included. The program can be used for airfoils with camber for a design lift coefficient up to 0.7, with thickness ratios from 4 to 21 percent, and for Mach numbers from 0.3 to 1.6. In comparison with wind-tunnel data, it has been shown to give reasonable results.


```

CALL CAMBER(CLDES(I),TR(J),AA(K),XM(L),CL,CD,XLD,IKEY,ALT,COR,D)
CHORD=COR*D/2
CALL ATMOS(ALT,RHO,SOS,T)
V=XM(L)*SOS
XMUU=(.1E-09)*.3170*T**1.5*734.7/(T+216.)
RN=RHO*V*CHORD/XMUU
IF(XM(L) .LT. .3 .OR. XM(L) .GT. 1.6) WRITE (6,202) XM(L)
IF(IKEY .EQ. 1 .AND. AA(K) .LT. -4.0 .OR. IKEY .EQ. 1 .AND.
&AA(K) .GT. 8.0)
&WRITE(6,203) AA(K)
IF(IKEY .EQ. 2 .AND. CL .LT. 0.0 .OR. IKEY .EQ. 2 .AND.
&CL .GT. 0.8)
&WRITE(6,208) CL
IF (IKEY .EQ. 2) GO TO 5000
WRITE(6,100) RN,CLDES(I),TR(J),XM(L),AA(K),CL,CD,XLD
GO TO 20
5000 WRITE(6,125) RN,CLDES(I),TR(J),XM(L),CL,AA(K),CD,XLD
20 CONTINUE
30 CONTINUE
40 CONTINUE
50 CONTINUE
150 FORMAT(/36H*****
125 FORMAT(*0REYNOLDS NUMBER=*,E15.3/*0DESIGN CL=*,F5.3,
&* THICKNESS RATIO=*,F5.3/*0MACH NUMBER=*,F6.3,
&* CL=*,F6.3/*0ALPHA=*,F6.3,* CD=*,F6.4,* L/D=*,F6.2)
100 FORMAT(*0REYNOLDS NUMBER=*,E15.3/*0DESIGN CL=*,F5.3,
&* THICKNESS RATIO=*,F5.3/*0MACH NUMBER=*,F6.3,* ALPHA=*,F7.3/
&*0CL=*,F6.3,* CD=*,F6.4,* L/D=*,F7.2/)
202 FORMAT(*0MACH=*,F6.3,* IS OUT OF RANGE OF DATA.
&*/* EXTRAPOLATION HAS BEEN PERFORMED*)
203 FORMAT(*0ALPHA=*,F5.2,* IS OUT OF RANGE OF DATA.
&*/* EXTRAPOLATION HAS BEEN PERFORMED.*)
208 FORMAT(*0CL=*,F6.4,* IS OUT OF RANGE OF DATA.
&*/* EXTRAPOLATION HAS BEEN PERFORMED.*)
END

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SUBROUTINE CAMBER(CLDES,TR,AA,XM,CL,CD,XLD,IKEY,ALT,COR,D)

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C
C THIS SUBROUTINE USES LINEAR INTERPOLATION BETWEEN CAMBERS
C TO OBTAIN THE AERODYNAMIC CHARACTERISTICS OF A 16-SERIES AIRFOIL.
C IT USES THE SUBROUTINES AERO0,AERO1,AERO2,...AERO7.
C
C THE RANGE OF DESIGN CL'S FOR ACCURATE RETURNS IS FROM 0 TO .7.
C
C DESCRIPTION OF VARIABLES:
C CLDES=DESIGN LIFT COEFFICIENT
C TR=MAXIMUM THICKNESS-TO-CHORD RATIO
C AA=ANGLE OF ATTACK AT BLADE ELEMENT
C XM=MACH NUMBER AT BLADE ELEMENT
C CL=SECTION LIFT COEFFICIENT
C CD=SECTION DRAG COEFFICIENT
C XLD=LIFT TO DRAG RATIO
C IKEY=PARAMETER WHICH INDICATES WHETHER PERFORMANCE OR DESIGN

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CL2=CL
CD2=CD
IPT(1)=-1
CALL AER03(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
CL3=CL
CD3=CD
CL=CL2+(CL3-CL2)*((CLDES-.2)/(.3-.2))
CD=CD2+(CD3-CD2)*((CLDES-.2)/(.3-.2))
GO TO 300
55 CALL AER03(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
CL3=CL
CD3=CD
IPT(1)=-1
CALL AER04(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
CL4=CL
CD4=CD
CL=CL3+(CL4-CL3)*((CLDES-.3)/(.4-.3))
CD=CD3+(CD4-CD3)*((CLDES-.3)/(.4-.3))
GO TO 300
65 CALL AER04(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
CL4=CL
CD4=CD
IPT(1)=-1
CALL AER05(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
CL5=CL
CD5=CD
CL=CL4+(CL5-CL4)*((CLDES-.4)/(.5-.4))
CD=CD4+(CD5-CD4)*((CLDES-.4)/(.5-.4))
GO TO 300
75 CALL AER05(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
CL5=CL
CD5=CD
IPT(1)=-1
CALL AER06(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
CL6=CL
CD6=CD
CL=CL5+(CL6-CL5)*((CLDES-.5)/(.6-.5))
CD=CD5+(CD6-CD5)*((CLDES-.5)/(.6-.5))
GO TO 300
85 CALL AER06(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
CL6=CL
CD6=CD
IPT(1)=-1
CALL AER07(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
CL7=CL
CD7=CD
CL=CL6+(CL7-CL6)*((CLDES-.6)/(.7-.6))
CD=CD6+(CD7-CD6)*((CLDES-.6)/(.7-.6))
GO TO 300
95 CALL AER07(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
IF (CLDES .GT. 0.7) WRITE(6,175) CLDES
175 FORMAT(* DESIGN CL=*,F5.3,* IS OUT OF RANGE OF DATA.* /
&* VALUES FOR CLDES=.7 HAVE BEEN RETURNED.*)
GO TO 300
2000 CONTINUE

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IPT(1)=-1
IF (CLDES .LT. 0.0) GO TO 16
IF (CLDES .GE. 0.0 .AND. CLDES .LT. 0.1) GO TO 26
IF (CLDES .GE. 0.1 .AND. CLDES .LT. 0.2) GO TO 36
IF (CLDES .GE. 0.2 .AND. CLDES .LT. 0.3) GO TO 46
IF (CLDES .GE. 0.3 .AND. CLDES .LT. 0.4) GO TO 56
IF (CLDES .GE. 0.4 .AND. CLDES .LT. 0.5) GO TO 66
IF (CLDES .GE. 0.5 .AND. CLDES .LT. 0.6) GO TO 76
IF (CLDES .GE. 0.6 .AND. CLDES .LT. 0.7) GO TO 86
IF (CLDES .GE. 0.7) GO TO 96
16 CALL AER00(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
WRITE(6,178)CLDES
178 FORMAT(* DESIGN CL =*,F5.2,* 'IS OUT OF RANGE OF DATA.*/
&* THE VALUES FOR CLDES = 0.0 HAVE BEEN RETURNED.*)
GO TO 300
26 CALL AER00(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
AA0=AA
CD0=CD
IPT(1)=-1
CALL AER01(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
AA1=AA
CD1=CD
AA=AA0+(AA1-AA0)*((CLDES-0.0)/(0.1-0.0))
CD=CD0+(CD1-CD0)*((CLDES-0.0)/(0.1-0.0))
GO TO 300
36 CALL AER01(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
AA1=AA
CD1=CD
IPT(1)=-1
CALL AER02(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
AA2=AA
CD2=CD
AA=AA1+(AA2-AA1)*((CLDES-.1)/(0.2-.1))
CD=CD1+(CD2-CD1)*((CLDES-.1)/(0.2-.1))
GO TO 300
46 CALL AER02(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
AA2=AA
CD2=CD
IPT(1)=-1
CALL AER03(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
AA3=AA
CD3=CD
AA=AA2+(AA3-AA2)*((CLDES-.2)/(0.3-.2))
CD=CD2+(CD3-CD2)*((CLDES-.2)/(0.3-.2))
GO TO 300
56 CALL AER03(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
AA3=AA
CD3=CD
IPT(1)=-1
CALL AER04(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
AA4=AA
CD4=CD
AA=AA3+(AA4-AA3)*((CLDES-.3)/(0.4-.3))
CD=CD3+(CD4-CD3)*((CLDES-.3)/(0.4-.3))
GO TO 300

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66  CALL AERO4 (XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
    AA4=AA
    CD4=CD
    IPT(1)=-1
    CALL AEROS (XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
    AA5=AA
    CD5=CD
    AA=AA4+(AA5-AA4)*((CLDES-.4)/(.5-.4))
    CD=CD4+(CD5-CD4)*((CLDES-.4)/(.5-.4))
    GO TO 300
76  CALL AEROS (XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
    AA5=AA
    CD5=CD
    IPT(1)=-1
    CALL AERO6 (XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
    AA6=AA
    CD6=CD
    AA=AA5+(AA6-AA5)*((CLDES-.5)/(.6-.5))
    CD=CD5+(CD6-CD5)*((CLDES-.5)/(.6-.5))
    GO TO 300
86  CALL AERO6 (XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
    AA6=AA
    CD6=CD
    IPT(1)=-1
    CALL AERO7 (XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
    AA7=AA
    CD7=CD
    AA=AA6+(AA7-AA6)*((CLDES-.6)/(.7-.6))
    CD=CD6+(CD7-CD6)*((CLDES-.6)/(.6-.7))
    GO TO 300
96  CALL AERO7 (XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
    IF (CLDES .GT. 0.7) WRITE(6,179) CLDES
179  FORMAT(* DESIGN CL =*,F5.2,* IS OUT OF RANGE OF DATA.* /
    &* THE VALUES FOR CLDES = .7 HAVE BEEN RETURNED.*)
300  XLD=CL/CD
    RETURN
    END

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```

SUBROUTINE AERO0 (XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)
C
C
C THIS SUBROUTINE IS DESIGNED TO COMPUTE THE AIRFOIL
C CHARACTERISTICS FOR A 16 SERIES AIRFOIL WITH A GIVEN CAMBER.
C
C THIS SUBROUTINE RELATES CL,CD,CL/CD,MACH,T/C,AND ALPHA.
C IT REPRESENTS THE DATA OF A 16-0XX AIRFOIL.
C
C XM=RELATIVE MACH NO. AT BLADE ELEMENT
C AA=ANGLE OF ATTACK IN DEGREES
C IKEY1: CL=CL(MACH,ALPHA,T/C)
C       : CD=CD(MACH,CL,T/C)
C       : XLD=CL/CD
C IKEY2: ALPHA=ALPHA(MACH,CL,T/C)

```

C
C
C
C
C
C
C

: CD=CD(MACH,CL,T/C)
: XLD=CL/CD
TR=T/C

DIMENSION IORDER(2),IPT(2),ALP004(26,9),ALP006(26,9),
& ALP009(26,9),ALP012(26,9),ALP015(26,9),ALP018(26,9),
& ALP021(26,9),CLI(9),XMI(26),ALPI(7),CL004(7,26),
& CL006(7,26),CL009(7,26),CL012(7,26),CL015(7,26),
& CL018(7,26),CL021(7,26),CD004(5,26),CD006(5,26),
& CD009(5,26),CD012(5,26),CD015(5,26),CD018(5,26),
& CD021(5,26),CLII(5)

DATA((CL004(I,J),J=1,26),I=1,4)/

1	-.395,	-.392,	-.390,	-.390,	-.389,	-.391,	-.392,	-.394,	-.394,
1	-.384,	-.373,	-.357,	-.340,	-.334,	-.341,	-.353,	-.353,	-.351,
1	-.348,	-.343,	-.340,	-.340,	-.342,	-.412,	-.418,	-.418,	
2	-.193,	-.190,	-.188,	-.186,	-.184,	-.183,	-.181,	-.179,	-.168,
2	-.154,	-.138,	-.121,	-.114,	-.121,	-.126,	-.131,	-.133,	-.130,
2	-.125,	-.120,	-.117,	-.115,	-.126,	-.190,	-.206,	-.212,	
3	.010,	.013,	.024,	.033,	.044,	.052,	.061,	.072,	.084,
3	.097,	.109,	.109,	.103,	.098,	.095,	.091,	.088,	.088,
3	.092,	.100,	.108,	.108,	.095,	.036,	.014,	.007,	
4	.206,	.227,	.251,	.264,	.282,	.291,	.299,	.306,	.313,
4	.323,	.327,	.323,	.319,	.312,	.306,	.302,	.298,	.298,
4	.300,	.310,	.317,	.315,	.304,	.195,	.143,	.128/	

DATA((CL004(I,J),J=1,26),I=5,7)/

5	.419,	.439,	.464,	.485,	.515,	.532,	.546,	.555,	.552,
5	.548,	.541,	.535,	.528,	.522,	.516,	.511,	.506,	.506,
5	.515,	.522,	.528,	.527,	.519,	.356,	.274,	.235,	
6	.612,	.659,	.722,	.762,	.803,	.812,	.814,	.814,	.804,
6	.794,	.784,	.774,	.764,	.756,	.751,	.745,	.741,	.739,
6	.747,	.761,	.772,	.776,	.763,	.571,	.405,	.342,	
7	.773,	.817,	.876,	.918,	.942,	.942,	.939,	.928,	.917,
7	.906,	.894,	.883,	.875,	.867,	.861,	.855,	.850,	.850,
7	.860,	.871,	.877,	.878,	.871,	.683,	.539,	.455/	

DATA((CL006(I,J),J=1,26),I=1,4)/

1	-.399,	-.400,	-.401,	-.401,	-.402,	-.402,	-.402,	-.402,	-.399,
1	-.396,	-.394,	-.391,	-.388,	-.386,	-.395,	-.413,	-.426,	-.421,
1	-.410,	-.399,	-.393,	-.401,	-.410,	-.426,	-.428,	-.428,	
2	-.197,	-.201,	-.203,	-.198,	-.194,	-.192,	-.189,	-.185,	-.180,
2	-.175,	-.169,	-.162,	-.155,	-.160,	-.167,	-.174,	-.177,	-.174,
2	-.167,	-.166,	-.173,	-.184,	-.195,	-.226,	-.232,	-.232,	
3	.002,	.000,	-.001,	.003,	.010,	.015,	.019,	.030,	.041,
3	.052,	.066,	.080,	.078,	.071,	.064,	.059,	.055,	.058,
3	.062,	.072,	.074,	.066,	.052,	-.019,	-.044,	-.050,	
4	.192,	.202,	.219,	.230,	.241,	.250,	.258,	.266,	.275,
4	.283,	.292,	.297,	.287,	.278,	.268,	.259,	.255,	.268,
4	.280,	.291,	.292,	.279,	.265,	.183,	.140,	.105/	

DATA((CL006(I,J),J=1,26),I=5,7)/

5	.378,	.400,	.424,	.437,	.464,	.477,	.490,	.503,	.516,
5	.527,	.524,	.521,	.515,	.502,	.489,	.478,	.476,	.482,
5	.498,	.514,	.508,	.490,	.471,	.356,	.264,	.212,	
6	.573,	.609,	.665,	.693,	.731,	.750,	.765,	.764,	.760,

6	.743,	.725,	.706,	.686,	.667,	.651,	.646,	.655,	.666,
6	.678,	.685,	.684,	.661,	.638,	.505,	.388,	.326,	
7	.766,	.786,	.804,	.846,	.887,	.906,	.909,	.892,	.875,
7	.858,	.841,	.824,	.807,	.789,	.768,	.749,	.753,	.772,
7	.791,	.798,	.793,	.774,	.754,	.637,	.512,	.424/	

DATA((CL009(I,J),J=1,26),I=1,4)/

1	-.364,	-.358,	-.352,	-.350,	-.348,	-.345,	-.343,	-.340,	-.337,
1	-.335,	-.332,	-.329,	-.326,	-.331,	-.345,	-.338,	-.326,	-.319,
1	-.319,	-.320,	-.322,	-.326,	-.330,	-.348,	-.356,	-.364,	
2	-.192,	-.173,	-.164,	-.160,	-.151,	-.147,	-.143,	-.140,	-.137,
2	-.137,	-.137,	-.141,	-.144,	-.145,	-.146,	-.145,	-.133,	-.123,
2	-.124,	-.129,	-.134,	-.139,	-.144,	-.165,	-.190,	-.215,	
3	-.004,	-.004,	.002,	.007,	.013,	.016,	.022,	.027,	.032,
3	.040,	.049,	.057,	.054,	.045,	.041,	.045,	.056,	.067,
3	.063,	.057,	.051,	.046,	.041,	.005,	-.024,	-.047,	
4	.181,	.190,	.202,	.211,	.224,	.231,	.237,	.244,	.251,
4	.257,	.264,	.266,	.252,	.233,	.216,	.223,	.238,	.253,
4	.258,	.252,	.245,	.237,	.230,	.184,	.144,	.122/	

DATA((CL009(I,J),J=1,26),I=5,7)/

5	.385,	.393,	.409,	.420,	.439,	.452,	.465,	.478,	.491,
5	.499,	.486,	.461,	.433,	.406,	.385,	.394,	.420,	.448,
5	.459,	.449,	.438,	.426,	.413,	.340,	.276,	.226,	
6	.558,	.601,	.641,	.672,	.704,	.723,	.715,	.702,	.680,
6	.655,	.630,	.604,	.579,	.551,	.532,	.544,	.569,	.593,
6	.609,	.596,	.582,	.569,	.555,	.473,	.406,	.341,	
7	.698,	.756,	.804,	.832,	.865,	.858,	.847,	.826,	.805,
7	.783,	.749,	.716,	.682,	.648,	.611,	.617,	.643,	.670,
7	.690,	.678,	.666,	.651,	.637,	.558,	.493,	.435/	

DATA((CL012(I,J),J=1,26),I=1,4)/

1	-.400,	-.400,	-.401,	-.402,	-.403,	-.403,	-.403,	-.402,	-.401,
1	-.400,	-.397,	-.394,	-.400,	-.416,	-.406,	-.387,	-.387,	-.388,
1	-.389,	-.390,	-.391,	-.393,	-.394,	-.400,	-.400,	-.397,	
2	-.201,	-.202,	-.203,	-.203,	-.204,	-.203,	-.202,	-.200,	-.197,
2	-.195,	-.193,	-.192,	-.214,	-.227,	-.211,	-.187,	-.186,	-.184,
2	-.186,	-.188,	-.189,	-.191,	-.193,	-.203,	-.217,	-.227,	
3	-.004,	-.006,	-.007,	-.007,	-.002,	.002,	.006,	.009,	.013,
3	.015,	.015,	.007,	-.019,	-.036,	-.020,	.003,	.015,	.014,
3	.012,	.010,	.009,	.007,	.005,	-.004,	-.019,	-.027,	
4	.192,	.192,	.195,	.201,	.208,	.211,	.215,	.217,	.218,
4	.213,	.204,	.185,	.167,	.161,	.179,	.195,	.206,	.209,
4	.202,	.195,	.189,	.182,	.177,	.158,	.139,	.129/	

DATA((CL012(I,J),J=1,26),I=5,7)/

5	.343,	.363,	.379,	.390,	.406,	.415,	.424,	.436,	.445,
5	.442,	.424,	.387,	.341,	.317,	.343,	.379,	.411,	.419,
5	.412,	.397,	.383,	.369,	.356,	.302,	.266,	.233,	
6	.510,	.537,	.567,	.587,	.619,	.635,	.643,	.631,	.602,
6	.570,	.536,	.495,	.455,	.441,	.465,	.495,	.524,	.537,
6	.529,	.517,	.504,	.492,	.480,	.425,	.384,	.351,	
7	.627,	.672,	.715,	.745,	.777,	.784,	.762,	.739,	.694,
7	.649,	.601,	.549,	.505,	.494,	.522,	.549,	.576,	.586,
7	.578,	.570,	.562,	.556,	.550,	.517,	.488,	.458/	

DATA((CL015(I,J),J=1,26),I=1,4)/

1	-.400,	-.402,	-.402,	-.403,	-.403,	-.399,	-.395,	-.390,	-.387,
1	-.384,	-.386,	-.401,	-.431,	-.417,	-.382,	-.376,	-.379,	-.383,
1	-.387,	-.388,	-.389,	-.390,	-.391,	-.396,	-.403,	-.420,	

2	-.204,	-.207,	-.209,	-.209,	-.209,	-.201,	-.192,	-.183,	-.175,
2	-.168,	-.178,	-.202,	-.223,	-.221,	-.184,	-.164,	-.166,	-.173,
2	-.181,	-.183,	-.186,	-.189,	-.191,	-.207,	-.223,	-.243,	
3	-.004,	-.009,	-.006,	.003,	.014,	.020,	.025,	.029,	.032,
3	.031,	.008,	-.024,	-.045,	-.028,	-.001,	.032,	.041,	.038,
3	.035,	.032,	.028,	.025,	.022,	.002,	-.017,	-.040,	
4	.179,	.182,	.191,	.196,	.208,	.214,	.219,	.225,	.231,
4	.216,	.181,	.146,	.133,	.151,	.187,	.222,	.226,	.221,
4	.216,	.211,	.205,	.200,	.195,	.169,	.150,	.130/	

DATA((CL015(I,J),J=1,26),I=5,7)/

5	.310,	.325,	.342,	.355,	.371,	.379,	.389,	.401,	.407,
5	.376,	.322,	.270,	.245,	.272,	.312,	.351,	.366,	.360,
5	.353,	.346,	.338,	.330,	.323,	.287,	.258,	.238,	
6	.444,	.473,	.499,	.517,	.539,	.552,	.566,	.575,	.563,
6	.503,	.427,	.363,	.344,	.374,	.415,	.450,	.467,	.464,
6	.459,	.452,	.444,	.436,	.431,	.400,	.374,	.352,	
7	.552,	.581,	.618,	.640,	.668,	.672,	.663,	.637,	.594,
7	.537,	.468,	.405,	.379,	.412,	.461,	.497,	.509,	.505,
7	.501,	.497,	.492,	.486,	.481,	.456,	.442,	.431/	

DATA((CL018(I,J),J=1,26),I=1,4)/

1	-.400,	-.399,	-.398,	-.397,	-.397,	-.397,	-.396,	-.391,	-.387,
1	-.387,	-.409,	-.426,	-.406,	-.381,	-.358,	-.347,	-.344,	-.344,
1	-.344,	-.344,	-.344,	-.344,	-.345,	-.348,	-.345,	-.344,	
2	-.177,	-.183,	-.184,	-.184,	-.183,	-.181,	-.179,	-.177,	-.181,
2	-.197,	-.228,	-.253,	-.221,	-.185,	-.149,	-.131,	-.133,	-.134,
2	-.135,	-.135,	-.135,	-.135,	-.136,	-.135,	-.141,	-.144,	
3	.006,	.004,	.003,	.003,	.006,	.010,	.013,	.019,	.023,
3	-.013,	-.051,	-.077,	-.046,	.007,	.063,	.074,	.072,	.069,
3	.065,	.064,	.063,	.063,	.061,	.047,	.035,	.026,	
4	.183,	.183,	.190,	.194,	.198,	.200,	.200,	.200,	.189,
4	.153,	.120,	.105,	.140,	.196,	.241,	.259,	.257,	.250,
4	.245,	.243,	.241,	.235,	.229,	.202,	.176,	.160/	

DATA((CL018(I,J),J=1,26),I=5,7)/

5	.317,	.324,	.332,	.341,	.347,	.347,	.348,	.343,	.314,
5	.274,	.235,	.216,	.247,	.299,	.344,	.368,	.366,	.359,
5	.353,	.350,	.346,	.339,	.333,	.307,	.282,	.265,	
6	.426,	.444,	.466,	.478,	.494,	.501,	.495,	.463,	.412,
6	.354,	.299,	.273,	.296,	.346,	.398,	.422,	.422,	.417,
6	.412,	.407,	.403,	.400,	.396,	.375,	.354,	.340,	
7	.521,	.539,	.566,	.588,	.600,	.599,	.579,	.529,	.465,
7	.398,	.335,	.305,	.331,	.385,	.440,	.458,	.460,	.460,
7	.457,	.454,	.451,	.449,	.447,	.429,	.419,	.413/	

DATA((CL021(I,J),J=1,26),I=1,4)/

1	-.374,	-.369,	-.367,	-.367,	-.356,	-.346,	-.337,	-.341,	-.355,
1	-.371,	-.379,	-.366,	-.337,	-.308,	-.286,	-.286,	-.293,	-.302,
1	-.311,	-.313,	-.316,	-.318,	-.321,	-.325,	-.324,	-.331,	
2	-.185,	-.182,	-.179,	-.174,	-.160,	-.146,	-.139,	-.153,	-.173,
2	-.194,	-.217,	-.203,	-.169,	-.133,	-.098,	-.077,	-.088,	-.100,
2	-.112,	-.123,	-.135,	-.141,	-.146,	-.151,	-.157,	-.165,	
3	.003,	-.002,	.006,	.016,	.033,	.029,	.016,	.001,	-.014,
3	-.028,	-.040,	-.027,	.004,	.035,	.075,	.094,	.082,	.069,
3	.056,	.049,	.043,	.036,	.029,	-.001,	-.013,	-.020,	
4	.178,	.175,	.191,	.211,	.219,	.204,	.181,	.159,	.136,
4	.108,	.090,	.101,	.134,	.168,	.192,	.194,	.187,	.176,
4	.165,	.155,	.148,	.142,	.135,	.106,	.091,	.086/	

DATA((CL021(I,J),J=1,26),I=5,7)/

5	.290,	.294,	.307,	.323,	.318,	.304,	.275,	.246,	.217,
5	.183,	.158,	.178,	.221,	.270,	.304,	.301,	.289,	.278,
5	.268,	.258,	.247,	.239,	.231,	.194,	.175,	.158,	
6	.373,	.373,	.384,	.404,	.401,	.379,	.343,	.307,	.271,
6	.233,	.212,	.229,	.283,	.340,	.377,	.381,	.371,	.361,
6	.351,	.340,	.330,	.320,	.310,	.275,	.248,	.227,	
7	.456,	.463,	.498,	.522,	.506,	.467,	.418,	.368,	.319,
7	.270,	.242,	.268,	.320,	.377,	.419,	.424,	.411,	.398,
7	.388,	.377,	.366,	.356,	.346,	.310,	.287,	.267/	

DATA((ALP004(J,N),N=1,9),J=1,13)/

&	-4.05,	-2.07,	-.10,	1.94,	3.82,	5.88,	8.34,	10.82,	13.30,
&	-4.08,	-2.10,	-.13,	1.75,	3.63,	5.46,	7.78,	10.32,	12.85,
&	-4.10,	-2.12,	-.23,	1.55,	3.40,	5.05,	7.01,	9.61,	12.21,
&	-4.10,	-2.14,	-.30,	1.45,	3.23,	4.83,	6.49,	9.05,	11.62,
&	-4.11,	-2.16,	-.39,	1.31,	3.01,	4.59,	5.98,	8.83,	11.71,
&	-4.09,	-2.16,	-.44,	1.24,	2.90,	4.49,	5.91,	8.89,	11.97,
&	-4.08,	-2.18,	-.50,	1.17,	2.82,	4.40,	5.90,	8.98,	12.18,
&	-4.06,	-2.20,	-.57,	1.09,	2.76,	4.35,	5.89,	9.26,	12.77,
&	-4.05,	-2.28,	-.67,	1.01,	2.73,	4.38,	5.97,	9.47,	13.01,
&	-4.14,	-2.40,	-.77,	.91,	2.68,	4.42,	6.11,	9.68,	13.25,
&	-4.23,	-2.53,	-.88,	.83,	2.68,	4.49,	6.29,	9.93,	13.56,
&	-4.36,	-2.67,	-.95,	.85,	2.73,	4.54,	6.48,	10.15,	13.82,
&	-4.53,	-2.76,	-.95,	.90,	2.78,	4.61,	6.65,	10.25,	13.86/

DATA((ALP004(J,N),N=1,9),J=14,26)/

&	-4.62,	-2.74,	-.89,	.95,	2.84,	4.67,	6.79,	10.40,	14.00,
&	-4.55,	-2.69,	-.86,	1.00,	2.90,	4.71,	6.89,	10.53,	14.16,
&	-4.42,	-2.62,	-.82,	1.03,	2.94,	4.76,	7.00,	10.64,	14.27,
&	-4.43,	-2.61,	-.80,	1.07,	2.98,	4.80,	7.08,	10.75,	14.42,
&	-4.44,	-2.63,	-.81,	1.07,	2.98,	4.81,	7.10,	10.70,	14.31,
&	-4.47,	-2.67,	-.85,	1.04,	2.93,	4.73,	6.94,	10.48,	14.02,
&	-4.51,	-2.72,	-.91,	.95,	2.85,	4.65,	6.71,	10.35,	13.98,
&	-4.54,	-2.74,	-.96,	.88,	2.79,	4.59,	6.53,	10.34,	14.15,
&	-4.53,	-2.76,	-.97,	.89,	2.80,	4.59,	6.47,	10.39,	14.31,
&	-4.54,	-2.69,	-.86,	1.00,	2.89,	4.66,	6.69,	10.39,	14.09,
&	-3.89,	-2.09,	-.32,	2.06,	4.41,	6.52,	10.09,	13.66,	17.23,
&	-3.83,	-1.95,	-.13,	2.87,	5.92,	8.91,	11.90,	14.88,	17.87,
&	-3.83,	-1.89,	-.06,	3.35,	7.03,	10.57,	14.11,	17.65,	21.19/

DATA((ALP006(J,N),N=1,9),J=1,13)/

&	-4.01,	-2.03,	-.02,	2.09,	4.23,	6.28,	8.35,	10.42,	12.50,
&	-4.00,	-1.99,	0.00,	1.98,	4.00,	5.91,	8.16,	10.42,	12.68,
&	-3.99,	-1.97,	.01,	1.83,	3.77,	5.46,	7.94,	10.82,	13.70,
&	-3.99,	-2.02,	-.03,	1.74,	3.64,	5.27,	7.40,	10.01,	12.63,
&	-3.98,	-2.06,	-.10,	1.65,	3.43,	5.02,	6.88,	9.45,	12.01,
&	-3.98,	-2.08,	-.14,	1.57,	3.32,	4.90,	6.64,	9.21,	11.77,
&	-3.98,	-2.10,	-.18,	1.51,	3.22,	4.80,	6.49,	9.26,	12.04,
&	-3.98,	-2.14,	-.28,	1.44,	3.13,	4.74,	6.56,	9.69,	12.81,
&	-4.01,	-2.18,	-.37,	1.36,	3.04,	4.69,	6.70,	10.17,	13.65,
&	-4.04,	-2.23,	-.46,	1.28,	2.96,	4.68,	6.99,	10.47,	13.95,
&	-4.05,	-2.28,	-.56,	1.19,	2.93,	4.76,	7.29,	10.74,	14.19,
&	-4.08,	-2.33,	-.66,	1.11,	2.92,	4.85,	7.59,	10.98,	14.37,
&	-4.10,	-2.39,	-.67,	1.17,	2.99,	4.99,	7.88,	11.19,	14.50/

DATA((ALP006(J,N),N=1,9),J=14,26)/

&	-4.12,	-2.35,	-.61,	1.25,	3.09,	5.19,	8.18,	11.46,	14.74,
&	-4.04,	-2.29,	-.55,	1.33,	3.19,	5.37,	8.55,	11.97,	15.38,

&	-3.89,	-2.22,	-.51,	1.41,	3.29,	5.45,	8.99,	12.87,	16.76,
&	-3.79,	-2.18,	-.47,	1.45,	3.31,	5.39,	8.96,	13.04,	17.12,
&	-3.83,	-2.21,	-.50,	1.35,	3.23,	5.28,	8.53,	12.30,	16.08,
&	-3.92,	-2.27,	-.54,	1.27,	3.10,	5.13,	8.16,	11.70,	15.24,
&	-4.01,	-2.29,	-.61,	1.17,	2.98,	5.01,	8.04,	11.58,	15.12,
&	-4.06,	-2.25,	-.60,	1.16,	3.00,	5.05,	8.13,	11.80,	15.47,
&	-3.99,	-2.15,	-.53,	1.26,	3.15,	5.29,	8.46,	12.00,	15.54,
&	-3.91,	-2.05,	-.42,	1.39,	3.31,	5.54,	8.79,	12.24,	15.69,
&	-3.74,	-1.75,	.19,	2.20,	4.59,	7.44,	10.47,	13.50,	16.53,
&	-3.71,	-1.66,	.48,	2.97,	6.19,	9.42,	12.65,	15.87,	19.10,
&	-3.71,	-1.65,	.65,	3.78,	7.51,	11.59,	15.67,	19.76,	23.84/
DATA((ALP009(J,N),N=1,9),J=1,13)/									
&	-4.42,	-2.09,	.04,	2.19,	4.17,	6.60,	9.46,	12.31,	15.17,
&	-4.45,	-2.29,	.04,	2.10,	4.07,	5.99,	8.57,	11.15,	13.73,
&	-4.51,	-2.38,	-.02,	1.98,	3.91,	5.65,	7.95,	10.40,	12.86,
&	-4.53,	-2.42,	-.08,	1.89,	3.81,	5.43,	7.60,	10.10,	12.60,
&	-4.53,	-2.50,	-.16,	1.77,	3.64,	5.22,	7.19,	9.68,	12.16,
&	-4.56,	-2.54,	-.20,	1.71,	3.53,	5.09,	7.14,	10.10,	13.07,
&	-4.57,	-2.57,	-.27,	1.66,	3.43,	5.08,	7.29,	10.32,	13.35,
&	-4.60,	-2.60,	-.32,	1.59,	3.33,	5.09,	7.58,	10.81,	14.03,
&	-4.63,	-2.63,	-.38,	1.53,	3.24,	5.15,	7.92,	11.12,	14.32,
&	-4.66,	-2.64,	-.45,	1.47,	3.18,	5.29,	8.27,	11.39,	14.52,
&	-4.70,	-2.65,	-.53,	1.40,	3.23,	5.58,	8.86,	12.22,	15.58,
&	-4.76,	-2.63,	-.58,	1.37,	3.37,	5.94,	9.50,	13.07,	16.64,
&	-4.81,	-2.62,	-.55,	1.47,	3.64,	6.41,	10.29,	14.17,	18.06/
DATA((ALP009(J,N),N=1,9),J=14,26)/									
&	-4.74,	-2.59,	-.47,	1.65,	3.93,	7.01,	11.13,	15.26,	19.38,
&	-4.55,	-2.54,	-.44,	1.82,	4.20,	7.72,	12.78,	17.85,	22.91,
&	-4.64,	-2.57,	-.47,	1.74,	4.08,	7.53,	13.01,	18.49,	23.97,
&	-4.77,	-2.69,	-.59,	1.58,	3.78,	6.84,	12.24,	17.65,	23.05,
&	-4.83,	-2.79,	-.71,	1.43,	3.51,	6.18,	11.38,	16.57,	21.77,
&	-4.83,	-2.78,	-.67,	1.41,	3.41,	5.88,	10.72,	15.65,	20.59,
&	-4.84,	-2.74,	-.61,	1.47,	3.50,	6.10,	10.98,	15.85,	20.73,
&	-4.83,	-2.70,	-.55,	1.54,	3.61,	6.43,	11.19,	15.95,	20.71,
&	-4.79,	-2.65,	-.50,	1.61,	3.72,	6.76,	11.63,	16.51,	21.39,
&	-4.75,	-2.60,	-.44,	1.68,	3.86,	7.10,	11.98,	16.85,	21.73,
&	-4.57,	-2.38,	-.06,	2.21,	4.90,	8.99,	13.69,	18.40,	23.11,
&	-4.53,	-2.12,	.29,	2.85,	5.91,	10.46,	15.06,	19.66,	24.25,
&	-4.48,	-1.82,	.56,	3.50,	7.26,	11.51,	15.77,	20.02,	24.28/
DATA((ALP012(J,N),N=1,9),J=1,13)/									
&	-4.00,	-1.99,	.04,	2.11,	4.68,	7.54,	10.96,	14.38,	17.79,
&	-4.00,	-1.98,	.06,	2.09,	4.43,	6.93,	9.90,	12.86,	15.82,
&	-3.99,	-1.97,	.07,	2.05,	4.22,	6.45,	9.15,	11.85,	14.55,
&	-3.98,	-1.97,	.07,	1.99,	4.10,	6.16,	8.70,	11.23,	13.76,
&	-3.97,	-1.96,	.02,	1.92,	3.94,	5.82,	8.29,	10.82,	13.35,
&	-3.97,	-1.97,	-.02,	1.89,	3.85,	5.68,	8.21,	10.90,	13.58,
&	-3.97,	-1.98,	-.06,	1.86,	3.77,	5.61,	8.64,	12.00,	15.36,
&	-3.98,	-2.00,	-.09,	1.84,	3.67,	5.68,	9.13,	12.83,	16.54,
&	-3.99,	-2.03,	-.12,	1.82,	3.60,	5.97,	10.30,	14.65,	19.00,
&	-4.00,	-2.05,	-.14,	1.87,	3.63,	6.76,	11.82,	16.89,	21.95,
&	-4.03,	-2.07,	-.14,	1.96,	3.78,	7.97,	14.12,	20.28,	26.43,
&	-4.06,	-2.08,	-.07,	2.15,	4.24,	9.89,	17.30,	24.70,	32.11,
&	-4.00,	-1.86,	.20,	2.38,	5.04,	11.80,	19.80,	27.80,	35.80/
DATA((ALP012(J,N),N=1,9),J=14,26)/									
&	-3.83,	-1.72,	.37,	2.50,	5.34,	12.00,	19.55,	27.09,	34.64,

```

& -3.94, -1.88, .20, 2.26, 4.93, 10.74, 17.75, 24.77, 31.79,
& -4.13, -2.13, -.03, 2.05, 4.36, 9.89, 17.30, 24.70, 32.11,
& -4.13, -2.14, -.15, 1.94, 3.89, 8.92, 16.62, 24.31, 32.00,
& -4.12, -2.16, -.14, 1.91, 3.82, 8.57, 16.73, 24.90, 33.06,
& -4.11, -2.14, -.12, 1.98, 3.89, 8.90, 17.06, 25.22, 33.39,
& -4.10, -2.12, -.10, 2.05, 4.05, 9.13, 16.68, 24.23, 31.77,
& -4.09, -2.11, -.09, 2.11, 4.28, 9.31, 16.21, 23.10, 30.00,
& -4.07, -2.09, -.07, 2.19, 4.50, 9.38, 15.63, 21.88, 28.13,
& -4.06, -2.07, -.05, 2.26, 4.71, 9.43, 15.14, 20.86, 26.57,
& -4.00, -1.97, .05, 2.58, 5.59, 9.80, 14.15, 18.50, 22.85,
& -4.00, -1.83, .24, 2.96, 6.31, 10.15, 14.00, 17.85, 21.69,
& -4.04, -1.73, .35, 3.37, 6.92, 10.65, 14.39, 18.13, 21.87/

```

DATA((ALP015(J,N),N=1,9),J=1,13)/

```

& -4.00, -1.96, .04, 2.32, 5.34, 8.89, 12.59, 16.30, 20.00,
& -3.98, -1.93, .09, 2.25, 5.01, 8.35, 12.06, 15.76, 19.46,
& -3.98, -1.91, .06, 2.12, 4.74, 7.70, 11.06, 14.42, 17.78,
& -3.97, -1.92, -.03, 2.05, 4.56, 7.35, 10.60, 13.85, 17.11,
& -3.97, -1.92, -.13, 1.92, 4.35, 6.95, 10.05, 13.15, 16.25,
& -4.01, -1.99, -.18, 1.86, 4.24, 6.80, 10.13, 13.47, 16.80,
& -4.05, -2.08, -.23, 1.80, 4.12, 6.70, 10.82, 14.95, 19.07,
& -4.10, -2.16, -.27, 1.74, 3.99, 6.81, 13.26, 19.71, 26.16,
& -4.12, -2.24, -.31, 1.69, 3.92, 8.39, 21.29, 34.19, 47.10,
& -4.15, -2.30, -.31, 1.83, 4.38, 11.71, 23.47, 35.24, 47.00,
& -4.13, -2.21, -.09, 2.27, 5.49, 14.44, 24.20, 33.95, 43.71,
& -3.99, -1.98, .28, 2.87, 7.76, 17.29, 26.81, 36.33, 45.86,
& -3.70, -1.74, .51, 3.20, 9.20, 20.63, 32.06, 43.49, 54.91/

```

DATA((ALP015(J,N),N=1,9),J=14,26)/

```

& -3.83, -1.78, .31, 2.81, 7.37, 17.89, 28.42, 38.95, 49.47,
& -4.18, -2.16, .01, 2.21, 5.71, 14.04, 22.74, 31.43, 40.13,
& -4.23, -2.34, -.33, 1.77, 4.99, 12.38, 20.89, 29.40, 37.91,
& -4.20, -2.32, -.40, 1.72, 4.67, 12.33, 21.86, 31.38, 40.90,
& -4.16, -2.26, -.36, 1.77, 4.77, 12.63, 22.39, 32.15, 41.90,
& -4.13, -2.18, -.32, 1.82, 4.89, 12.71, 22.24, 31.76, 41.29,
& -4.12, -2.17, -.30, 1.88, 5.02, 12.58, 21.47, 30.36, 39.24,
& -4.11, -2.14, -.26, 1.94, 5.17, 12.50, 20.83, 29.17, 37.50,
& -4.10, -2.11, -.23, 2.00, 5.32, 12.56, 20.56, 28.56, 36.56,
& -4.09, -2.09, -.21, 2.08, 5.43, 12.76, 20.76, 28.76, 36.76,
& -4.04, -1.93, -.02, 2.53, 6.00, 13.14, 20.29, 27.43, 34.57,
& -3.97, -1.78, .20, 2.93, 6.76, 12.65, 18.53, 24.41, 30.29,
& -3.77, -1.58, .47, 3.30, 7.22, 12.24, 17.34, 22.41, 27.47/

```

DATA((ALP018(J,N),N=1,9),J=1,13)/

```

& -4.00, -2.21, -.07, 2.25, 5.52, 9.66, 13.87, 18.08, 22.29,
& -4.01, -2.16, -.04, 2.24, 5.27, 9.28, 13.49, 17.71, 21.92,
& -4.02, -2.15, -.03, 2.14, 5.01, 8.68, 12.68, 16.68, 20.68,
& -4.03, -2.15, -.03, 2.08, 4.86, 8.22, 11.85, 15.49, 19.13,
& -4.03, -2.16, -.06, 2.03, 4.72, 8.00, 11.77, 15.55, 19.32,
& -4.03, -2.18, -.10, 2.00, 4.69, 8.02, 12.10, 16.18, 20.27,
& -4.04, -2.19, -.14, 2.00, 4.71, 8.50, 13.26, 18.02, 22.79,
& -4.08, -2.21, -.19, 2.00, 4.95, 10.15, 16.21, 22.27, 28.33,
& -4.13, -2.18, -.23, 2.18, 5.76, 13.09, 20.64, 28.19, 35.74,
& -4.14, -2.03, .16, 2.78, 8.09, 17.18, 26.27, 35.36, 44.45,
& -3.90, -1.68, .60, 3.39, 11.61, 22.72, 33.83, 44.94, 56.06,
& -3.70, -1.40, .85, 3.71, 13.94, 26.44, 38.94, 51.44, 63.94,
& -3.94, -1.76, .49, 3.12, 11.94, 23.37, 34.80, 46.23, 57.66/

```

DATA((ALP018(J,N),N=1,9),J=14,26)/

&	-4.19,	-2.15,	-.07,	2.08,	8.77,	19.03,	29.28,	39.54,	49.79,
&	-4.40,	-2.49,	-.59,	1.54,	6.10,	15.62,	25.14,	34.67,	44.19,
&	-4.49,	-2.64,	-.72,	1.36,	5.19,	15.89,	27.00,	38.11,	49.22,
&	-4.53,	-2.64,	-.70,	1.38,	5.21,	15.37,	25.89,	36.42,	46.95,
&	-4.53,	-2.63,	-.68,	1.45,	5.41,	14.51,	23.81,	33.12,	42.42,
&	-4.54,	-2.62,	-.65,	1.50,	5.59,	14.36,	23.24,	32.13,	41.02,
&	-4.54,	-2.62,	-.64,	1.52,	5.75,	14.21,	22.72,	31.23,	39.74,
&	-4.54,	-2.62,	-.64,	1.54,	5.89,	14.21,	22.54,	30.88,	39.21,
&	-4.54,	-2.62,	-.64,	1.59,	6.00,	14.16,	22.33,	30.49,	38.65,
&	-4.53,	-2.61,	-.62,	1.65,	6.16,	14.00,	21.84,	29.69,	37.53,
&	-4.49,	-2.61,	-.52,	1.97,	6.93,	14.33,	21.74,	29.15,	36.56,
&	-4.54,	-2.58,	-.40,	2.45,	7.42,	13.57,	19.72,	25.88,	32.03,
&	-4.56,	-2.56,	-.31,	2.76,	7.64,	13.12,	18.60,	24.08,	29.56/

DATA((ALP021(J,N),N=1,9),J=1,13)/

&	-4.28,	-2.16,	-.03,	2.39,	6.65,	11.47,	16.29,	21.11,	25.93,
&	-4.33,	-2.19,	.02,	2.42,	6.60,	11.04,	15.49,	19.93,	24.38,
&	-4.35,	-2.22,	-.06,	2.16,	6.28,	9.79,	13.30,	16.81,	20.32,
&	-4.34,	-2.27,	-.17,	1.89,	5.90,	9.32,	12.71,	16.10,	19.49,
&	-4.45,	-2.41,	-.34,	1.80,	5.98,	9.79,	13.60,	17.41,	21.22,
&	-4.54,	-2.54,	-.33,	1.95,	6.48,	11.02,	15.57,	20.11,	24.66,
&	-4.64,	-2.62,	-.21,	2.40,	7.52,	12.85,	18.19,	23.52,	28.85,
&	-4.63,	-2.50,	-.01,	2.94,	9.05,	15.61,	22.16,	28.72,	35.28,
&	-4.49,	-2.30,	.19,	3.58,	11.38,	19.71,	28.04,	36.38,	44.71,
&	-4.33,	-2.07,	.41,	4.68,	15.03,	25.84,	36.65,	47.46,	58.27,
&	-4.26,	-1.81,	.62,	5.56,	18.53,	31.87,	45.20,	58.53,	71.87,
&	-4.42,	-1.97,	.42,	4.86,	14.77,	25.03,	35.28,	45.54,	55.79,
&	-4.75,	-2.37,	-.05,	3.52,	12.32,	23.14,	33.95,	44.76,	55.57/

DATA((ALP021(J,N),N=1,9),J=14,26)/

&	-5.05,	-2.77,	-.42,	2.63,	9.24,	20.05,	30.86,	41.68,	52.49,
&	-5.21,	-3.09,	-.87,	2.14,	7.10,	16.62,	26.14,	35.67,	45.19,
&	-5.09,	-3.18,	-1.10,	2.11,	6.88,	16.19,	25.49,	34.79,	44.09,
&	-5.04,	-3.09,	-.96,	2.25,	7.45,	17.45,	27.45,	37.45,	47.45,
&	-4.97,	-2.99,	-.82,	2.47,	8.11,	18.92,	29.73,	40.54,	51.35,
&	-4.89,	-2.88,	-.67,	2.68,	8.65,	19.46,	30.27,	41.08,	51.89,
&	-4.92,	-2.81,	-.57,	2.87,	9.24,	20.05,	30.86,	41.68,	52.49,
&	-4.93,	-2.72,	-.48,	3.05,	9.89,	21.00,	32.11,	43.22,	54.33,
&	-4.93,	-2.67,	-.41,	3.20,	10.44,	21.56,	32.67,	43.78,	54.89,
&	-4.90,	-2.62,	-.33,	3.35,	11.00,	22.11,	33.22,	44.33,	55.44,
&	-4.86,	-2.56,	.02,	4.15,	13.14,	24.57,	36.00,	47.43,	58.86,
&	-4.91,	-2.51,	.25,	4.68,	13.79,	24.05,	34.31,	44.56,	54.82,
&	-4.83,	-2.42,	.38,	5.22,	14.65,	24.65,	34.65,	44.65,	54.65/

DATA((CD004(I,J),J=1,26),I=1,5)/

1	.0046,	.0046,	.0046,	.0046,	.0046,	.0046,	.0046,	.0046,	.0046,
1	.0046,	.0046,	.0046,	.0047,	.0061,	.0111,	.0161,	.0200,	.0221,
1	.0225,	.0226,	.0226,	.0225,	.0220,	.0185,	.0159,	.0149,	
2	.0066,	.0065,	.0064,	.0064,	.0064,	.0065,	.0065,	.0065,	.0065,
2	.0065,	.0066,	.0070,	.0077,	.0088,	.0138,	.0196,	.0234,	.0253,
2	.0264,	.0267,	.0271,	.0274,	.0275,	.0280,	.0278,	.0274,	
3	.0177,	.0144,	.0126,	.0122,	.0117,	.0115,	.0115,	.0116,	.0116,
3	.0116,	.0118,	.0119,	.0135,	.0181,	.0237,	.0293,	.0340,	.0370,
3	.0387,	.0405,	.0417,	.0428,	.0439,	.0501,	.0565,	.0632,	
4	.0446,	.0359,	.0305,	.0278,	.0272,	.0293,	.0321,	.0349,	.0377,
4	.0405,	.0439,	.0482,	.0524,	.0567,	.0609,	.0651,	.0694,	.0736,
4	.0772,	.0805,	.0838,	.0871,	.0904,	.1047,	.1141,	.1216,	
5	.0877,	.0599,	.0537,	.0569,	.0623,	.0651,	.0691,	.0759,	.0826,

5 .0894, .0969, .1051, .1133, .1215, .1282, .1332, .1382, .1432,
5 .1471, .1498, .1526, .1553, .1580, .1707, .1792, .1826/

DATA((CD006(I,J),J=1,26),I=1,5)/

1 .0044, .0044, .0044, .0044, .0044, .0044, .0044, .0044, .0046,
1 .0047, .0049, .0053, .0071, .0142, .0218, .0261, .0287, .0293,
1 .0297, .0301, .0302, .0301, .0300, .0284, .0261, .0238,
2 .0070, .0069, .0069, .0069, .0069, .0068, .0068, .0068, .0068,
2 .0069, .0074, .0084, .0117, .0188, .0244, .0283, .0311, .0330,
2 .0344, .0348, .0352, .0356, .0360, .0365, .0358, .0338,
3 .0149, .0137, .0131, .0128, .0124, .0123, .0121, .0120, .0118,
3 .0119, .0128, .0145, .0185, .0253, .0321, .0375, .0406, .0427,
3 .0444, .0459, .0473, .0488, .0502, .0582, .0662, .0743,
4 .0384, .0314, .0267, .0237, .0217, .0213, .0223, .0244, .0275,
4 .0316, .0388, .0460, .0532, .0625, .0736, .0825, .0897, .0951,
4 .0982, .1013, .1037, .1052, .1066, .1153, .1239, .1326,
5 .0699, .0522, .0515, .0546, .0615, .0650, .0684, .0719, .0753,
5 .0815, .0881, .0947, .1013, .1121, .1265, .1408, .1553, .1711,
5 .1792, .1816, .1839, .1862, .1886, .2025, .2153, .2261/

DATA((CD009(I,J),J=1,26),I=1,5)/

1 .0044, .0044, .0044, .0044, .0044, .0044, .0044, .0044, .0044,
1 .0044, .0045, .0061, .0096, .0148, .0224, .0312, .0379, .0428,
1 .0457, .0485, .0508, .0527, .0533, .0506, .0464, .0422,
2 .0063, .0064, .0064, .0065, .0066, .0066, .0067, .0067, .0069,
2 .0076, .0092, .0135, .0196, .0266, .0337, .0399, .0450, .0490,
2 .0517, .0539, .0555, .0565, .0569, .0569, .0556, .0542,
3 .0120, .0123, .0124, .0124, .0125, .0125, .0125, .0126, .0126,
3 .0132, .0151, .0223, .0302, .0385, .0460, .0524, .0558, .0592,
3 .0619, .0640, .0661, .0682, .0697, .0773, .0842, .0910,
4 .0251, .0242, .0238, .0236, .0236, .0237, .0237, .0238, .0250,
4 .0298, .0374, .0470, .0575, .0685, .0800, .0905, .0993, .1048,
4 .1102, .1146, .1189, .1232, .1275, .1388, .1422, .1432,
5 .0502, .0466, .0435, .0422, .0439, .0467, .0517, .0602, .0688,
5 .0773, .0865, .0968, .1067, .1161, .1254, .1347, .1439, .1532,
5 .1606, .1669, .1732, .1787, .1842, .1957, .1957, .1957/

DATA((CD012(I,J),J=1,26),I=1,5)/

1 .0059, .0059, .0059, .0059, .0059, .0059, .0059, .0059, .0059,
1 .0061, .0067, .0139, .0242, .0357, .0468, .0558, .0616, .0666,
1 .0695, .0724, .0738, .0749, .0756, .0768, .0764, .0717,
2 .0084, .0084, .0085, .0085, .0085, .0085, .0085, .0085, .0085,
2 .0094, .0164, .0263, .0365, .0471, .0553, .0614, .0676, .0708,
2 .0737, .0765, .0785, .0795, .0805, .0849, .0854, .0843,
3 .0151, .0149, .0148, .0149, .0149, .0150, .0152, .0154, .0163,
3 .0209, .0297, .0385, .0478, .0582, .0670, .0746, .0803, .0850,
3 .0894, .0927, .0961, .0992, .1008, .1082, .1126, .1160,
4 .0233, .0251, .0260, .0265, .0268, .0270, .0272, .0287, .0323,
4 .0471, .0637, .0790, .0929, .1037, .1114, .1190, .1256, .1314,
4 .1372, .1417, .1448, .1479, .1508, .1637, .1693, .1744,
5 .0347, .0401, .0416, .0422, .0450, .0488, .0542, .0636, .0792,
5 .0947, .1116, .1300, .1484, .1626, .1742, .1859, .1923, .1953,
5 .1982, .2011, .2016, .2016, .2016, .2016, .2016, .2016/

DATA((CD015(I,J),J=1,26),I=1,5)/

1 .0071, .0065, .0062, .0061, .0060, .0060, .0060, .0061, .0070,
1 .0138, .0219, .0356, .0497, .0633, .0764, .0861, .0958, .1016,
1 .1074, .1119, .1155, .1179, .1187, .1182, .1099, .1009,
2 .0104, .0105, .0107, .0109, .0111, .0112, .0114, .0123, .0148,

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2 .0235, .0331, .0449, .0567, .0685, .0792, .0892, .0967, .1039,
2 .1110, .1163, .1196, .1228, .1248, .1260, .1205, .1119,
3 .0197, .0203, .0206, .0207, .0209, .0209, .0210, .0212, .0235,
3 .0323, .0438, .0558, .0664, .0772, .0881, .0975, .1063, .1135,
3 .1198, .1261, .1305, .1335, .1365, .1463, .1521, .1545,
4 .0275, .0322, .0346, .0358, .0370, .0382, .0398, .0442, .0546,
4 .0684, .0806, .0925, .1048, .1172, .1283, .1376, .1468, .1537,
4 .1598, .1659, .1700, .1735, .1770, .1925, .2025, .2126,
5 .0399, .0476, .0514, .0534, .0553, .0579, .0626, .0751, .0897,
5 .1073, .1266, .1438, .1596, .1753, .1879, .2002, .2124, .2232,
5 .2317, .2403, .2488, .2550, .2598, .2697, .2697, .2697/

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DATA((CD018(I,J),J=1,26),I=1,5)/
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1 .0081, .0089, .0097, .0100, .0104, .0106, .0108, .0110, .0112,
1 .0187, .0348, .0526, .0693, .0845, .0983, .1096, .1173, .1232,
1 .1277, .1308, .1339, .1354, .1359, .1358, .1341, .1320,
2 .0112, .0152, .0173, .0183, .0193, .0198, .0205, .0220, .0268,
2 .0421, .0566, .0715, .0845, .0966, .1071, .1165, .1242, .1294,
2 .1346, .1398, .1420, .1442, .1463, .1521, .1553, .1586,
3 .0197, .0267, .0302, .0319, .0337, .0350, .0367, .0392, .0462,
3 .0575, .0695, .0817, .0930, .1037, .1143, .1248, .1344, .1391,
3 .1438, .1486, .1522, .1542, .1563, .1683, .1804, .1925,
4 .0346, .0484, .0538, .0564, .0595, .0614, .0660, .0767, .0923,
4 .1108, .1297, .1489, .1631, .1738, .1808, .1858, .1908, .1945,
4 .1977, .2008, .2040, .2069, .2095, .2250, .2406, .2561,
5 .0553, .0739, .0830, .0876, .0944, .0981, .1051, .1139, .1329,
5 .1562, .1864, .2150, .2351, .2502, .2625, .2713, .2800, .2888,
5 .2976, .3035, .3085, .3135, .3184, .3429, .3535, .3642/

```

```
DATA((CD021(I,J),J=1,26),I=1,5)/
```

```

1 .0093, .0113, .0123, .0129, .0135, .0137, .0142, .0167, .0277,
1 .0405, .0535, .0665, .0795, .0915, .1024, .1133, .1242, .1343,
1 .1421, .1500, .1578, .1656, .1714, .1816, .1804, .1775,
2 .0136, .0172, .0190, .0199, .0208, .0213, .0224, .0307, .0401,
2 .0499, .0620, .0741, .0861, .0982, .1103, .1224, .1328, .1424,
2 .1520, .1617, .1713, .1757, .1786, .1857, .1857, .1857,
3 .0280, .0332, .0358, .0371, .0383, .0398, .0421, .0501, .0605,
3 .0719, .0837, .0959, .1087, .1215, .1331, .1446, .1561, .1677,
3 .1793, .1836, .1878, .1919, .1961, .2031, .2021, .2010,
4 .0566, .0668, .0730, .0772, .0814, .0840, .0884, .0973, .1132,
4 .1291, .1449, .1577, .1702, .1826, .1920, .2005, .2089, .2173,
4 .2257, .2320, .2358, .2396, .2433, .2509, .2530, .2551,
5 .1044, .1234, .1329, .1376, .1423, .1446, .1610, .1781, .1953,
5 .2125, .2285, .2444, .2604, .2764, .2898, .2941, .2983, .3026,
5 .3069, .3091, .3088, .3084, .3081, .3062, .3042, .3023/

```

```
DATA(XMI(J),J=1,26)/.3,.5,.6,.65,.7,.725,.75,.775,
```

```
& .8,.825,.85,.875,.9,.925,.95,.975,1.0,1.025,1.05,1.075,
&1.1,1.125,1.15,1.3,1.45,1.6/
```

```
DATA(CLI(J),J=1,9)/-.4,-.2,0.0,.2,.4,.6,.8,1.0,1.2/
```

```
DATA(ALPI(J),J=1,7)/-4.0,-2.0,0.0,2.0,4.0,6.0,8.0/
```

```
DATA(CLII(J),J=1,5)/0.0,.2,.4,.6,.8/
```

```
IORDER(1)=IORDER(2)=1
```

```
IPT (1) = -1
```

```
IF (IKEY .EQ. 2) GO TO 1000
```

```
IF (TR .LT. .04) GO TO 9
```

```
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 1
```

```
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 2
```

```

IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 3
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 4
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 5
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 6
IF (TR .GE. .21) GO TO 7
9 CALL IBI (7,ALPI,26,XMI,7,CL004,IORDER,IPT,AA,XM,CLFT04,IERR)
  CL=CLFT04
  GO TO 400
1 CALL IBI (7,ALPI,26,XMI,7,CL004,IORDER,IPT,AA,XM,CLFT04,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL006,IORDER,IPT,AA,XM,CLFT06,IERR)
  CL=CLFT04 + (CLFT06-CLFT04)*((TR-.04)/(.06-.04))
  GO TO 400
2 CALL IBI (7,ALPI,26,XMI,7,CL006,IORDER,IPT,AA,XM,CLFT06,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL009,IORDER,IPT,AA,XM,CLFT09,IERR)
  CL=CLFT06 + (CLFT09 - CLFT06)*((TR-.06)/(.09-.06))
  GO TO 400
3 CALL IBI (7,ALPI,26,XMI,7,CL009,IORDER,IPT,AA,XM,CLFT09,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL012,IORDER,IPT,AA,XM,CLFT12,IERR)
  CL=CLFT09+(CLFT12-CLFT09)*((TR-.09)/(.12-.09))
  GO TO 400
4 CALL IBI (7,ALPI,26,XMI,7,CL012,IORDER,IPT,AA,XM,CLFT12,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL015,IORDER,IPT,AA,XM,CLFT15,IERR)
  CL=CLFT12 + (CLFT15-CLFT12)*((TR-.12)/(.15-.12))
  GO TO 400
5 CALL IBI (7,ALPI,26,XMI,7,CL015,IORDER,IPT,AA,XM,CLFT15,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL018,IORDER,IPT,AA,XM,CLFT18,IERR)
  CL=CLFT15+(CLFT18-CLFT15)*((TR-.15)/(.18-.15))
  GO TO 400
6 CALL IBI (7,ALPI,26,XMI,7,CL018,IORDER,IPT,AA,XM,CLFT18,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL021,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT18+(CLFT21-CLFT18)*((TR-.18)/(.21-.18))
  GO TO 400
7 CALL IBI (7,ALPI,26,XMI,7,CL021,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT21
  GO TO 400
1000 CONTINUE
  IPT (1)=-1
  IF (TR .LT. .04) GO TO 90
  IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 10
  IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 20
  IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 30
  IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 40
  IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 50
  IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 60
  IF (TR .GE. .21) GO TO 70
90 CALL IBI (26,XMI,9,CLI,26,ALP004,IORDER,IPT,XM,CL,AA04,IERR)
  AA=AA04
  GO TO 400
10 CALL IBI (26,XMI,9,CLI,26,ALP004,IORDER,IPT,XM,CL,AA04,IERR)

```

```

IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP006,IORDER,IPT,XM,CL,AA06,IERR)
AA=AA04 + (AA06-AA04)*((TR-.04)/(.06-.04))
GO TO 400
20 CALL IBI (26,XMI,9,CLI,26,ALP006,IORDER,IPT,XM,CL,AA06,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP009,IORDER,IPT,XM,CL,AA09,IERR)
AA=AA06 + (AA09 - AA06)*((TR -.06)/(.09-.06))
GO TO 400
30 CALL IBI (26,XMI,9,CLI,26,ALP009,IORDER,IPT,XM,CL,AA09,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP012,IORDER,IPT,XM,CL,AA12,IERR)
AA=AA09+(AA12-AA09)*((TR-.09)/(.12-.09))
GO TO 400
40 CALL IBI (26,XMI,9,CLI,26,ALP012,IORDER,IPT,XM,CL,AA12,IERR)
IPT(1)=-1
CALL IBI (26,XMI,9,CLI,26,ALP015,IORDER,IPT,XM,CL,AA15,IERR)
AA=AA12+(AA15-AA12)*((TR-.12)/(.15-.12))
GO TO 400
50 CALL IBI (26,XMI,9,CLI,26,ALP015,IORDER,IPT,XM,CL,AA15,IERR)
IPT(1)=-1
CALL IBI (26,XMI,9,CLI,26,ALP018,IORDER,IPT,XM,CL,AA18,IERR)
AA=AA15+(AA18-AA15)*((TR-.15)/(.18-.15))
GO TO 400
60 CALL IBI (26,XMI,9,CLI,26,ALP018,IORDER,IPT,XM,CL,AA18,IERR)
IPT(1)=-1
CALL IBI (26,XMI,9,CLI,26,ALP021,IORDER,IPT,XM,CL,AA21,IERR)
AA=AA18+(AA21-AA18)*((TR-.18)/(.21-.18))
GO TO 400
70 CALL IBI (26,XMI,9,CLI,26,ALP021,IORDER,IPT,XM,CL,AA21,IERR)
AA=AA21
400 CONTINUE
IPT (1)=-1
IF (TR .LT. .04) GO TO 91
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 11
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 21
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 31
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 41
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 51
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 61
IF (TR .GE. .21) GO TO 71
91 CALL IBI (5,CLII,26,XMI,5,CD004,IORDER,IPT,CL,XM,CDRG04,IERR)
CD=CDRG04
WRITE (6,201) TR
201 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
& /* THE VALUES FOR T/C=.04 HAVE BEEN RETURNED*)
GO TO 250
11 CALL IBI (5,CLII,26,XMI,5,CD004,IORDER,IPT,CL,XM,CDRG04,IERR)
IPT(1)=-1
CALL IBI (5,CLII,26,XMI,5,CD006,IORDER,IPT,CL,XM,CDRG06,IERR)
CD=CDRG04+(CDRG06-CDRG04)*((TR-.04)/(.06-.04))
GO TO 250
21 CALL IBI (5,CLII,26,XMI,5,CDU06,IORDER,IPT,CL,XM,CDRG06,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CDU09,IORDER,IPT,CL,XM,CDRG09,IERR)

```

```

      CD=CDRG06 + (CDRG09 - CDRG06)*((TR-.06)/(.09-.06))
      GO TO 250
31  CALL IBI (5,CLII,26,XMI,5,CD009,IORDER,IPT,CL,XM,CDRG09,IERR)
      IPT (1)=-1
      CALL IBI (5,CLII,26,XMI,5,CD012,IORDER,IPT,CL,XM,CDRG12,IERR)
      CD=CDRG09+(CDRG12-CDRG09)*((TR-.09)/(.12-.09))
      GO TO 250
41  CALL IBI (5,CLII,26,XMI,5,CD012,IORDER,IPT,CL,XM,CDRG12,IERR)
      IPT(1)=-1
      CALL IBI (5,CLII,26,XMI,5,CD015,IORDER,IPT,CL,XM,CDRG15,IERR)
      CD=CDRG12+(CDRG15-CDRG12)*((TR-.12)/(.15-.12))
      GO TO 250
51  CALL IBI (5,CLII,26,XMI,5,CD015,IORDER,IPT,CL,XM,CDRG15,IERR)
      IPT(1)=-1
      CALL IBI (5,CLII,26,XMI,5,CD018,IORDER,IPT,CL,XM,CDRG18,IERR)
      CD=CDRG15+(CDRG18-CDRG15)*((TR-.15)/(.18-.15))
      GO TO 250
61  CALL IBI (5,CLII,26,XMI,5,CD018,IORDER,IPT,CL,XM,CDRG18,IERR)
      IPT(1)=-1
      CALL IBI (5,CLII,26,XMI,5,CD021,IORDER,IPT,CL,XM,CDRG21,IERR)
      CD=CDRG18+(CDRG21-CDRG18)*((TR-.18)/(.21-.18))
      GO TO 250
71  CALL IBI (5,CLII,26,XMI,5,CD021,IORDER,IPT,CL,XM,CDRG21,IERR)
      CD=CDRG21
      IF (TR .GT. .21) WRITE (6,204) TR
204  FORMAT(#0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
      &*/# THE VALUES FOR T/C=.21 HAVE BEEN RETURNED.&)
250  IF (CL .GT. .8) GO TO 251
      RETURN
251  CALL COMPUT(D,XM,ALT,COR,TR,AA,CDT,CL,CD,CLDES)
      CD=CDT
      RETURN
      END

```

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      SUBROUTINE AERO1(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)

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C
C
C THIS SUBROUTINE IS DESIGNED TO COMPUTE THE AIRFOIL
C CHARACTERISTIC FOR A 16 SERIES AIRFOIL WITH A GIVEN CAMBER.
C
C THIS SUBROUTINE RELATES CL,CD,CL/CD,MACH,T/C,AND ALPHA.
C IT REPRESENTS THE DATA OF A 16-1XX AIRFOIL.
C
C XM=RELATIVE MACH NO. AT BLADE ELEMENT
C AA=ANGLE OF ATTACK IN DEGREES
C IKEY1: CL=CL(MACH,ALPHA,T/C)
C       : CD=CD(MACH,CL,T/C)
C       : XLD=CL/CD
C IKEY2: ALPHA=ALPHA(MACH,CL,T/C)
C       : CD=CD(MACH,CL,T/C)
C       : XLD=CL/CD
C TR=T/C
C

```

C
C
C

DIMENSION IORDER(2),IPT(2),ALP104(26,9),ALP106(26,9),
 & ALP109(26,9),ALP112(26,9),ALP115(26,9),ALP118(26,9),
 & ALP121(26,9),CLI(9),XMI(26),ALPI(7),CL104(7,26),
 & CL106(7,26),CL109(7,26),CL112(7,26),CL115(7,26),
 & CL118(7,26),CL121(7,26),CD104(5,26),CD106(5,26),
 & CD109(5,26),CD112(5,26),CD115(5,26),CD118(5,26),
 & CD121(5,26),CLII(5)

DATA((CL104(I,J),J=1,26),I=1,4)/
 1 -.302, -.302, -.302, -.302, -.304, -.308, -.312, -.315, -.317,
 1 -.318, -.318, -.306, -.294, -.277, -.261, -.247, -.247, -.262,
 1 -.262, -.258, -.256, -.256, -.256, -.317, -.324, -.308,
 2 -.099, -.116, -.125, -.131, -.138, -.144, -.149, -.155, -.161,
 2 -.161, -.155, -.138, -.112, -.085, -.068, -.066, -.082, -.081,
 2 -.079, -.072, -.067, -.069, -.072, -.128, -.133, -.128,
 3 .095, .098, .108, .117, .126, .130, .134, .141, .147,
 3 .154, .161, .167, .175, .183, .190, .182, .165, .155,
 3 .158, .168, .176, .183, .175, .057, -.009, -.014,
 4 .301, .318, .339, .355, .378, .389, .400, .412, .424,
 4 .436, .448, .459, .467, .460, .450, .433, .416, .407,
 4 .415, .430, .445, .450, .430, .246, .136, .104/

DATA((CL104(I,J),J=1,26),I=5,7)/
 5 .504, .536, .562, .585, .622, .639, .656, .669, .678,
 5 .681, .677, .669, .661, .651, .641, .634, .629, .631,
 5 .642, .656, .669, .675, .656, .410, .255, .215,
 6 .698, .744, .791, .827, .864, .874, .877, .874, .868,
 6 .858, .848, .838, .829, .821, .813, .807, .803, .808,
 6 .816, .832, .848, .854, .828, .564, .389, .321,
 7 .852, .893, .971, 1.017, 1.042, 1.037, 1.026, 1.015, 1.003,
 7 .989, .975, .961, .950, .941, .933, .924, .919, .918,
 7 .924, .935, .955, .964, .934, .697, .521, .438/

DATA((CL106(I,J),J=1,26),I=1,4)/
 1 -.301, -.301, -.301, -.296, -.291, -.290, -.289, -.289, -.288,
 1 -.285, -.283, -.280, -.277, -.272, -.282, -.305, -.320, -.311,
 1 -.299, -.288, -.281, -.282, -.288, -.314, -.321, -.311,
 2 -.083, -.088, -.086, -.083, -.079, -.077, -.074, -.072, -.070,
 2 -.066, -.063, -.060, -.057, -.071, -.103, -.124, -.130, -.111,
 2 -.090, -.070, -.060, -.070, -.084, -.124, -.134, -.132,
 3 .105, .116, .129, .135, .142, .147, .152, .157, .162,
 3 .167, .172, .178, .184, .175, .151, .123, .118, .131,
 3 .153, .171, .168, .155, .143, .072, .021, .003,
 4 .313, .329, .348, .359, .377, .385, .395, .408, .420,
 4 .433, .445, .446, .431, .411, .392, .377, .376, .392,
 4 .415, .436, .437, .421, .396, .257, .159, .112/

DATA((CL106(I,J),J=1,26),I=5,7)/
 5 .502, .529, .558, .585, .614, .634, .655, .669, .666,
 5 .654, .641, .624, .608, .592, .577, .564, .565, .581,
 5 .604, .625, .621, .603, .571, .398, .278, .221,
 6 .684, .731, .782, .823, .872, .877, .864, .849, .831,
 6 .814, .796, .779, .761, .744, .729, .717, .715, .731,
 6 .750, .769, .769, .743, .712, .529, .405, .331,
 7 .820, .869, .934, .989, 1.008, 1.002, .991, .971, .951,
 7 .931, .911, .891, .871, .851, .834, .820, .829, .845,

```

7 .867, .885, .883, .865, .837, .667, .536, .440/
DATA((CL109(I,J),J=1,26),I=1,4)/
1 -.273, -.294, -.310, -.322, -.336, -.344, -.352, -.360, -.370,
1 -.379, -.387, -.394, -.402, -.409, -.422, -.424, -.384, -.349,
1 -.328, -.323, -.323, -.325, -.327, -.336, -.341, -.338,
2 -.077, -.081, -.094, -.103, -.112, -.119, -.124, -.130, -.137,
2 -.145, -.153, -.161, -.170, -.180, -.188, -.178, -.148, -.123,
2 -.108, -.108, -.109, -.111, -.113, -.125, -.136, -.139,
3 .099, .099, .099, .103, .107, .110, .113, .117, .120,
3 .124, .127, .130, .118, .089, .065, .071, .089, .106,
3 .119, .119, .109, .100, .090, .043, .016, .008,
4 .298, .322, .334, .337, .351, .358, .365, .372, .379,
4 .384, .387, .378, .339, .298, .266, .283, .310, .337,
4 .360, .353, .339, .325, .310, .225, .157, .125/
DATA((CL109(I,J),J=1,26),I=5,7)/
5 .465, .492, .519, .536, .557, .571, .585, .598, .605,
5 .593, .559, .524, .490, .456, .430, .447, .476, .505,
5 .528, .518, .500, .481, .462, .362, .283, .226,
6 .638, .673, .708, .738, .783, .812, .814, .800, .776,
6 .741, .704, .667, .627, .584, .564, .588, .615, .645,
6 .667, .655, .635, .616, .596, .493, .414, .346,
7 .762, .818, .868, .906, .949, .948, .929, .898, .866,
7 .828, .788, .749, .709, .671, .649, .668, .694, .720,
7 .745, .733, .717, .701, .686, .596, .517, .450/
DATA((CL112(I,J),J=1,26),I=1,4)/
1 -.276, -.274, -.272, -.274, -.276, -.277, -.278, -.279, -.280,
1 -.281, -.282, -.294, -.340, -.373, -.362, -.306, -.301, -.303,
1 -.305, -.308, -.310, -.313, -.315, -.334, -.349, -.361,
2 -.086, -.094, -.095, -.094, -.093, -.093, -.093, -.094, -.096,
2 -.097, -.099, -.121, -.171, -.203, -.186, -.141, -.098, -.094,
2 -.097, -.099, -.102, -.105, -.109, -.128, -.143, -.148,
3 .084, .093, .098, .101, .104, .105, .107, .111, .116,
3 .119, .103, .071, .034, .014, .028, .055, .082, .104,
3 .093, .083, .073, .063, .053, .013, -.010, -.014,
4 .283, .287, .298, .303, .311, .315, .319, .324, .328,
4 .321, .297, .255, .211, .183, .204, .240, .277, .298,
4 .287, .272, .258, .243, .229, .165, .125, .095/
DATA((CL112(I,J),J=1,26),I=5,7)/
5 .421, .444, .467, .479, .496, .504, .512, .521, .528,
5 .509, .470, .415, .360, .330, .345, .382, .420, .439,
5 .429, .415, .399, .383, .367, .294, .248, .207,
6 .581, .608, .640, .663, .700, .719, .734, .717, .680,
6 .630, .579, .528, .484, .454, .481, .514, .556, .571,
6 .557, .542, .526, .510, .494, .415, .357, .314,
7 .692, .712, .749, .778, .831, .855, .847, .824, .784,
7 .721, .658, .595, .534, .513, .527, .566, .607, .629,
7 .618, .607, .597, .586, .575, .510, .461, .415/
DATA((CL115(I,J),J=1,26),I=1,4)/
1 -.285, -.285, -.288, -.289, -.291, -.292, -.292, -.292, -.292,
1 -.292, -.305, -.345, -.383, -.361, -.301, -.291, -.280, -.279,
1 -.279, -.280, -.281, -.282, -.282, -.289, -.296, -.302,
2 -.104, -.117, -.128, -.134, -.138, -.140, -.142, -.147, -.152,
2 -.157, -.168, -.217, -.248, -.227, -.165, -.124, -.124, -.124,
2 -.124, -.124, -.124, -.124, -.124, -.135, -.147, -.157,
3 .073, .070, .071, .072, .075, .077, .079, .082, .081,

```


3	.064,	.023,	-.018,	-.043,	-.023,	.019,	.057,	.069,	.067,
3	.063,	.059,	.054,	.050,	.046,	.026,	.008,	-.010,	
4	.263,	.265,	.275,	.281,	.291,	.296,	.301,	.308,	.313,
4	.284,	.212,	.146,	.129,	.158,	.204,	.250,	.270,	.261,
4	.250,	.240,	.231,	.222,	.212,	.161,	.125,	.099/	

DATA((CL115(I,J),J=1,26),I=5,7)/

5	.388,	.410,	.428,	.438,	.459,	.471,	.481,	.489,	.474,
5	.410,	.347,	.284,	.250,	.287,	.329,	.372,	.394,	.384,
5	.374,	.364,	.354,	.344,	.334,	.279,	.233,	.204,	
6	.516,	.541,	.568,	.589,	.613,	.628,	.645,	.648,	.604,
6	.526,	.448,	.376,	.342,	.366,	.415,	.462,	.480,	.469,
6	.457,	.444,	.432,	.423,	.414,	.365,	.331,	.306,	
7	.628,	.657,	.688,	.711,	.741,	.759,	.752,	.722,	.658,
7	.575,	.491,	.415,	.388,	.416,	.466,	.512,	.526,	.516,
7	.506,	.496,	.487,	.477,	.468,	.419,	.382,	.355/	

DATA((CL118(I,J),J=1,26),I=1,4)/

1	-.252,	-.255,	-.255,	-.265,	-.280,	-.288,	-.296,	-.310,	-.328,
1	-.344,	-.359,	-.371,	-.375,	-.344,	-.312,	-.289,	-.278,	-.277,
1	-.280,	-.283,	-.286,	-.289,	-.289,	-.293,	-.296,	-.298,	
2	-.111,	-.122,	-.135,	-.145,	-.156,	-.161,	-.167,	-.185,	-.205,
2	-.223,	-.241,	-.250,	-.228,	-.191,	-.151,	-.137,	-.135,	-.135,
2	-.138,	-.141,	-.144,	-.147,	-.148,	-.151,	-.150,	-.157,	
3	.047,	.040,	.042,	.044,	.055,	.057,	.057,	.053,	.024,
3	-.024,	-.071,	-.094,	-.071,	-.024,	.024,	.043,	.040,	.038,
3	.035,	.032,	.029,	.027,	.024,	.009,	-.006,	-.013,	
4	.218,	.226,	.235,	.240,	.246,	.250,	.247,	.226,	.186,
4	.132,	.072,	.047,	.082,	.148,	.209,	.232,	.224,	.217,
4	.209,	.201,	.193,	.185,	.178,	.148,	.119,	.099/	

DATA((CL118(I,J),J=1,26),I=5,7)/

5	.352,	.358,	.371,	.383,	.401,	.405,	.390,	.362,	.311,
5	.248,	.179,	.169,	.208,	.274,	.333,	.344,	.339,	.335,
5	.329,	.321,	.313,	.305,	.298,	.262,	.226,	.203,	
6	.454,	.467,	.498,	.516,	.556,	.559,	.529,	.456,	.383,
6	.311,	.253,	.244,	.283,	.341,	.397,	.419,	.411,	.404,
6	.396,	.389,	.381,	.374,	.367,	.326,	.295,	.272,	
7	.546,	.569,	.599,	.630,	.669,	.664,	.619,	.543,	.461,
7	.365,	.288,	.272,	.306,	.366,	.424,	.453,	.446,	.438,
7	.431,	.423,	.416,	.410,	.403,	.363,	.329,	.305/	

DATA((CL121(I,J),J=1,26),I=1,4)/

1	-.393,	-.391,	-.390,	-.382,	-.374,	-.371,	-.364,	-.376,	-.390,
1	-.419,	-.438,	-.420,	-.371,	-.305,	-.252,	-.254,	-.259,	-.265,
1	-.271,	-.277,	-.283,	-.289,	-.295,	-.305,	-.318,	-.328,	
2	-.174,	-.174,	-.170,	-.166,	-.152,	-.145,	-.135,	-.151,	-.179,
2	-.211,	-.213,	-.189,	-.134,	-.078,	-.042,	-.036,	-.040,	-.048,
2	-.056,	-.064,	-.072,	-.080,	-.088,	-.127,	-.148,	-.151,	
3	.019,	.019,	.020,	.026,	.032,	.030,	.015,	-.015,	-.045,
3	-.075,	-.090,	-.066,	.006,	.093,	.124,	.122,	.120,	.113,
3	.107,	.100,	.093,	.087,	.080,	.046,	.020,	.002,	
4	.186,	.186,	.191,	.197,	.211,	.210,	.183,	.130,	.076,
4	.030,	.007,	.035,	.115,	.193,	.220,	.216,	.209,	.202,
4	.196,	.189,	.183,	.176,	.169,	.132,	.101,	.077/	

DATA((CL121(I,J),J=1,26),I=5,7)/

5	.281,	.284,	.286,	.299,	.325,	.332,	.306,	.244,	.172,
5	.113,	.100,	.126,	.207,	.283,	.314,	.309,	.303,	.294,
5	.286,	.277,	.269,	.260,	.252,	.212,	.182,	.160,	

6	.386,	.386,	.398,	.414,	.450,	.435,	.398,	.316,	.234,
6	.171,	.159,	.185,	.258,	.333,	.366,	.363,	.359,	.351,
6	.343,	.335,	.328,	.320,	.312,	.269,	.233,	.205,	
7	.452,	.472,	.501,	.538,	.553,	.516,	.456,	.384,	.287,
7	.204,	.180,	.205,	.285,	.350,	.389,	.393,	.386,	.380,
7	.373,	.366,	.360,	.353,	.346,	.301,	.265,	.235/	
DATA((ALP104(J,N),N=1,9),J=1,13)/									
&	-4.97,	-3.00,	-.98,	1.02,	2.98,	4.99,	7.32,	9.92,	12.52,
&	-5.05,	-2.90,	-.92,	.93,	2.75,	4.62,	6.75,	9.44,	12.12,
&	-5.11,	-2.85,	-.93,	.80,	2.55,	4.33,	6.10,	8.32,	10.54,
&	-5.15,	-2.81,	-.94,	.70,	2.39,	4.12,	5.78,	7.82,	9.93,
&	-5.16,	-2.75,	-.95,	.59,	2.18,	3.82,	5.47,	7.53,	9.78,
&	-5.12,	-2.68,	-.95,	.54,	2.09,	3.69,	5.37,	7.55,	10.00,
&	-5.08,	-2.63,	-.95,	.50,	2.00,	3.56,	5.30,	7.65,	10.34,
&	-5.06,	-2.56,	-.95,	.44,	1.91,	3.46,	5.28,	7.79,	10.62,
&	-5.06,	-2.50,	-.95,	.38,	1.83,	3.39,	5.28,	7.96,	10.92,
&	-5.04,	-2.50,	-.98,	.33,	1.74,	3.34,	5.34,	8.17,	11.22,
&	-5.01,	-2.55,	-1.02,	.27,	1.67,	3.33,	5.44,	8.39,	11.54,
&	-5.12,	-2.74,	-1.10,	.23,	1.60,	3.34,	5.55,	8.63,	11.89,
&	-5.16,	-2.97,	-1.22,	.17,	1.54,	3.37,	5.65,	8.83,	12.13/
DATA((ALP104(J,N),N=1,9),J=14,26)/									
&	-5.28,	-3.20,	-1.37,	.12,	1.57,	3.47,	5.75,	8.98,	12.32,
&	-5.44,	-3.37,	-1.47,	.08,	1.62,	3.57,	5.85,	9.12,	12.45,
&	-5.69,	-3.48,	-1.47,	.14,	1.74,	3.66,	5.92,	9.30,	12.72,
&	-5.85,	-3.43,	-1.34,	.28,	1.87,	3.73,	5.97,	9.40,	12.84,
&	-5.52,	-3.31,	-1.31,	.36,	1.94,	3.72,	5.91,	9.49,	13.13,
&	-5.51,	-3.32,	-1.33,	.33,	1.88,	3.63,	5.82,	9.41,	13.11,
&	-5.53,	-3.38,	-1.40,	.24,	1.77,	3.50,	5.64,	9.26,	13.15,
&	-5.52,	-3.41,	-1.45,	.18,	1.67,	3.38,	5.46,	8.84,	12.58,
&	-5.54,	-3.40,	-1.45,	.13,	1.63,	3.33,	5.40,	8.65,	12.29,
&	-5.57,	-3.39,	-1.42,	.20,	1.76,	3.50,	5.67,	9.25,	13.02,
&	-4.88,	-2.76,	-.62,	1.51,	3.88,	6.54,	9.55,	12.56,	15.56,
&	-4.80,	-2.70,	.12,	3.08,	6.17,	9.20,	12.23,	15.26,	18.29,
&	-5.02,	-2.80,	.24,	3.73,	7.35,	10.77,	14.19,	17.61,	21.03/
DATA((ALP106(J,N),N=1,9),J=1,13)/									
&	-4.91,	-3.07,	-1.12,	.91,	2.92,	5.08,	7.71,	10.65,	13.59,
&	-4.93,	-3.05,	-1.14,	.79,	2.71,	4.70,	7.00,	9.90,	12.80,
&	-4.92,	-3.06,	-1.20,	.65,	2.50,	4.38,	6.24,	8.87,	11.50,
&	-4.98,	-3.10,	-1.24,	.58,	2.36,	4.13,	5.81,	8.13,	10.54,
&	-5.03,	-3.14,	-1.29,	.49,	2.19,	3.88,	5.44,	7.88,	10.82,
&	-5.03,	-3.15,	-1.31,	.45,	2.12,	3.73,	5.37,	7.97,	11.17,
&	-5.03,	-3.17,	-1.35,	.40,	2.04,	3.58,	5.39,	8.14,	11.29,
&	-5.02,	-3.18,	-1.37,	.34,	1.94,	3.47,	5.46,	8.48,	11.75,
&	-5.03,	-3.19,	-1.40,	.29,	1.84,	3.46,	5.62,	8.82,	12.15,
&	-5.05,	-3.22,	-1.43,	.25,	1.75,	3.51,	5.83,	9.18,	12.60,
&	-5.06,	-3.25,	-1.46,	.21,	1.67,	3.58,	6.07,	9.55,	13.03,
&	-5.09,	-3.27,	-1.50,	.16,	1.66,	3.73,	6.38,	9.95,	13.52,
&	-5.12,	-3.30,	-1.53,	.13,	1.75,	3.91,	6.71,	10.35,	13.98/
DATA((ALP106(J,N),N=1,9),J=14,26)/									
&	-5.27,	-3.28,	-1.42,	.21,	1.91,	4.11,	7.05,	10.79,	14.52,
&	-5.32,	-3.08,	-1.19,	.41,	2.09,	4.30,	7.35,	11.16,	14.97,
&	-5.05,	-2.84,	-1.00,	.61,	2.25,	4.47,	7.61,	11.50,	15.38,
&	-4.84,	-2.74,	-.95,	.64,	2.25,	4.47,	7.49,	11.00,	14.51,
&	-4.89,	-2.89,	-1.08,	.53,	2.08,	4.25,	7.21,	10.72,	14.23,
&	-4.97,	-3.05,	-1.26,	.36,	1.89,	3.96,	6.85,	10.27,	13.69,

```

& -5.03, -3.19, -1.42, .22, 1.73, 3.74, 6.53, 9.98, 13.43,
& -5.08, -3.27, -1.47, .24, 1.72, 3.77, 6.54, 10.05, 13.56,
& -5.11, -3.23, -1.38, .34, 1.84, 3.97, 6.93, 10.21, 13.49,
& -5.10, -3.14, -1.26, .45, 2.05, 4.41, 7.41, 10.61, 13.81,
& -4.91, -2.80, -.73, 1.38, 4.03, 7.03, 9.93, 12.83, 15.72,
& -4.84, -2.71, -.27, 2.69, 5.92, 8.98, 12.03, 15.08, 18.14,
& -4.99, -2.76, -.04, 3.61, 7.27, 10.94, 14.61, 18.28, 21.94/

```

```
DATA((ALP109(J,N),N=1,9),J=1,13)/
```

```

& -5.30, -3.26, -1.13, 1.02, 3.22, 5.56, 8.61, 11.84, 15.06,
& -5.00, -3.12, -1.10, .91, 2.92, 5.19, 7.75, 10.51, 13.27,
& -4.83, -2.98, -1.03, .86, 2.71, 4.86, 7.15, 9.65, 12.15,
& -4.71, -2.89, -1.00, .83, 2.63, 4.63, 6.74, 9.12, 11.50,
& -4.57, -2.79, -.98, .76, 2.48, 4.38, 6.20, 8.61, 11.02,
& -4.50, -2.73, -.96, .73, 2.39, 4.24, 5.90, 8.76, 11.71,
& -4.42, -2.67, -.95, .69, 2.32, 4.13, 5.88, 9.23, 12.71,
& -4.35, -2.61, -.95, .65, 2.25, 4.02, 6.00, 10.08, 14.16,
& -4.26, -2.54, -.93, .62, 2.19, 3.96, 6.53, 10.98, 15.42,
& -4.18, -2.47, -.92, .58, 2.15, 4.09, 7.36, 11.95, 16.55,
& -4.11, -2.40, -.91, .56, 2.15, 4.57, 8.29, 13.05, 17.81,
& -4.05, -2.33, -.89, .56, 2.30, 5.06, 9.24, 14.12, 19.00,
& -3.98, -2.26, -.82, .74, 2.81, 5.61, 10.22, 15.10, 19.98/

```

```
DATA((ALP109(J,N),N=1,9),J=14,26)/
```

```

& -3.92, -2.17, -.66, 1.06, 3.29, 6.37, 10.97, 15.56, 20.16,
& -3.81, -2.10, -.51, 1.34, 3.63, 6.85, 11.55, 16.26, 20.96,
& -3.80, -2.18, -.57, 1.22, 3.43, 6.30, 11.30, 16.30, 21.30,
& -4.14, -2.44, -.75, 1.00, 3.08, 5.77, 10.72, 15.85, 20.97,
& -4.45, -2.68, -.93, .81, 2.75, 5.36, 10.13, 15.47, 20.80,
& -4.65, -2.84, -1.05, .67, 2.48, 5.04, 9.41, 14.54, 19.67,
& -4.72, -2.86, -1.05, .69, 2.57, 5.20, 9.72, 14.85, 19.97,
& -4.72, -2.85, -1.00, .79, 2.76, 5.48, 10.02, 14.90, 19.78,
& -4.70, -2.83, -.95, .89, 2.96, 5.76, 10.33, 15.04, 19.74,
& -4.68, -2.81, -.89, 1.00, 3.18, 6.09, 10.53, 14.98, 19.42,
& -4.61, -2.71, -.51, 1.73, 4.58, 8.08, 11.96, 15.84, 19.73,
& -4.58, -2.62, -.21, 2.68, 5.79, 9.61, 13.50, 17.38, 21.26,
& -4.62, -2.61, -.11, 3.49, 7.04, 10.88, 14.73, 18.58, 22.42/

```

```
DATA((ALP112(J,N),N=1,9),J=1,13)/
```

```

& -5.31, -3.20, -.99, 1.17, 3.70, 6.34, 9.95, 13.55, 17.15,
& -5.40, -3.18, -.99, 1.10, 3.44, 5.90, 9.69, 13.54, 17.38,
& -5.45, -3.19, -1.02, 1.02, 3.21, 5.54, 8.94, 12.61, 16.28,
& -5.40, -3.18, -1.04, .98, 3.10, 5.32, 8.38, 11.86, 15.34,
& -5.36, -3.17, -1.06, .93, 2.96, 5.02, 7.53, 10.58, 13.63,
& -5.34, -3.16, -1.06, .90, 2.90, 4.89, 7.19, 10.13, 13.07,
& -5.32, -3.16, -1.07, .88, 2.84, 4.79, 7.17, 10.71, 14.25,
& -5.31, -3.15, -1.08, .84, 2.77, 4.81, 7.55, 11.29, 15.03,
& -5.30, -3.13, -1.09, .79, 2.72, 4.95, 8.31, 12.15, 16.00,
& -5.29, -3.12, -1.10, .80, 2.84, 5.50, 9.74, 14.13, 18.53,
& -5.29, -3.10, -1.02, 1.00, 3.19, 6.53, 11.59, 16.66, 21.72,
& -5.23, -2.91, -.74, 1.40, 3.81, 8.15, 14.12, 20.09, 26.06,
& -4.71, -2.34, -.33, 1.88, 4.65, 10.64, 18.64, 26.64, 34.64/

```

```
DATA((ALP112(J,N),N=1,9),J=14,26)/
```

```

& -4.32, -1.97, -.13, 2.23, 5.13, 10.95, 17.73, 24.51, 31.29,
& -4.43, -2.16, -.26, 1.95, 4.81, 11.17, 19.87, 28.57, 37.26,
& -5.14, -2.72, -.56, 1.57, 4.27, 9.31, 17.00, 24.69, 32.38,
& -4.98, -3.00, -.91, 1.21, 3.72, 7.73, 15.57, 23.41, 31.25,
& -4.93, -3.01, -1.05, .99, 3.45, 7.00, 13.90, 20.79, 27.69,

```

```

& -4.91, -2.99, -.98, 1.10, 3.59, 7.41, 13.97, 20.52, 27.08,
& -4.88, -2.97, -.91, 1.24, 3.79, 7.78, 13.94, 20.09, 26.25,
& -4.87, -2.94, -.83, 1.37, 4.02, 8.08, 13.72, 19.35, 24.99,
& -4.84, -2.91, -.75, 1.52, 4.27, 8.37, 13.63, 18.89, 24.16,
& -4.83, -2.88, -.65, 1.67, 4.52, 8.62, 13.56, 18.49, 23.43,
& -4.64, -2.70, -.18, 2.54, 5.75, 9.89, 14.11, 18.32, 22.53,
& -4.50, -2.55, .15, 3.22, 6.83, 10.67, 14.52, 18.37, 22.21,
& -4.37, -2.49, .26, 3.88, 7.70, 11.66, 15.62, 19.58, 23.54/
DATA((ALP115(J,N),N=1,9),J=1,13)/
& -5.27, -3.06, -.82, 1.34, 4.19, 7.50, 11.07, 14.64, 18.21,
& -5.37, -2.99, -.75, 1.33, 3.86, 7.02, 10.47, 13.91, 17.36,
& -5.40, -2.90, -.71, 1.26, 3.63, 6.53, 9.87, 13.20, 16.53,
& -5.43, -2.85, -.70, 1.22, 3.52, 6.18, 9.46, 12.74, 16.02,
& -5.42, -2.81, -.70, 1.16, 3.30, 5.83, 8.92, 12.05, 15.17,
& -5.42, -2.79, -.71, 1.12, 3.19, 5.64, 8.63, 11.68, 14.73,
& -5.44, -2.77, -.71, 1.09, 3.10, 5.45, 8.90, 12.64, 16.37,
& -5.49, -2.73, -.72, 1.04, 3.02, 5.40, 10.11, 15.51, 20.92,
& -5.54, -2.69, -.70, 1.03, 3.08, 5.94, 13.26, 20.67, 28.07,
& -5.60, -2.64, -.58, 1.24, 3.84, 9.02, 17.18, 25.35, 33.51,
& -5.39, -2.47, -.24, 1.87, 5.05, 13.07, 22.37, 31.67, 40.98,
& -4.86, -1.83, .22, 2.78, 7.23, 17.49, 27.74, 38.00, 48.26,
& -4.25, -1.53, .50, 3.17, 8.52, 17.22, 25.91, 34.61, 43.30/
DATA((ALP115(J,N),N=1,9),J=14,26)/
& -4.58, -1.74, .25, 2.65, 7.36, 15.36, 23.36, 31.36, 39.36,
& -5.46, -2.51, -.21, 1.96, 5.65, 13.25, 21.10, 28.94, 36.78,
& -5.52, -2.97, -.63, 1.48, 4.62, 11.52, 19.52, 27.52, 35.52,
& -5.54, -2.97, -.72, 1.30, 4.14, 11.22, 19.91, 28.61, 37.30,
& -5.56, -2.98, -.70, 1.37, 4.38, 11.57, 20.09, 28.60, 37.11,
& -5.56, -2.98, -.67, 1.47, 4.63, 11.84, 20.00, 28.16, 36.33,
& -5.54, -2.97, -.64, 1.56, 4.90, 12.00, 19.69, 27.38, 35.08,
& -5.52, -2.97, -.61, 1.65, 5.18, 12.11, 19.38, 26.65, 33.93,
& -5.49, -2.96, -.57, 1.74, 5.42, 12.56, 19.96, 27.37, 34.78,
& -5.49, -2.96, -.54, 1.86, 5.65, 12.89, 20.30, 27.70, 35.11,
& -5.44, -2.84, -.32, 2.66, 7.30, 14.70, 22.11, 29.52, 36.93,
& -5.40, -2.71, -.10, 3.39, 8.71, 16.55, 24.39, 32.24, 40.08,
& -5.35, -2.59, .18, 3.92, 9.84, 18.00, 26.16, 34.33, 42.49/
DATA((ALP118(J,N),N=1,9),J=1,13)/
& -6.10, -3.26, -.59, 1.79, 4.94, 9.17, 13.52, 17.87, 22.22,
& -6.18, -3.17, -.49, 1.72, 4.77, 8.61, 12.53, 16.45, 20.37,
& -6.42, -3.08, -.47, 1.64, 4.46, 8.02, 11.98, 15.94, 19.90,
& -6.25, -2.92, -.47, 1.59, 4.26, 7.47, 10.98, 14.49, 18.00,
& -5.94, -2.71, -.52, 1.52, 3.99, 6.78, 10.32, 13.86, 17.40,
& -5.76, -2.61, -.52, 1.48, 3.94, 6.78, 10.59, 14.40, 18.21,
& -5.61, -2.51, -.51, 1.51, 4.14, 7.58, 12.02, 16.47, 20.91,
& -5.44, -2.24, -.45, 1.70, 4.81, 9.31, 13.91, 18.51, 23.10,
& -5.17, -1.96, -.21, 2.22, 6.44, 11.56, 16.69, 21.82, 26.95,
& -4.93, -1.77, .31, 3.17, 9.30, 16.70, 24.11, 31.52, 38.93,
& -4.69, -1.52, .99, 4.57, 14.40, 25.83, 37.26, 48.69, 60.11,
& -4.48, -1.36, 1.33, 4.83, 17.14, 31.43, 45.71, 60.00, 74.29,
& -4.34, -1.64, .93, 3.87, 16.17, 33.57, 50.96, 68.35, 85.74/
DATA((ALP118(J,N),N=1,9),J=14,26)/
& -4.73, -2.12, .28, 2.83, 10.72, 26.72, 42.72, 58.72, 74.72,
& -5.09, -2.61, -.27, 1.90, 6.22, 21.04, 35.85, 50.67, 65.48,
& -5.46, -2.83, -.48, 1.66, 5.49, 16.65, 28.41, 40.18, 51.94,
& -5.71, -2.91, -.46, 1.74, 5.69, 16.80, 28.23, 39.66, 51.09,

```

&	-5.73,	-2.92,	-.44,	1.81,	5.88,	17.53,	29.29,	41.06,	52.82,
&	-5.69,	-2.87,	-.40,	1.90,	6.23,	17.66,	29.09,	40.51,	51.94,
&	-5.65,	-2.83,	-.37,	1.99,	6.65,	18.41,	30.18,	41.94,	53.71,
&	-5.61,	-2.79,	-.34,	2.12,	7.09,	18.51,	29.94,	41.37,	52.80,
&	-5.56,	-2.75,	-.31,	2.25,	7.44,	18.56,	29.67,	40.78,	51.89,
&	-5.57,	-2.74,	-.28,	2.37,	7.83,	18.94,	30.06,	41.17,	52.28,
&	-5.51,	-2.69,	-.11,	2.91,	10.00,	20.81,	31.62,	42.43,	53.24,
&	-5.42,	-2.68,	.10,	3.51,	12.18,	23.94,	35.71,	47.47,	59.24,
&	-5.45,	-2.61,	.23,	3.94,	13.76,	25.88,	38.00,	50.12,	62.24/

DATA((ALP121(J,N),N=1,9),J=1,13)/

&	-4.06,	-2.24,	-.20,	2.29,	6.42,	12.48,	18.55,	24.61,	30.67,
&	-4.08,	-2.24,	-.20,	2.29,	6.33,	10.98,	15.63,	20.28,	24.93,
&	-4.09,	-2.27,	-.21,	2.19,	6.04,	9.92,	13.81,	17.69,	21.57,
&	-4.17,	-2.31,	-.27,	2.06,	5.76,	9.00,	12.23,	15.45,	18.68,
&	-4.23,	-2.43,	-.35,	1.88,	5.20,	8.91,	12.80,	16.68,	20.56,
&	-4.26,	-2.49,	-.34,	1.89,	5.32,	10.07,	15.01,	19.95,	24.89,
&	-4.31,	-2.57,	-.20,	2.28,	6.07,	12.97,	19.86,	26.76,	33.66,
&	-4.21,	-2.44,	.21,	3.23,	8.47,	14.35,	20.24,	26.12,	32.00,
&	-4.09,	-2.20,	.74,	4.90,	12.26,	19.81,	27.36,	34.91,	42.45,
&	-3.82,	-1.84,	1.43,	7.76,	19.88,	32.00,	44.12,	56.24,	68.36,
&	-3.66,	-1.79,	1.86,	9.90,	28.95,	48.00,	67.05,	86.10,	105.14,
&	-3.83,	-2.10,	1.31,	7.50,	27.50,	47.50,	67.50,	87.50,	107.50,
&	-4.24,	-2.56,	-.09,	3.85,	16.52,	31.33,	46.15,	60.96,	75.78/

DATA((ALP121(J,N),N=1,9),J=14,26)/

&	-4.84,	-3.07,	-1.09,	2.16,	13.88,	37.41,	60.94,	84.47,	108.00,
&	-5.41,	-3.50,	-1.49,	1.58,	8.96,	26.35,	43.74,	61.13,	78.52,
&	-5.34,	-3.50,	-1.54,	1.66,	8.47,	21.80,	35.13,	48.47,	61.80,
&	-5.29,	-3.46,	-1.50,	1.80,	9.04,	23.85,	38.67,	53.48,	68.30,
&	-5.24,	-3.40,	-1.40,	1.96,	9.38,	23.17,	36.97,	50.76,	64.55,
&	-5.20,	-3.34,	-1.31,	2.09,	9.80,	23.13,	36.47,	49.80,	63.13,
&	-5.15,	-3.28,	-1.22,	2.25,	10.19,	23.10,	36.00,	48.90,	61.81,
&	-5.11,	-3.21,	-1.13,	2.40,	10.50,	23.00,	35.50,	48.00,	60.50,
&	-5.06,	-3.15,	-1.04,	2.57,	10.85,	22.97,	35.09,	47.21,	59.33,
&	-5.01,	-3.08,	-.95,	2.75,	11.18,	22.94,	34.71,	46.47,	58.24,
&	-5.07,	-2.82,	-.53,	3.70,	14.19,	26.69,	39.19,	51.69,	64.19,
&	-4.96,	-2.61,	-.24,	4.71,	16.44,	28.94,	41.44,	53.94,	66.44,
&	-4.81,	-2.55,	-.03,	5.78,	19.00,	32.33,	45.67,	59.00,	72.33/

DATA((CD104(I,J),J=1,26),I=1,5)/

1	.0049,	.0050,	.0050,	.0050,	.0050,	.0050,	.0050,	.0050,	.0050,
1	.0050,	.0051,	.0051,	.0054,	.0073,	.0146,	.0185,	.0224,	.0256,
1	.0274,	.0285,	.0285,	.0282,	.0275,	.0224,	.0174,	.0149,	
2	.0049,	.0050,	.0050,	.0050,	.0050,	.0050,	.0050,	.0050,	.0050,
2	.0050,	.0050,	.0053,	.0067,	.0114,	.0161,	.0190,	.0216,	.0236,
2	.0252,	.0268,	.0275,	.0280,	.0285,	.0291,	.0275,	.0245,	
3	.0079,	.0075,	.0073,	.0072,	.0072,	.0072,	.0072,	.0072,	.0072,
3	.0072,	.0073,	.0082,	.0108,	.0169,	.0236,	.0274,	.0301,	.0325,
3	.0341,	.0356,	.0370,	.0380,	.0390,	.0458,	.0523,	.0585,	
4	.0334,	.0247,	.0199,	.0181,	.0173,	.0172,	.0176,	.0185,	.0211,
4	.0239,	.0266,	.0309,	.0364,	.0418,	.0475,	.0534,	.0592,	.0651,
4	.0700,	.0749,	.0798,	.0841,	.0874,	.1019,	.1114,	.1176,	
5	.0569,	.0409,	.0335,	.0306,	.0297,	.0296,	.0302,	.0313,	.0335,
5	.0401,	.0486,	.0571,	.0669,	.0780,	.0891,	.1002,	.1114,	.1226,
5	.1306,	.1385,	.1465,	.1526,	.1568,	.1807,	.1979,	.2068/	

DATA((CD106(I,J),J=1,26),I=1,5)/

1	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,
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1	.0055,	.0059,	.0071,	.0094,	.0149,	.0210,	.0269,	.0318,	.0346,
1	.0355,	.0360,	.0363,	.0363,	.0363,	.0320,	.0282,	.0247,	
2	.0052,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,
2	.0055,	.0060,	.0071,	.0104,	.0163,	.0228,	.0285,	.0327,	.0354,
2	.0367,	.0380,	.0387,	.0395,	.0399,	.0401,	.0374,	.0343,	
3	.0088,	.0076,	.0075,	.0075,	.0075,	.0075,	.0075,	.0075,	.0075,
3	.0077,	.0085,	.0104,	.0148,	.0216,	.0283,	.0344,	.0380,	.0410,
3	.0431,	.0447,	.0463,	.0478,	.0492,	.0573,	.0640,	.0700,	
4	.0282,	.0185,	.0146,	.0128,	.0120,	.0118,	.0122,	.0126,	.0140,
4	.0169,	.0244,	.0318,	.0392,	.0467,	.0541,	.0627,	.0734,	.0813,
4	.0871,	.0911,	.0950,	.0989,	.1019,	.1155,	.1226,	.1287,	
5	.0514,	.0370,	.0303,	.0294,	.0290,	.0295,	.0302,	.0324,	.0367,
5	.0432,	.0545,	.0676,	.0806,	.0968,	.1136,	.1304,	.1415,	.1523,
5	.1606,	.1668,	.1730,	.1790,	.1842,	.2094,	.2270,	.2449/	

DATA((CD109(I,J),J=1,26),I=1,5)/

1	.0055,	.0055,	.0055,	.0056,	.0057,	.0058,	.0060,	.0062,	.0064,
1	.0066,	.0071,	.0081,	.0147,	.0220,	.0286,	.0348,	.0400,	.0434,
1	.0466,	.0489,	.0512,	.0532,	.0535,	.0539,	.0491,	.0433,	
2	.0061,	.0060,	.0060,	.0060,	.0060,	.0061,	.0063,	.0065,	.0066,
2	.0070,	.0075,	.0084,	.0155,	.0233,	.0301,	.0364,	.0418,	.0451,
2	.0482,	.0501,	.0521,	.0538,	.0543,	.0546,	.0527,	.0485,	
3	.0091,	.0089,	.0088,	.0088,	.0088,	.0087,	.0087,	.0089,	.0090,
3	.0098,	.0118,	.0185,	.0260,	.0342,	.0424,	.0501,	.0538,	.0576,
3	.0601,	.0627,	.0652,	.0663,	.0674,	.0717,	.0765,	.0788,	
4	.0200,	.0164,	.0146,	.0141,	.0141,	.0147,	.0153,	.0166,	.0188,
4	.0245,	.0301,	.0365,	.0482,	.0599,	.0714,	.0821,	.0922,	.0985,
4	.1047,	.1098,	.1149,	.1198,	.1226,	.1307,	.1322,	.1336,	
5	.0384,	.0305,	.0264,	.0249,	.0242,	.0246,	.0260,	.0292,	.0390,
5	.0489,	.0590,	.0723,	.0856,	.0988,	.1107,	.1226,	.1345,	.1464,
5	.1533,	.1595,	.1657,	.1719,	.1775,	.1927,	.1987,	.1934/	

DATA((CD112(I,J),J=1,26),I=1,5)/

1	.0060,	.0060,	.0060,	.0060,	.0060,	.0060,	.0060,	.0060,	.0060,
1	.0067,	.0081,	.0143,	.0255,	.0368,	.0481,	.0564,	.0642,	.0694,
1	.0745,	.0765,	.0786,	.0798,	.0802,	.0814,	.0784,	.0704,	
2	.0072,	.0072,	.0071,	.0071,	.0071,	.0071,	.0071,	.0071,	.0074,
2	.0081,	.0104,	.0168,	.0268,	.0366,	.0448,	.0521,	.0591,	.0649,
2	.0695,	.0741,	.0777,	.0797,	.0817,	.0851,	.0839,	.0777,	
3	.0110,	.0111,	.0112,	.0112,	.0113,	.0113,	.0115,	.0120,	.0128,
3	.0147,	.0220,	.0301,	.0389,	.0475,	.0559,	.0630,	.0695,	.0756,
3	.0803,	.0851,	.0896,	.0926,	.0957,	.1074,	.1090,	.1102,	
4	.0200,	.0198,	.0197,	.0196,	.0196,	.0196,	.0198,	.0204,	.0243,
4	.0366,	.0489,	.0616,	.0747,	.0862,	.0977,	.1080,	.1157,	.1234,
4	.1312,	.1361,	.1398,	.1436,	.1473,	.1597,	.1648,	.1671,	
5	.0324,	.0302,	.0283,	.0283,	.0290,	.0297,	.0318,	.0374,	.0535,
5	.0712,	.0887,	.1062,	.1225,	.1380,	.1536,	.1688,	.1820,	.1952,
5	.2084,	.2215,	.2294,	.2373,	.2452,	.2679,	.2759,	.2868/	

DATA((CD115(I,J),J=1,26),I=1,5)/

1	.0070,	.0070,	.0070,	.0070,	.0070,	.0070,	.0070,	.0070,	.0076,
1	.0142,	.0242,	.0364,	.0482,	.0595,	.0704,	.0812,	.0920,	.1005,
1	.1082,	.1158,	.1200,	.1240,	.1252,	.1225,	.1123,	.1023,	
2	.0083,	.0082,	.0081,	.0081,	.0081,	.0082,	.0084,	.0094,	.0114,
2	.0195,	.0309,	.0412,	.0520,	.0624,	.0723,	.0808,	.0892,	.0974,
2	.1049,	.1116,	.1168,	.1220,	.1247,	.1259,	.1169,	.1058,	
3	.0153,	.0154,	.0154,	.0153,	.0153,	.0153,	.0154,	.0164,	.0206,
3	.0295,	.0399,	.0508,	.0610,	.0706,	.0803,	.0900,	.0993,	.1076,

```

3 .1158, .1208, .1257, .1300, .1332, .1380, .1329, .1258,
4 .0220, .0238, .0247, .0251, .0255, .0258, .0274, .0340, .0457,
4 .0579, .0703, .0826, .0949, .1070, .1187, .1288, .1373, .1456,
4 .1533, .1610, .1673, .1713, .1752, .1827, .1785, .1711,
5 .0328, .0334, .0343, .0349, .0362, .0385, .0469, .0603, .0760,
5 .0934, .1108, .1281, .1459, .1638, .1800, .1949, .2098, .2219,
5 .2324, .2429, .2501, .2553, .2604, .2716, .2743, .2771/

```

```
DATA((CD118(I,J),J=1,26),I=1,5)/
```

```

1 .0084, .0094, .0099, .0101, .0104, .0105, .0108, .0129, .0202,
1 .0317, .0432, .0542, .0646, .0751, .0848, .0942, .1035, .1129,
1 .1195, .1240, .1284, .1328, .1373, .1443, .1451, .1451,
2 .0085, .0099, .0107, .0111, .0114, .0116, .0120, .0151, .0255,
2 .0358, .0468, .0591, .0712, .0818, .0923, .1023, .1112, .1202,
2 .1292, .1333, .1371, .1410, .1449, .1506, .1512, .1518,
3 .0165, .0192, .0206, .0213, .0219, .0223, .0231, .0257, .0364,
3 .0488, .0610, .0733, .0855, .0959, .1053, .1146, .1240, .1309,
3 .1368, .1427, .1486, .1545, .1605, .1679, .1700, .1700,
4 .0264, .0341, .0380, .0399, .0419, .0430, .0450, .0579, .0715,
4 .0856, .0998, .1139, .1281, .1399, .1507, .1615, .1713, .1791,
4 .1862, .1930, .1976, .2022, .2068, .2171, .2198, .2182,
5 .0396, .0511, .0568, .0597, .0625, .0640, .0679, .0857, .1084,
5 .1308, .1527, .1746, .1964, .2183, .2365, .2515, .2665, .2815,
5 .2965, .3050, .3085, .3120, .3155, .3206, .3244, .3282/

```

```
DATA((CD121(I,J),J=1,26),I=1,5)/
```

```

1 .0092, .0107, .0114, .0118, .0123, .0129, .0138, .0164, .0256,
1 .0372, .0500, .0634, .0756, .0882, .1010, .1138, .1246, .1351,
1 .1455, .1530, .1605, .1680, .1717, .1780, .1780, .1780,
2 .0109, .0125, .0133, .0137, .0141, .0146, .0156, .0199, .0295,
2 .0427, .0555, .0681, .0808, .0938, .1069, .1194, .1314, .1434,
2 .1525, .1605, .1685, .1750, .1782, .1842, .1842, .1842,
3 .0211, .0234, .0246, .0252, .0257, .0263, .0282, .0355, .0496,
3 .0626, .0761, .0897, .1027, .1156, .1285, .1401, .1515, .1628,
3 .1715, .1778, .1842, .1905, .1950, .2029, .2047, .2064,
4 .0433, .0485, .0511, .0528, .0560, .0592, .0658, .0777, .0939,
4 .1088, .1225, .1362, .1500, .1639, .1778, .1898, .2001, .2105,
4 .2195, .2269, .2343, .2410, .2461, .2581, .2557, .2533,
5 .0661, .0696, .0714, .0722, .0807, .0988, .1165, .1337, .1508,
5 .1684, .1863, .2041, .2219, .2389, .2554, .2719, .2884, .2982,
5 .3047, .3112, .3177, .3218, .3256, .3390, .3340, .3291/

```

```
DATA(XMI(J),J=1,26)/.3,.5,.6,.65,.7,.725,.75,.775,
```

```
& .8,.825,.85,.875,.9,.925,.95,.975,1.0,1.025,1.05,1.075,
```

```
&1.1,1.125,1.15,1.3,1.45,1.6/
```

```
DATA(CLI(J),J=1,9)/-.4,-.2,0.0,.2,.4,.6,.8,1.0,1.2/
```

```
DATA(ALPI(J),J=1,7)/-4.0,-2.0,0.0,2.0,4.0,6.0,8.0/
```

```
DATA(CLII(J),J=1,5)/0.0,.2,.4,.6,.8/
```

```
IORDER(1)=IORDER(2)=1
```

```
IPT (1) = -1
```

```
IF (IKEY .EQ. 2) GO TO 1000
```

```
IF (TR .LT. .04) GO TO 9
```

```
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 1
```

```
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 2
```

```
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 3
```

```
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 4
```

```
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 5
```

```
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 6
```

```

IF (TR .GE. .21) GO TO 7
9 CALL IBI (7,ALPI,26,XMI,7,CL104,IORDER,IPT,AA,XM,CLFT04,IERR)
  CL=CLFT04
  GO TO 400
1 CALL IBI (7,ALPI,26,XMI,7,CL104,IORDER,IPT,AA,XM,CLFT04,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL106,IORDER,IPT,AA,XM,CLFT06,IERR)
  CL=CLFT04 + (CLFT06-CLFT04)*((TR-.04)/(.06-.04))
  GO TO 400
2 CALL IBI (7,ALPI,26,XMI,7,CL106,IORDER,IPT,AA,XM,CLFT06,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL109,IORDER,IPT,AA,XM,CLFT09,IERR)
  CL=CLFT06 + (CLFT09 - CLFT06)*((TR-.06)/(.09-.06))
  GO TO 400
3 CALL IBI (7,ALPI,26,XMI,7,CL109,IORDER,IPT,AA,XM,CLFT09,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL112,IORDER,IPT,AA,XM,CLFT12,IERR)
  CL=CLFT09+(CLFT12-CLFT09)*((TR-.09)/(.12-.09))
  GO TO 400
4 CALL IBI (7,ALPI,26,XMI,7,CL112,IORDER,IPT,AA,XM,CLFT12,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL115,IORDER,IPT,AA,XM,CLFT15,IERR)
  CL=CLFT12 + (CLFT15-CLFT12)*((TR-.12)/(.15-.12))
  GO TO 400
5 CALL IBI (7,ALPI,26,XMI,7,CL115,IORDER,IPT,AA,XM,CLFT15,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL118,IORDER,IPT,AA,XM,CLFT18,IERR)
  CL=CLFT15+(CLFT18-CLFT15)*((TR-.15)/(.18-.15))
  GO TO 400
6 CALL IBI (7,ALPI,26,XMI,7,CL118,IORDER,IPT,AA,XM,CLFT18,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL121,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT18+(CLFT21-CLFT18)*((TR-.18)/(.21-.18))
  GO TO 400
7 CALL IBI (7,ALPI,26,XMI,7,CL121,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT21
  GO TO 400
1000 CONTINUE
  IPT (1)=-1
  IF (TR .LT. .04) GO TO 90
  IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 10
  IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 20
  IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 30
  IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 40
  IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 50
  IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 60
  IF (TR .GE. .21) GO TO 70
90 CALL IBI (26,XMI,9,CLI,26,ALP104,IORDER,IPT,XM,CL,AA04,IERR)
  AA=AA04
  GO TO 400
10 CALL IBI (26,XMI,9,CLI,26,ALP104,IORDER,IPT,XM,CL,AA04,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP106,IORDER,IPT,XM,CL,AA06,IERR)
  AA=AA04 + (AA06-AA04)*((TR-.04)/(.06-.04))
  GO TO 400

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20 CALL IBI (26,XMI,9,CLI,26,ALP106,IORDER,IPT,XM,CL,AA06,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP109,IORDER,IPT,XM,CL,AA09,IERR)
   AA=AA06 + (AA09 - AA06)*((TR-.06)/(.09-.06))
   GO TO 400
30 CALL IBI (26,XMI,9,CLI,26,ALP109,IORDER,IPT,XM,CL,AA09,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP112,IORDER,IPT,XM,CL,AA12,IERR)
   AA=AA09+(AA12-AA09)*((TR-.09)/(.12-.09))
   GO TO 400
40 CALL IBI (26,XMI,9,CLI,26,ALP112,IORDER,IPT,XM,CL,AA12,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP115,IORDER,IPT,XM,CL,AA15,IERR)
   AA=AA12+(AA15-AA12)*((TR-.12)/(.15-.12))
   GO TO 400
50 CALL IBI (26,XMI,9,CLI,26,ALP115,IORDER,IPT,XM,CL,AA15,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP118,IORDER,IPT,XM,CL,AA18,IERR)
   AA=AA15+(AA18-AA15)*((TR-.15)/(.18-.15))
60 CALL IBI (26,XMI,9,CLI,26,ALP118,IORDER,IPT,XM,CL,AA18,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP121,IORDER,IPT,XM,CL,AA21,IERR)
   AA=AA18+(AA21-AA18)*((TR-.18)/(.21-.18))
   GO TO 400
70 CALL IBI (26,XMI,9,CLI,26,ALP121,IORDER,IPT,XM,CL,AA21,IERR)
   AA=AA21
400 CONTINUE
   IPT (1)=-1
   IF (TR .LT. .04) GO TO 91
   IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 11
   IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 21
   IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 31
   IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 41
   IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 51
   IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 61
   IF (TR .GE. .21) GO TO 71
91 CALL IBI (5,CLII,26,XMI,5,CD104,IORDER,IPT,CL,XM,CDRG04,IERR)
   CD=CDRG04
   WRITE (6,201) TR
201 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
   &*/ * THE VALUES FOR T/C=.04 HAVE BEEN RETURNED*)
   GO TO 250
11 CALL IBI (5,CLII,26,XMI,5,CD104,IORDER,IPT,CL,XM,CDRG04,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD106,IORDER,IPT,CL,XM,CDRG06,IERR)
   CD=CDRG04 + (CDRG06-CDRG04)*((TR-.04)/(.06-.04))
   GO TO 250
21 CALL IBI (5,CLII,26,XMI,5,CD106,IORDER,IPT,CL,XM,CDRG06,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD109,IORDER,IPT,CL,XM,CDRG09,IERR)
   CD=CDRG06 + (CDRG09 - CDRG06)*((TR-.06)/(.09-.06))
   GO TO 250
31 CALL IBI (5,CLII,26,XMI,5,CD109,IORDER,IPT,CL,XM,CDRG09,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD112,IORDER,IPT,CL,XM,CDRG12,IERR)

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      CD=CDRG09+(CDRG12-CDRG09)*((TR-.09)/(.12-.09))
      GO TO 250
41  CALL IBI (5,CLII,26,XMI,5,CD112,IORDER,IPT,CL,XM,CDRG12,IERR)
      IPT (1)=-1
      CALL IBI (5,CLII,26,XMI,5,CD115,IORDER,IPT,CL,XM,CDRG15,IERR)
      CD=CDRG12 + (CDRG15-CDRG12)*((TR-.12)/(.15-.12))
      GO TO 250
51  CALL IBI (5,CLII,26,XMI,5,CD115,IORDER,IPT,CL,XM,CDRG15,IERR)
      IPT (1)=-1
      CALL IBI (5,CLII,26,XMI,5,CD118,IORDER,IPT,CL,XM,CDRG18,IERR)
      CD=CDRG15+(CDRG18-CDRG15)*((TR-.15)/(.18-.15))
      GO TO 250
61  CALL IBI (5,CLII,26,XMI,5,CD118,IORDER,IPT,CL,XM,CDRG18,IERR)
      IPT (1)=-1
      CALL IBI (5,CLII,26,XMI,5,CD121,IORDER,IPT,CL,XM,CDRG21,IERR)
      CD=CDRG18+(CDRG21-CDRG18)*((TR-.18)/(.21-.18))
      GO TO 250
71  CALL IBI (5,CLII,26,XMI,5,CD121,IORDER,IPT,CL,XM,CDRG21,IERR)
      CD=CDRG21
      IF (TR .GT. .21) WRITE(6,204) TR
204  FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
      &*/ * THE VALUES FOR T/C=.21 HAVE BEEN RETURNED.*)
250  IF(CL .GT. .8) GO TO 251
      RETURN
251  CALL COMPUT(D,XM,ALT,COR,TR,AA,CDT,CL,CD,CLDES)
      CD=CDT
      RETURN
      END

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      SUBROUTINE AERO2(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)

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C
C
C THIS SUBROUTINE IS DESIGNED TO COMPUTE THE AIRFOIL
C CHARACTERISTICS FOR A 16 SERIES AIRFOIL WITH A GIVEN CAMBER.
C
C THIS SUBROUTINE RELATES CL,CD,CL/CD,MACH,T/C,AND ALPHA.
C IT REPRESENTS THE DATA OF A 16-2XX AIRFOIL.
C
C XM=RELATIVE MACH NO. AT BLADE ELEMENT
C AA=ANGLE OF ATTACK IN DEGREES
C IKEY1: CL=CL(MACH,ALPHA,T/C)
C       : CD=CD(MACH,CL,T/C)
C       : XLD=CL/CD
C IKEY2: ALPHA=ALPHA(MACH,CL,T/C)
C       : CD=CD(MACH,CL,T/C)
C       : XLD=CL/CD
C TR=T/C
C
C
C
C
      DIMENSION IORDER(2),IPT(2),ALP204(26,9),ALP206(26,9),
      & ALP209(26,9),ALP212(26,9),ALP215(26,9),ALP218(26,9),

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& ALP221(26,9), CLI(9), XMI(26), ALPI(7), CL204(7,26),
 & CL206(7,26), CL209(7,26), CL212(7,26), CL215(7,26),
 & CL218(7,26), CL221(7,26), CD204(5,26), CD206(5,26),
 & CD209(5,26), CD212(5,26), CD215(5,26), CD218(5,26),
 & CD221(5,26), CLII(5)

DATA((CL204(I,J),J=1,26),I=1,4)/

1	-.232,	-.237,	-.238,	-.237,	-.235,	-.234,	-.234,	-.233,	-.232,
1	-.230,	-.220,	-.203,	-.181,	-.159,	-.144,	-.148,	-.165,	-.176,
1	-.171,	-.165,	-.160,	-.157,	-.162,	-.256,	-.262,	-.262,	
2	-.019,	-.025,	-.028,	-.031,	-.034,	-.036,	-.037,	-.038,	-.036,
2	-.032,	-.019,	.005,	.029,	.054,	.066,	.056,	.036,	.021,
2	.027,	.035,	.043,	.047,	.036,	-.124,	-.151,	-.153,	
3	.188,	.196,	.213,	.224,	.236,	.242,	.250,	.257,	.265,
3	.273,	.281,	.291,	.302,	.310,	.309,	.281,	.255,	.236,
3	.247,	.265,	.285,	.289,	.277,	.098,	-.006,	-.015,	
4	.412,	.427,	.450,	.462,	.479,	.488,	.497,	.507,	.516,
4	.526,	.538,	.550,	.553,	.545,	.529,	.512,	.494,	.489,
4	.499,	.517,	.533,	.540,	.508,	.286,	.137,	.106/	

DATA((CL204(I,J),J=1,26),I=5,7)/

5	.596,	.629,	.668,	.693,	.727,	.744,	.761,	.780,	.791,
5	.791,	.781,	.770,	.757,	.740,	.724,	.714,	.705,	.703,
5	.711,	.725,	.749,	.764,	.730,	.456,	.277,	.214,	
6	.784,	.827,	.868,	.894,	.935,	.955,	.973,	.980,	.970,
6	.958,	.945,	.932,	.917,	.902,	.886,	.871,	.856,	.849,
6	.860,	.881,	.906,	.918,	.884,	.609,	.402,	.319,	
7	.922,	.973,	1.040,	1.085,	1.111,	1.106,	1.099,	1.085,	1.071,
7	1.057,	1.043,	1.029,	1.014,	1.000,	.987,	.977,	.971,	.971,
7	.977,	.996,	1.022,	1.034,	.999,	.744,	.535,	.430/	

DATA((CL206(I,J),J=1,26),I=1,4)/

1	-.206,	-.206,	-.206,	-.206,	-.206,	-.206,	-.206,	-.207,	-.208,
1	-.209,	-.209,	-.211,	-.212,	-.222,	-.258,	-.303,	-.333,	-.307,
1	-.277,	-.261,	-.249,	-.256,	-.271,	-.323,	-.284,	-.224,	
2	-.015,	-.021,	-.024,	-.025,	-.023,	-.023,	-.022,	-.023,	-.023,
2	-.024,	-.025,	-.025,	-.025,	-.041,	-.086,	-.135,	-.141,	-.118,
2	-.094,	-.075,	-.069,	-.082,	-.097,	-.157,	-.136,	-.114,	
3	.172,	.183,	.200,	.209,	.219,	.224,	.229,	.234,	.239,
3	.249,	.258,	.268,	.266,	.237,	.199,	.164,	.160,	.181,
3	.206,	.226,	.227,	.211,	.191,	.069,	-.015,	-.025,	
4	.376,	.403,	.427,	.447,	.467,	.478,	.489,	.500,	.512,
4	.523,	.535,	.523,	.496,	.462,	.427,	.406,	.406,	.424,
4	.448,	.472,	.474,	.448,	.414,	.220,	.115,	.096/	

DATA((CL206(I,J),J=1,26),I=5,7)/

5	.564,	.617,	.658,	.681,	.711,	.729,	.746,	.758,	.755,
5	.744,	.719,	.694,	.669,	.644,	.619,	.597,	.592,	.610,
5	.640,	.664,	.664,	.635,	.598,	.391,	.255,	.203,	
6	.736,	.793,	.840,	.878,	.915,	.931,	.938,	.922,	.899,
6	.875,	.852,	.829,	.805,	.782,	.759,	.737,	.740,	.758,
6	.786,	.804,	.801,	.783,	.749,	.547,	.404,	.315,	
7	.864,	.930,	.999,	1.035,	1.071,	1.074,	1.060,	1.041,	1.022,
7	1.003,	.979,	.954,	.929,	.904,	.879,	.854,	.847,	.865,
7	.896,	.920,	.917,	.892,	.862,	.685,	.528,	.430/	

DATA((CL209(I,J),J=1,26),I=1,4)/

1	-.174,	-.183,	-.183,	-.183,	-.193,	-.199,	-.206,	-.217,	-.229,
1	-.241,	-.254,	-.268,	-.282,	-.295,	-.306,	-.287,	-.253,	-.231,
1	-.214,	-.220,	-.226,	-.232,	-.236,	-.258,	-.264,	-.264,	

2	-.012,	-.012,	-.012,	-.012,	-.018,	-.022,	-.027,	-.032,	-.037,
2	-.049,	-.060,	-.072,	-.084,	-.105,	-.120,	-.102,	-.068,	-.035,
2	-.021,	-.024,	-.038,	-.049,	-.061,	-.107,	-.132,	-.141,	
3	.153,	.159,	.169,	.174,	.183,	.188,	.194,	.202,	.210,
3	.218,	.221,	.201,	.154,	.107,	.060,	.064,	.099,	.140,
3	.162,	.157,	.142,	.124,	.107,	.010,	-.025,	-.025,	
4	.351,	.379,	.403,	.416,	.434,	.442,	.451,	.465,	.478,
4	.474,	.450,	.394,	.339,	.283,	.255,	.269,	.301,	.337,
4	.356,	.342,	.318,	.293,	.269,	.156,	.109,	.092/	
DATA((CL209(I,J),J=1,26),I=5,7)/									
5	.522,	.552,	.584,	.603,	.629,	.645,	.661,	.678,	.670,
5	.631,	.591,	.550,	.509,	.468,	.432,	.435,	.479,	.517,
5	.530,	.516,	.490,	.464,	.438,	.316,	.247,	.204,	
6	.697,	.736,	.788,	.819,	.855,	.871,	.858,	.828,	.797,
6	.767,	.723,	.678,	.634,	.590,	.567,	.583,	.622,	.657,
6	.676,	.663,	.642,	.618,	.593,	.468,	.377,	.308,	
7	.817,	.870,	.930,	.972,	1.007,	.992,	.968,	.935,	.902,
7	.860,	.817,	.775,	.732,	.684,	.653,	.660,	.698,	.737,
7	.758,	.748,	.730,	.710,	.689,	.585,	.498,	.420/	
DATA((CL212(I,J),J=1,26),I=1,4)/									
1	-.207,	-.203,	-.201,	-.198,	-.195,	-.194,	-.192,	-.192,	-.197,
1	-.220,	-.258,	-.335,	-.410,	-.443,	-.409,	-.333,	-.280,	-.260,
1	-.270,	-.280,	-.289,	-.298,	-.306,	-.342,	-.359,	-.364,	
2	-.024,	-.021,	-.021,	-.020,	-.017,	-.015,	-.013,	-.010,	-.011,
2	-.023,	-.052,	-.123,	-.202,	-.239,	-.212,	-.171,	-.130,	-.098,
2	-.110,	-.120,	-.130,	-.141,	-.150,	-.197,	-.217,	-.220,	
3	.142,	.149,	.164,	.172,	.182,	.186,	.191,	.196,	.198,
3	.187,	.151,	.081,	.012,	-.023,	.001,	.045,	.088,	.115,
3	.106,	.096,	.085,	.075,	.064,	.011,	-.020,	-.028,	
4	.328,	.346,	.359,	.368,	.378,	.387,	.395,	.404,	.399,
4	.361,	.312,	.253,	.196,	.162,	.185,	.230,	.274,	.297,
4	.284,	.269,	.255,	.241,	.227,	.157,	.107,	.080/	
DATA((CL212(I,J),J=1,26),I=5,7)/									
5	.476,	.505,	.527,	.540,	.561,	.571,	.584,	.599,	.571,
5	.507,	.444,	.381,	.323,	.302,	.337,	.385,	.429,	.442,
5	.430,	.415,	.401,	.386,	.372,	.292,	.233,	.185,	
6	.613,	.653,	.700,	.726,	.758,	.780,	.779,	.739,	.682,
6	.626,	.570,	.514,	.460,	.443,	.476,	.517,	.556,	.573,
6	.562,	.547,	.531,	.515,	.500,	.417,	.349,	.301,	
7	.743,	.791,	.839,	.871,	.910,	.903,	.852,	.795,	.738,
7	.680,	.623,	.566,	.514,	.499,	.533,	.578,	.622,	.639,
7	.629,	.619,	.608,	.598,	.588,	.525,	.474,	.424/	
DATA((CL215(I,J),J=1,26),I=1,4)/									
1	-.212,	-.217,	-.227,	-.231,	-.239,	-.243,	-.247,	-.253,	-.284,
1	-.340,	-.417,	-.505,	-.519,	-.492,	-.419,	-.311,	-.239,	-.248,
1	-.249,	-.250,	-.251,	-.253,	-.254,	-.260,	-.265,	-.270,	
2	-.046,	-.052,	-.058,	-.062,	-.067,	-.070,	-.073,	-.079,	-.109,
2	-.166,	-.234,	-.297,	-.321,	-.301,	-.238,	-.118,	-.073,	-.078,
2	-.083,	-.088,	-.092,	-.095,	-.097,	-.110,	-.120,	-.131,	
3	.106,	.116,	.121,	.123,	.130,	.135,	.139,	.137,	.124,
3	.088,	.020,	-.077,	-.114,	-.081,	-.022,	.034,	.061,	.064,
3	.060,	.055,	.050,	.046,	.041,	.012,	-.004,	-.011,	
4	.288,	.309,	.324,	.334,	.343,	.348,	.353,	.349,	.332,
4	.276,	.174,	.090,	.075,	.109,	.178,	.236,	.249,	.239,
4	.229,	.220,	.212,	.204,	.196,	.154,	.120,	.096/	

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DATA((CL215(I,J),J=1,26),I=5,7)/
5 .431, .458, .485, .503, .527, .537, .524, .496, .454,
5 .385, .307, .226, .196, .230, .295, .354, .378, .367,
5 .357, .346, .335, .326, .317, .268, .235, .213,
6 .554, .584, .617, .641, .685, .690, .671, .627, .555,
6 .474, .392, .313, .288, .330, .397, .452, .465, .457,
6 .448, .440, .432, .424, .416, .374, .347, .330,
7 .659, .695, .735, .766, .805, .798, .762, .687, .606,
7 .525, .444, .365, .347, .378, .448, .508, .527, .521,
7 .514, .508, .502, .496, .490, .461, .442, .434/
DATA((CL218(I,J),J=1,26),I=1,4)/
1 -.212, -.221, -.240, -.254, -.273, -.283, -.298, -.327, -.374,
1 -.421, -.463, -.490, -.473, -.410, -.339, -.286, -.274, -.273,
1 -.272, -.272, -.273, -.274, -.275, -.282, -.284, -.291,
2 -.058, -.058, -.065, -.072, -.080, -.087, -.101, -.150, -.203,
2 -.254, -.301, -.324, -.278, -.215, -.157, -.117, -.111, -.113,
2 -.114, -.115, -.117, -.118, -.119, -.129, -.137, -.137,
3 .093, .104, .112, .116, .122, .125, .115, .046, -.022,
3 -.091, -.152, -.182, -.153, -.076, .003, .034, .031, .028,
3 .025, .022, .019, .017, .015, .003, -.008, -.008,
4 .268, .276, .287, .293, .300, .299, .267, .208, .147,
4 .086, .026, -.012, .016, .098, .176, .208, .203, .197,
4 .192, .187, .182, .176, .171, .142, .116, .100/
DATA((CL218(I,J),J=1,26),I=5,7)/
5 .413, .425, .437, .445, .457, .452, .408, .346, .284,
5 .222, .160, .115, .142, .229, .305, .328, .321, .315,
5 .308, .302, .296, .289, .282, .244, .214, .192,
6 .504, .537, .565, .588, .623, .598, .524, .450, .375,
6 .301, .238, .203, .227, .310, .382, .415, .406, .398,
6 .390, .381, .373, .366, .359, .319, .288, .259,
7 .600, .639, .683, .713, .738, .685, .612, .525, .438,
7 .351, .273, .232, .255, .338, .418, .449, .441, .432,
7 .424, .415, .407, .399, .392, .350, .314, .281/
DATA((CL221(I,J),J=1,26),I=1,4)/
1 -.266, -.263, -.253, -.239, -.226, -.226, -.234, -.256, -.312,
1 -.372, -.434, -.421, -.339, -.257, -.213, -.210, -.216, -.223,
1 -.230, -.237, -.243, -.249, -.255, -.263, -.268, -.275,
2 -.111, -.115, -.102, -.086, -.065, -.059, -.072, -.107, -.164,
2 -.239, -.291, -.277, -.203, -.129, -.071, -.076, -.084, -.092,
2 -.101, -.109, -.117, -.126, -.135, -.167, -.167, -.167,
3 .069, .071, .072, .078, .087, .083, .069, .021, -.039,
3 -.124, -.176, -.154, -.054, .051, .084, .078, .070, .062,
3 .054, .046, .039, .031, .025, .000, -.006, -.007,
4 .239, .226, .233, .246, .250, .237, .196, .125, .054,
4 -.013, -.059, -.050, .048, .148, .178, .176, .169, .160,
4 .151, .141, .135, .128, .122, .095, .082, .072/
DATA((CL221(I,J),J=1,26),I=5,7)/
5 .370, .364, .374, .383, .387, .379, .344, .277, .185,
5 .101, .044, .061, .151, .257, .287, .286, .277, .269,
5 .260, .252, .243, .235, .228, .190, .168, .157,
6 .420, .433, .471, .498, .511, .479, .417, .337, .243,
6 .144, .115, .137, .230, .323, .357, .354, .344, .332,
6 .321, .314, .306, .299, .292, .256, .240, .223,
7 .495, .533, .586, .625, .622, .574, .482, .385, .287,
7 .190, .144, .159, .255, .358, .385, .381, .373, .366,

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7 .358, .351, .343, .336, .328, .288, .269, .253/
DATA((ALP204(J,N),N=1,9),J=1,13)/
& -5.58, -3.70, -1.82, .11, 1.89, 4.04, 6.23, 9.13, 12.03,
& -5.54, -3.65, -1.77, .03, 1.77, 3.71, 5.73, 8.37, 11.11,
& -5.54, -3.64, -1.77, -.11, 1.58, 3.38, 5.32, 7.53, 9.86,
& -5.58, -3.64, -1.76, -.19, 1.48, 3.19, 5.06, 7.11, 9.20,
& -5.64, -3.65, -1.75, -.27, 1.35, 2.98, 4.70, 6.74, 9.01,
& -5.68, -3.66, -1.74, -.30, 1.28, 2.88, 4.53, 6.60, 9.25,
& -5.69, -3.65, -1.74, -.35, 1.21, 2.78, 4.37, 6.43, 9.60,
& -5.71, -3.66, -1.74, -.39, 1.14, 2.68, 4.20, 6.38, 10.19,
& -5.71, -3.67, -1.76, -.43, 1.08, 2.61, 4.10, 6.59, 10.55,
& -5.72, -3.70, -1.79, -.48, 1.00, 2.56, 4.11, 6.85, 10.89,
& -5.79, -3.80, -1.87, -.54, .93, 2.51, 4.23, 7.12, 11.20,
& -5.89, -3.97, -2.05, -.64, .84, 2.45, 4.37, 7.40, 11.53,
& -6.09, -4.18, -2.28, -.75, .78, 2.46, 4.54, 7.71, 11.84/
DATA((ALP204(J,N),N=1,9),J=14,26)/
& -6.26, -4.38, -2.51, -.86, .77, 2.56, 4.74, 8.00, 12.08,
& -6.44, -4.53, -2.63, -.90, .83, 2.73, 4.94, 8.26, 12.22,
& -6.47, -4.51, -2.55, -.72, 1.03, 2.87, 5.10, 8.43, 12.21,
& -6.34, -4.35, -2.36, -.50, 1.21, 3.00, 5.26, 8.50, 11.98,
& -6.27, -4.24, -2.21, -.33, 1.30, 3.04, 5.33, 8.48, 11.75,
& -6.31, -4.29, -2.27, -.43, 1.21, 2.95, 5.19, 8.39, 11.81,
& -6.35, -4.35, -2.35, -.57, 1.07, 2.80, 4.96, 8.07, 11.55,
& -6.36, -4.39, -2.42, -.70, .93, 2.62, 4.65, 7.62, 11.07,
& -6.38, -4.42, -2.46, -.74, .88, 2.54, 4.47, 7.41, 10.86,
& -6.40, -4.38, -2.36, -.64, 1.06, 2.83, 4.91, 8.02, 11.50,
& -6.18, -3.15, -.88, 1.09, 3.34, 5.88, 8.83, 11.79, 14.76,
& -6.49, -2.88, .08, 2.90, 5.97, 8.98, 11.98, 14.99, 18.00,
& -6.53, -2.86, .25, 3.74, 7.46, 11.06, 14.67, 18.27, 21.87/
DATA((ALP206(J,N),N=1,9),J=1,13)/
& -6.03, -3.94, -1.84, .27, 2.26, 4.42, 7.00, 10.13, 13.25,
& -6.10, -3.94, -1.79, .15, 1.97, 3.84, 6.10, 9.02, 11.94,
& -6.13, -3.93, -1.79, 0.00, 1.76, 3.50, 5.56, 8.01, 10.53,
& -6.14, -3.93, -1.79, -.08, 1.61, 3.31, 5.21, 7.55, 10.10,
& -6.12, -3.93, -1.81, -.16, 1.46, 3.09, 4.87, 7.09, 9.65,
& -6.12, -3.93, -1.81, -.19, 1.39, 2.97, 4.70, 6.97, 9.76,
& -6.11, -3.93, -1.82, -.23, 1.32, 2.86, 4.56, 7.02, 10.30,
& -6.10, -3.92, -1.82, -.26, 1.25, 2.78, 4.51, 7.31, 10.67,
& -6.08, -3.91, -1.82, -.30, 1.18, 2.72, 4.63, 7.64, 10.89,
& -6.06, -3.90, -1.82, -.36, 1.10, 2.70, 4.85, 7.95, 11.08,
& -6.08, -3.90, -1.82, -.41, 1.03, 2.71, 5.22, 8.33, 11.48,
& -6.03, -3.88, -1.83, -.46, 1.04, 2.90, 5.57, 8.74, 11.94,
& -6.01, -3.87, -1.83, -.45, 1.17, 3.20, 5.93, 9.15, 12.37/
DATA((ALP206(J,N),N=1,9),J=14,26)/
& -5.97, -3.76, -1.71, -.27, 1.45, 3.52, 6.30, 9.57, 12.85,
& -5.65, -3.33, -1.40, .01, 1.76, 3.80, 6.68, 10.02, 13.35,
& -5.15, -2.77, -1.10, .30, 1.95, 4.04, 7.08, 10.50, 13.91,
& -4.70, -2.61, -1.06, .33, 1.95, 4.11, 7.12, 10.86, 14.60,
& -4.98, -2.87, -1.21, .16, 1.80, 3.89, 6.79, 10.52, 14.26,
& -5.34, -3.16, -1.37, -.04, 1.60, 3.58, 6.25, 9.89, 13.53,
& -5.49, -3.34, -1.50, -.17, 1.41, 3.33, 5.94, 9.38, 12.83,
& -5.68, -3.46, -1.53, -.18, 1.40, 3.33, 5.99, 9.43, 12.88,
& -5.66, -3.36, -1.44, -.08, 1.59, 3.63, 6.31, 9.98, 13.65,
& -5.48, -3.18, -1.33, .08, 1.87, 4.03, 6.90, 10.44, 13.98,
& -4.93, -2.52, -.61, 1.74, 4.12, 6.77, 9.67, 12.57, 15.46,

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& -5.57, -2.86, .23, 3.21, 5.95, 9.16, 12.39, 15.61, 18.84,
& -7.20, -3.56, .41, 3.94, 7.48, 10.96, 14.43, 17.91, 21.39/
DATA((ALP209(J,N),N=1,9),J=1,13)/
& -6.79, -4.32, -1.85, .47, 2.57, 4.89, 7.72, 11.05, 14.38,
& -6.54, -4.20, -1.86, .37, 2.24, 4.52, 6.96, 9.94, 12.93,
& -6.54, -4.20, -1.87, .26, 1.97, 4.16, 6.17, 8.99, 11.80,
& -6.54, -4.20, -1.87, .21, 1.87, 3.97, 5.82, 8.37, 10.98,
& -6.37, -4.08, -1.82, .14, 1.73, 3.70, 5.51, 7.91, 10.54,
& -6.27, -4.01, -1.79, .09, 1.67, 3.56, 5.37, 8.13, 11.44,
& -6.17, -3.93, -1.76, .05, 1.60, 3.42, 5.41, 8.58, 12.22,
& -5.98, -3.82, -1.73, -.02, 1.51, 3.27, 5.63, 9.21, 12.95,
& -5.78, -3.70, -1.70, -.08, 1.42, 3.27, 6.06, 9.87, 13.68,
& -5.66, -3.57, -1.63, -.13, 1.42, 3.61, 6.71, 11.01, 15.31,
& -5.51, -3.44, -1.57, -.15, 1.56, 4.14, 7.64, 11.89, 16.15,
& -5.35, -3.31, -1.47, -.01, 2.08, 4.78, 8.52, 12.64, 16.76,
& -5.19, -3.17, -1.29, .50, 2.72, 5.46, 9.39, 13.47, 17.55/
DATA((ALP209(J,N),N=1,9),J=14,26)/
& -5.11, -3.00, -1.01, 1.06, 3.26, 6.21, 10.47, 14.72, 18.98,
& -5.01, -2.86, -.67, 1.44, 3.64, 6.77, 11.42, 16.07, 20.72,
& -5.22, -3.06, -.77, 1.33, 3.58, 6.44, 11.64, 16.83, 22.03,
& -5.59, -3.43, -1.19, 1.00, 3.11, 5.69, 10.68, 15.95, 21.21,
& -5.72, -3.68, -1.60, .61, 2.70, 5.19, 9.58, 14.58, 19.58,
& -5.93, -3.85, -1.77, .39, 2.51, 4.96, 9.02, 13.90, 18.78,
& -5.84, -3.80, -1.73, .46, 2.67, 5.14, 9.22, 13.93, 18.64,
& -5.85, -3.72, -1.58, .66, 2.95, 5.45, 9.59, 14.14, 18.68,
& -5.84, -3.65, -1.43, .90, 3.25, 5.77, 9.96, 14.30, 18.65,
& -5.87, -3.59, -1.27, 1.15, 3.55, 6.15, 10.31, 14.48, 18.65,
& -5.88, -3.23, -.17, 2.55, 5.11, 8.26, 11.68, 15.09, 18.51,
& -6.06, -3.03, .37, 3.32, 6.38, 9.69, 12.99, 16.30, 19.60,
& -6.21, -2.96, .43, 3.93, 7.64, 11.21, 14.79, 18.36, 21.93/
DATA((ALP212(J,N),N=1,9),J=1,13)/
& -6.11, -3.92, -1.71, .62, 2.97, 5.81, 8.88, 11.95, 15.03,
& -6.16, -3.97, -1.75, .52, 2.68, 5.28, 8.13, 11.03, 13.93,
& -6.21, -3.99, -1.77, .37, 2.49, 4.84, 7.44, 10.32, 13.19,
& -6.27, -4.02, -1.79, .29, 2.37, 4.65, 7.02, 9.78, 12.54,
& -6.30, -4.06, -1.83, .18, 2.24, 4.40, 6.55, 9.18, 11.82,
& -6.30, -4.07, -1.85, .14, 2.14, 4.28, 6.33, 9.58, 12.83,
& -6.32, -4.09, -1.87, .09, 2.05, 4.16, 6.58, 12.05, 17.53,
& -6.29, -4.09, -1.90, .04, 1.96, 4.01, 8.18, 15.32, 22.46,
& -6.18, -4.03, -1.89, .02, 2.01, 4.52, 10.21, 17.36, 24.50,
& -5.83, -3.80, -1.78, .15, 2.53, 5.56, 12.44, 19.85, 27.26,
& -5.38, -3.44, -1.49, .61, 3.33, 7.13, 14.68, 22.23, 29.77,
& -4.61, -2.73, -.79, 1.38, 4.29, 9.31, 17.00, 24.69, 32.38,
& -3.90, -1.98, -.11, 2.06, 5.12, 11.19, 18.59, 26.00, 33.41/
DATA((ALP212(J,N),N=1,9),J=14,26)/
& -3.58, -1.64, .25, 2.54, 5.39, 11.61, 18.75, 25.89, 33.04,
& -3.91, -1.89, -.01, 2.20, 4.91, 10.35, 17.37, 24.39, 31.40,
& -4.83, -2.36, -.42, 1.68, 4.23, 8.72, 15.28, 21.84, 28.39,
& -5.60, -2.93, -.81, 1.20, 3.63, 7.33, 13.39, 19.45, 25.52,
& -5.73, -3.26, -1.08, .93, 3.42, 6.82, 12.88, 18.94, 25.00,
& -5.63, -3.13, -.98, 1.06, 3.59, 7.13, 13.10, 19.07, 25.04,
& -5.50, -3.00, -.89, 1.20, 3.79, 7.47, 13.03, 18.58, 24.14,
& -5.40, -2.88, -.79, 1.35, 3.99, 7.79, 12.99, 18.18, 23.38,
& -5.30, -2.75, -.69, 1.51, 4.22, 8.05, 12.87, 17.69, 22.51,
& -5.21, -2.64, -.60, 1.67, 4.44, 8.27, 12.82, 17.36, 21.91,

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& -4.80, -2.04, -.11, 2.64, 5.73, 9.39, 13.09, 16.80, 20.50,
& -4.58, -1.83, .31, 3.48, 6.82, 10.02, 13.22, 16.42, 19.62,
& -4.50, -1.79, .52, 4.26, 7.61, 10.86, 14.11, 17.37, 20.62/
DATA((ALP215(J,N),N=1,9),J=1,13)/
& -6.27, -3.86, -1.39, 1.03, 3.57, 6.88, 10.69, 14.50, 18.30,
& -6.22, -3.79, -1.38, .87, 3.22, 6.29, 9.89, 13.50, 17.10,
& -6.05, -3.68, -1.35, .78, 2.94, 5.74, 9.10, 12.49, 15.88,
& -6.00, -3.63, -1.33, .73, 2.78, 5.41, 8.54, 11.74, 14.94,
& -5.87, -3.55, -1.32, .66, 2.62, 4.92, 7.92, 11.25, 14.58,
& -5.82, -3.50, -1.32, .61, 2.55, 4.82, 8.04, 11.74, 15.44,
& -5.76, -3.46, -1.31, .57, 2.55, 5.03, 8.84, 13.23, 17.63,
& -5.69, -3.39, -1.27, .59, 2.69, 5.59, 11.77, 18.43, 25.10,
& -5.33, -3.04, -1.06, .73, 3.11, 7.76, 15.61, 23.45, 31.29,
& -4.69, -2.39, -.69, 1.19, 4.34, 10.94, 18.78, 26.63, 34.47,
& -3.81, -1.73, -.16, 2.39, 6.31, 14.00, 21.69, 29.38, 37.08,
& -2.99, -1.12, .92, 3.62, 9.35, 17.04, 24.73, 32.42, 40.12,
& -2.80, -.83, 1.21, 4.09, 9.80, 16.58, 23.36, 30.14, 36.92/
DATA((ALP215(J,N),N=1,9),J=14,26)/
& -3.04, -1.08, .85, 3.50, 8.92, 17.25, 25.58, 33.92, 42.25,
& -3.79, -1.65, .22, 2.38, 6.12, 13.96, 21.80, 29.65, 37.49,
& -4.92, -2.85, -.45, 1.64, 4.94, 11.29, 18.43, 25.57, 32.71,
& -5.94, -3.53, -.91, 1.48, 4.51, 10.35, 16.81, 23.26, 29.71,
& -5.79, -3.44, -.90, 1.55, 4.73, 10.47, 16.72, 22.97, 29.22,
& -5.82, -3.41, -.84, 1.66, 4.95, 10.61, 16.67, 22.73, 28.79,
& -5.85, -3.38, -.77, 1.76, 5.15, 10.71, 16.59, 22.47, 28.35,
& -5.87, -3.36, -.70, 1.85, 5.34, 10.80, 16.51, 22.23, 27.94,
& -5.86, -3.33, -.65, 1.95, 5.51, 10.89, 16.44, 22.00, 27.56,
& -5.86, -3.31, -.59, 2.07, 5.68, 10.97, 16.38, 21.78, 27.19,
& -5.87, -3.20, -.20, 2.81, 6.60, 11.20, 15.79, 20.39, 24.99,
& -5.86, -3.10, .06, 3.39, 7.12, 11.33, 15.54, 19.75, 23.96,
& -5.87, -2.99, .21, 3.78, 7.35, 11.19, 15.04, 18.88, 22.73/
DATA((ALP218(J,N),N=1,9),J=1,13)/
& -6.44, -3.84, -1.23, 1.22, 3.82, 8.00, 12.17, 16.33, 20.50,
& -6.20, -3.74, -1.28, 1.12, 3.66, 7.24, 11.16, 15.08, 19.00,
& -5.83, -3.54, -1.27, 1.01, 3.51, 6.59, 9.98, 13.37, 16.76,
& -5.60, -3.41, -1.23, .95, 3.41, 6.19, 9.39, 12.59, 15.79,
& -5.32, -3.24, -1.21, .88, 3.27, 5.72, 9.08, 12.56, 16.03,
& -5.19, -3.15, -1.18, .86, 3.32, 6.05, 10.64, 15.24, 19.84,
& -5.04, -3.01, -1.06, 1.12, 3.89, 7.73, 12.27, 16.82, 21.36,
& -4.82, -2.56, -.47, 1.90, 5.04, 10.00, 15.33, 20.67, 26.00,
& -4.30, -1.97, .26, 2.77, 6.79, 13.14, 19.49, 25.84, 32.19,
& -3.75, -1.34, 1.03, 3.68, 9.96, 17.96, 25.96, 33.96, 41.96,
& -3.22, -.64, 1.71, 5.03, 15.26, 26.69, 38.11, 49.54, 60.97,
& -2.92, -.25, 2.19, 5.93, 19.59, 33.38, 47.17, 60.97, 74.76,
& -3.25, -.75, 1.81, 5.36, 18.36, 32.64, 46.93, 61.21, 75.50/
DATA((ALP218(J,N),N=1,9),J=14,26)/
& -3.90, -1.78, .87, 3.56, 12.43, 26.71, 41.00, 55.29, 69.57,
& -4.67, -2.47, -.04, 2.37, 7.00, 18.11, 29.22, 40.33, 51.44,
& -5.35, -2.98, -.45, 1.91, 5.66, 16.88, 28.65, 40.41, 52.18,
& -5.55, -3.09, -.44, 1.97, 5.86, 17.09, 28.51, 39.94, 51.37,
& -5.59, -3.09, -.40, 2.05, 6.12, 17.88, 29.65, 41.41, 53.18,
& -5.62, -3.09, -.36, 2.14, 6.59, 18.35, 30.12, 41.88, 53.65,
& -5.63, -3.08, -.32, 2.23, 7.12, 18.88, 30.65, 42.41, 54.18,
& -5.63, -3.06, -.28, 2.32, 7.59, 19.35, 31.12, 42.88, 54.65,
& -5.62, -3.05, -.25, 2.42, 8.06, 20.18, 32.30, 44.42, 56.55,

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& -5.60, -3.04, -.22, 2.52, 8.48, 20.61, 32.73, 44.85, 56.97,
 & -5.54, -2.93, -.05, 3.14, 11.23, 24.13, 37.03, 49.94, 62.84,
 & -5.58, -2.86, .13, 3.71, 14.62, 30.00, 45.38, 60.77, 76.15,
 & -5.42, -2.82, .15, 4.24, 18.82, 37.00, 55.18, 73.36, 91.55/

DATA((ALP221(J,N),N=1,9),J=1,13)/

& -5.73, -3.15, -.77, 1.54, 5.20, 10.80, 16.13, 21.47, 26.80,
 & -5.85, -3.15, -.76, 1.66, 5.04, 9.34, 13.34, 17.34, 21.34,
 & -5.95, -3.30, -.83, 1.59, 4.54, 8.24, 11.72, 15.20, 18.68,
 & -6.10, -3.49, -.95, 1.45, 4.30, 7.61, 10.76, 13.91, 17.06,
 & -6.16, -3.68, -1.14, 1.39, 4.21, 7.60, 11.21, 14.81, 18.41,
 & -6.08, -3.69, -1.17, 1.52, 4.42, 8.55, 12.76, 16.97, 21.18,
 & -6.05, -3.58, -.98, 2.05, 5.53, 11.63, 17.78, 23.94, 30.09,
 & -5.93, -3.25, -.33, 2.99, 8.63, 16.96, 25.29, 33.63, 41.96,
 & -5.19, -2.49, .84, 4.52, 13.14, 22.23, 31.32, 40.41, 49.50,
 & -4.42, -1.32, 2.23, 8.43, 17.13, 25.83, 34.52, 43.22, 51.91,
 & -3.52, -.42, 3.15, 11.86, 25.66, 39.45, 53.24, 67.03, 80.83,
 & -3.71, -.75, 2.90, 11.73, 29.91, 48.09, 66.27, 84.45, 102.64,
 & -4.90, -1.96, 1.06, 5.24, 19.60, 35.60, 51.60, 67.60, 83.60/

DATA((ALP221(J,N),N=1,9),J=14,26)/

& -6.23, -3.11, -.57, 2.95, 10.40, 21.83, 33.26, 44.69, 56.11,
 & -6.63, -3.82, -1.08, 2.40, 9.07, 23.36, 37.64, 51.93, 66.21,
 & -6.84, -3.85, -1.01, 2.44, 9.41, 24.22, 39.04, 53.85, 68.67,
 & -6.79, -3.76, -.91, 2.57, 9.86, 23.66, 37.45, 51.24, 65.03,
 & -6.70, -3.65, -.81, 2.73, 10.00, 21.76, 33.53, 45.29, 57.06,
 & -6.64, -3.53, -.70, 2.90, 10.27, 21.08, 31.89, 42.70, 53.51,
 & -6.55, -3.42, -.59, 3.06, 10.65, 21.46, 32.27, 43.08, 53.89,
 & -6.49, -3.32, -.50, 3.20, 11.08, 21.89, 32.70, 43.51, 54.32,
 & -6.46, -3.20, -.39, 3.35, 11.46, 22.27, 33.08, 43.89, 54.70,
 & -6.42, -3.08, -.31, 3.47, 12.00, 23.11, 34.22, 45.33, 56.44,
 & -6.85, -2.69, 0.00, 4.30, 15.00, 27.50, 40.00, 52.50, 65.00,
 & -6.61, -2.65, .14, 4.89, 17.03, 30.83, 44.62, 58.41, 72.21,
 & -6.31, -2.61, .18, 5.30, 17.80, 31.13, 44.47, 57.80, 71.13/

DATA((CD204(I,J),J=1,26),I=1,5)/

1 .0061, .0061, .0061, .0061, .0061, .0062, .0062, .0062, .0062,
 1 .0062, .0063, .0064, .0076, .0113, .0169, .0211, .0245, .0270,
 1 .0296, .0310, .0320, .0329, .0332, .0292, .0221, .0170,
 2 .0047, .0046, .0046, .0045, .0045, .0045, .0045, .0045, .0045,
 2 .0045, .0045, .0047, .0055, .0098, .0152, .0192, .0225, .0249,
 2 .0270, .0290, .0303, .0316, .0325, .0317, .0299, .0283,
 3 .0065, .0058, .0055, .0055, .0054, .0054, .0054, .0054, .0055,
 3 .0055, .0057, .0066, .0096, .0153, .0210, .0250, .0284, .0304,
 3 .0324, .0344, .0361, .0375, .0389, .0469, .0546, .0619,
 4 .0219, .0168, .0144, .0133, .0128, .0126, .0128, .0130, .0138,
 4 .0154, .0187, .0220, .0264, .0321, .0377, .0434, .0496, .0559,
 4 .0623, .0686, .0750, .0788, .0823, .0979, .1077, .1194,
 5 .0575, .0328, .0227, .0202, .0188, .0182, .0184, .0189, .0205,
 5 .0236, .0317, .0403, .0489, .0586, .0701, .0817, .0928, .1036,
 5 .1143, .1220, .1284, .1348, .1412, .1692, .1842, .1890/

DATA((CD206(I,J),J=1,26),I=1,5)/

1 .0059, .0059, .0060, .0060, .0061, .0061, .0061, .0061, .0061,
 1 .0062, .0062, .0067, .0112, .0173, .0235, .0289, .0333, .0364,
 1 .0385, .0397, .0405, .0406, .0407, .0370, .0313, .0253,
 2 .0044, .0044, .0044, .0044, .0044, .0044, .0044, .0044, .0044,
 2 .0045, .0046, .0055, .0101, .0162, .0222, .0275, .0312, .0340,
 2 .0360, .0377, .0387, .0396, .0400, .0398, .0365, .0325,

3	.0068,	.0055,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,
3	.0053,	.0057,	.0082,	.0132,	.0209,	.0273,	.0319,	.0354,	.0375,
3	.0394,	.0413,	.0430,	.0446,	.0462,	.0547,	.0611,	.0657,	
4	.0173,	.0125,	.0095,	.0085,	.0082,	.0082,	.0083,	.0087,	.0090,
4	.0099,	.0121,	.0169,	.0224,	.0334,	.0448,	.0549,	.0639,	.0711,
4	.0772,	.0834,	.0877,	.0918,	.0958,	.1116,	.1178,	.1234,	
5	.0377,	.0292,	.0227,	.0195,	.0182,	.0183,	.0184,	.0188,	.0202,
5	.0229,	.0267,	.0304,	.0395,	.0666,	.0956,	.1136,	.1271,	.1380,
5	.1474,	.1568,	.1654,	.1737,	.1820,	.2120,	.2260,	.2238/	

DATA((CD209(I,J),J=1,26),I=1,5)/

1	.0064,	.0064,	.0063,	.0063,	.0063,	.0063,	.0063,	.0063,	.0063,
1	.0063,	.0068,	.0089,	.0138,	.0201,	.0278,	.0356,	.0426,	.0481,
1	.0529,	.0561,	.0577,	.0577,	.0577,	.0573,	.0516,	.0449,	
2	.0055,	.0053,	.0054,	.0056,	.0058,	.0059,	.0059,	.0060,	.0062,
2	.0065,	.0073,	.0106,	.0156,	.0213,	.0269,	.0322,	.0373,	.0423,
2	.0471,	.0515,	.0560,	.0582,	.0598,	.0601,	.0567,	.0526,	
3	.0074,	.0070,	.0066,	.0065,	.0066,	.0066,	.0066,	.0067,	.0070,
3	.0072,	.0088,	.0143,	.0213,	.0287,	.0359,	.0432,	.0496,	.0555,
3	.0603,	.0645,	.0675,	.0702,	.0719,	.0769,	.0817,	.0866,	
4	.0124,	.0109,	.0101,	.0098,	.0097,	.0097,	.0101,	.0105,	.0113,
4	.0135,	.0188,	.0241,	.0348,	.0514,	.0648,	.0764,	.0861,	.0948,
4	.1022,	.1087,	.1135,	.1183,	.1231,	.1335,	.1384,	.1432,	
5	.0285,	.0214,	.0178,	.0162,	.0156,	.0156,	.0159,	.0168,	.0190,
5	.0241,	.0371,	.0537,	.0706,	.0863,	.1003,	.1126,	.1245,	.1354,
5	.1464,	.1565,	.1641,	.1716,	.1785,	.1939,	.1971,	.2003/	

DATA((CD212(I,J),J=1,26),I=1,5)/

1	.0073,	.0073,	.0073,	.0072,	.0072,	.0072,	.0072,	.0072,	.0073,
1	.0081,	.0127,	.0228,	.0329,	.0416,	.0506,	.0585,	.0658,	.0727,
1	.0793,	.0833,	.0862,	.0877,	.0887,	.0889,	.0816,	.0704,	
2	.0060,	.0057,	.0057,	.0056,	.0056,	.0056,	.0058,	.0059,	.0064,
2	.0075,	.0118,	.0189,	.0272,	.0361,	.0448,	.0530,	.0599,	.0667,
2	.0734,	.0789,	.0831,	.0865,	.0880,	.0903,	.0845,	.0746,	
3	.0081,	.0078,	.0078,	.0078,	.0080,	.0081,	.0083,	.0090,	.0104,
3	.0129,	.0173,	.0262,	.0353,	.0437,	.0520,	.0606,	.0693,	.0772,
3	.0843,	.0902,	.0952,	.0986,	.1013,	.1051,	.1046,	.1040,	
4	.0136,	.0131,	.0129,	.0128,	.0129,	.0131,	.0133,	.0146,	.0172,
4	.0247,	.0348,	.0472,	.0590,	.0703,	.0829,	.0940,	.1035,	.1125,
4	.1208,	.1280,	.1336,	.1392,	.1430,	.1543,	.1560,	.1505,	
5	.0215,	.0205,	.0201,	.0201,	.0204,	.0212,	.0239,	.0305,	.0403,
5	.0559,	.0753,	.0955,	.1132,	.1295,	.1455,	.1615,	.1713,	.1780,
5	.1841,	.1891,	.1940,	.1989,	.2027,	.2213,	.2368,	.2420/	

DATA((CD215(I,J),J=1,26),I=1,5)/

1	.0074,	.0076,	.0077,	.0078,	.0078,	.0078,	.0080,	.0087,	.0109,
1	.0200,	.0300,	.0403,	.0507,	.0613,	.0718,	.0809,	.0900,	.0992,
1	.1062,	.1130,	.1199,	.1267,	.1301,	.1302,	.1187,	.1041,	
2	.0074,	.0076,	.0077,	.0078,	.0078,	.0078,	.0080,	.0087,	.0108,
2	.0198,	.0300,	.0404,	.0507,	.0612,	.0718,	.0824,	.0909,	.0986,
2	.1063,	.1134,	.1198,	.1261,	.1324,	.1315,	.1228,	.1103,	
3	.0099,	.0099,	.0100,	.0103,	.0109,	.0112,	.0118,	.0128,	.0173,
3	.0268,	.0369,	.0474,	.0584,	.0701,	.0806,	.0893,	.0981,	.1062,
3	.1142,	.1221,	.1299,	.1334,	.1369,	.1433,	.1409,	.1373,	
4	.0159,	.0170,	.0175,	.0178,	.0182,	.0195,	.0218,	.0273,	.0370,
4	.0494,	.0618,	.0741,	.0863,	.0979,	.1086,	.1193,	.1299,	.1383,
4	.1458,	.1534,	.1609,	.1675,	.1711,	.1838,	.1864,	.1890,	
5	.0260,	.0245,	.0248,	.0246,	.0262,	.0281,	.0315,	.0433,	.0618,

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5 .0822, .1021, .1194, .1363, .1526, .1689, .1847, .1992, .2138,
5 .2283, .2359, .2429, .2499, .2570, .2727, .2772, .2816/
DATA((CD218(I,J),J=1,26),I=1,5)/
1 .0096, .0101, .0103, .0104, .0108, .0112, .0122, .0144, .0207,
1 .0335, .0493, .0630, .0743, .0847, .0951, .1043, .1122, .1200,
1 .1273, .1322, .1370, .1418, .1450, .1525, .1524, .1482,
2 .0084, .0085, .0085, .0086, .0086, .0088, .0094, .0114, .0223,
2 .0354, .0514, .0655, .0777, .0891, .0994, .1083, .1173, .1248,
2 .1305, .1361, .1414, .1459, .1503, .1589, .1559, .1516,
3 .0130, .0141, .0147, .0150, .0154, .0159, .0175, .0208, .0308,
3 .0454, .0611, .0758, .0868, .0978, .1088, .1178, .1263, .1349,
3 .1416, .1468, .1520, .1572, .1601, .1677, .1710, .1742,
4 .0222, .0262, .0282, .0292, .0302, .0307, .0323, .0414, .0630,
4 .0793, .0966, .1118, .1246, .1375, .1486, .1589, .1692, .1760,
4 .1816, .1871, .1926, .1969, .2002, .2161, .2230, .2265,
5 .0358, .0414, .0441, .0455, .0495, .0565, .0661, .0841, .1029,
5 .1219, .1492, .1758, .1958, .2158, .2321, .2471, .2621, .2717,
5 .2812, .2908, .3003, .3008, .3008, .3028, .3071, .3114/
DATA((CD221(I,J),J=1,26),I=1,5)/
1 .0098, .0137, .0146, .0153, .0159, .0165, .0174, .0199, .0267,
1 .0388, .0521, .0660, .0801, .0942, .1069, .1186, .1304, .1421,
1 .1526, .1625, .1724, .1793, .1834, .1860, .1868, .1876,
2 .0111, .0111, .0111, .0114, .0117, .0123, .0130, .0196, .0321,
2 .0443, .0569, .0697, .0832, .0963, .1083, .1203, .1331, .1470,
2 .1608, .1706, .1793, .1878, .1918, .1926, .1945, .1964,
3 .0154, .0164, .0169, .0172, .0176, .0180, .0202, .0305, .0450,
3 .0601, .0752, .0902, .1045, .1188, .1325, .1455, .1586, .1688,
3 .1772, .1856, .1940, .2024, .2064, .2181, .2191, .2202,
4 .0369, .0324, .0332, .0350, .0375, .0434, .0577, .0719, .0862,
4 .1012, .1169, .1326, .1463, .1597, .1732, .1849, .1959, .2069,
4 .2165, .2245, .2325, .2405, .2479, .2562, .2572, .2583,
5 .0670, .0511, .0528, .0547, .0607, .0771, .0969, .1168, .1348,
5 .1527, .1705, .1893, .2084, .2276, .2461, .2643, .2825, .3007,
5 .3055, .3084, .3113, .3136, .3138, .3149, .3160, .3172/
DATA(XMI(J),J=1,26)/.3,.5,.6,.65,.7,.725,.75,.775,
& .8,.825,.85,.875,.9,.925,.95,.975,1.0,1.025,1.05,1.075,
& 1.1,1.125,1.15,1.3,1.45,1.6/
DATA(CLI(J),J=1,9)/-.4,-.2,0.0,.2,.4,.6,.8,1.0,1.2/
DATA(ALPI(J),J=1,7)/-4.0,-2.0,0.0,2.0,4.0,6.0,8.0/
DATA(CLII(J),J=1,5)/0.0,.2,.4,.6,.8/
IORDER(1)=IORDER(2)=1
IPT (1) = -1
IF (IKEY .EQ. 2) GO TO 1000
IF (TR .LT. .04) GO TO 9
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 1
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 2
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 3
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 4
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 5
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 6
IF (TR .GE. .21) GO TO 7
9 CALL IBI (7,ALPI,26,XMI,7,CL204,IORDER,IPT,AA,XM,CLFT04,IERR)
CL=CLFT04
GO TO 400
1 CALL IBI (7,ALPI,26,XMI,7,CL204,IORDER,IPT,AA,XM,CLFT04,IERR)

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IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL206,IORDER,IPT,AA,XM,CLFT06,IERR)
CL=CLFT04 + (CLFT06-CLFT04)*((TR-.04)/(.06-.04))
GO TO 400
2 CALL IBI (7,ALPI,26,XMI,7,CL206,IORDER,IPT,AA,XM,CLFT06,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL209,IORDER,IPT,AA,XM,CLFT09,IERR)
CL=CLFT06 + (CLFT09 - CLFT06)*((TR-.06)/(.09-.06))
GO TO 400
3 CALL IBI (7,ALPI,26,XMI,7,CL209,IORDER,IPT,AA,XM,CLFT09,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL212,IORDER,IPT,AA,XM,CLFT12,IERR)
CL=CLFT09+(CLFT12-CLFT09)*((TR-.09)/(.12-.09))
GO TO 400
4 CALL IBI (7,ALPI,26,XMI,7,CL212,IORDER,IPT,AA,XM,CLFT12,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL215,IORDER,IPT,AA,XM,CLFT15,IERR)
CL=CLFT12 + (CLFT15-CLFT12)*((TR-.12)/(.15-.12))
GO TO 400
5 CALL IBI (7,ALPI,26,XMI,7,CL215,IORDER,IPT,AA,XM,CLFT15,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL218,IORDER,IPT,AA,XM,CLFT18,IERR)
CL=CLFT15+(CLFT18-CLFT15)*((TR-.15)/(.18-.15))
GO TO 400
6 CALL IBI (7,ALPI,26,XMI,7,CL218,IORDER,IPT,AA,XM,CLFT18,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL221,IORDER,IPT,AA,XM,CLFT21,IERR)
CL=CLFT18+(CLFT21-CLFT18)*((TR-.18)/(.21-.18))
GO TO 400
7 CALL IBI (7,ALPI,26,XMI,7,CL221,IORDER,IPT,AA,XM,CLFT21,IERR)
CL=CLFT21
GO TO 400
1000 CONTINUE
IPT (1)=-1
IF (TR .LT. .04) GO TO 90
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 10
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 20
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 30
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 40
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 50
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 60
IF (TR .GE. .21) GO TO 70
90 CALL IBI (26,XMI,9,CLI,26,ALP204,IORDER,IPT,XM,CL,AA04,IERR)
AA=AA04
GO TO 400
10 CALL IBI (26,XMI,9,CLI,26,ALP204,IORDER,IPT,XM,CL,AA04,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP206,IORDER,IPT,XM,CL,AA06,IERR)
AA=AA04 + (AA06-AA04)*((TR-.04)/(.06-.04))
GO TO 400
20 CALL IBI (26,XMI,9,CLI,26,ALP206,IORDER,IPT,XM,CL,AA06,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP209,IORDER,IPT,XM,CL,AA09,IERR)
AA=AA06 + (AA09 - AA06)*((TR -.06)/(.09-.06))
GO TO 400

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30 CALL IBI (26,XMI,9,CLI,26,ALP209,IORDER,IPT,XM,CL,AA09,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP212,IORDER,IPT,XM,CL,AA12,IERR)
   AA=AA09+(AA12-AA09)*((TR-.09)/(.12-.09))
   GO TO 400
40 CALL IBI (26,XMI,9,CLI,26,ALP212,IORDER,IPT,XM,CL,AA12,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP215,IORDER,IPT,XM,CL,AA15,IERR)
   AA=AA12+(AA15-AA12)*((TR-.12)/(.15-.12))
   GO TO 400
50 CALL IBI (26,XMI,9,CLI,26,ALP215,IORDER,IPT,XM,CL,AA15,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP218,IORDER,IPT,XM,CL,AA18,IERR)
   AA=AA15+(AA18-AA15)*((TR-.15)/(.18-.15))
   GO TO 400
60 CALL IBI (26,XMI,9,CLI,26,ALP218,IORDER,IPT,XM,CL,AA18,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP221,IORDER,IPT,XM,CL,AA21,IERR)
   AA=AA18+(AA21-AA18)*((TR-.18)/(.21-.18))
   GO TO 400
70 CALL IBI (26,XMI,9,CLI,26,ALP221,IORDER,IPT,XM,CL,AA21,IERR)
   AA=AA21
400 CONTINUE
   IPT (1)=-1
   IF (TR .LT. .04) GO TO 91
   IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 11
   IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 21
   IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 31
   IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 41
   IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 51
   IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 61
   IF (TR .GE. .21) GO TO 71
91 CALL IBI (5,CLII,26,XMI,5,CD204,IORDER,IPT,CL,XM,CDRG04,IERR)
   CD=CDRG04
   WRITE (6,201) TR
201 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
   &*/* THE VALUES FOR T/C=.04 HAVE BEEN RETURNED*)
   GO TO 250
11 CALL IBI (5,CLII,26,XMI,5,CD204,IORDER,IPT,CL,XM,CDRG04,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD206,IORDER,IPT,CL,XM,CDRG06,IERR)
   CD=CDRG04 + (CDRG06-CDRG04)*((TR-.04)/(.06-.04))
   GO TO 250
21 CALL IBI (5,CLII,26,XMI,5,CD206,IORDER,IPT,CL,XM,CDRG06,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD209,IORDER,IPT,CL,XM,CDRG09,IERR)
   CD=CDRG06 + (CDRG09 - CDRG06)*((TR-.06)/(.09-.06))
   GO TO 250
31 CALL IBI (5,CLII,26,XMI,5,CD209,IORDER,IPT,CL,XM,CDRG09,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD212,IORDER,IPT,CL,XM,CDRG12,IERR)
   CD=CDRG09+(CDRG12-CDRG09)*((TR-.09)/(.12-.09))
   GO TO 250
41 CALL IBI (5,CLII,26,XMI,5,CD212,IORDER,IPT,CL,XM,CDRG12,IERR)
   IPT (1)=-1

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& CD321(5,26),CLII(5)

DATA((CL304(I,J),J=1,26),I=1,4)/

1	-.184,	-.211,	-.232,	-.245,	-.265,	-.276,	-.287,	-.301,	-.316,
1	-.327,	-.325,	-.314,	-.289,	-.263,	-.242,	-.226,	-.215,	-.210,
1	-.212,	-.219,	-.232,	-.244,	-.255,	-.281,	-.294,	-.295,	
2	.052,	.055,	.061,	.064,	.067,	.069,	.073,	.077,	.080,
2	.084,	.090,	.096,	.102,	.107,	.103,	.078,	.027,	-.002,
2	.021,	.050,	.065,	.077,	.070,	-.038,	-.116,	-.141,	
3	.262,	.284,	.305,	.319,	.334,	.341,	.349,	.357,	.368,
3	.378,	.390,	.407,	.407,	.381,	.345,	.308,	.272,	.258,
3	.273,	.300,	.327,	.330,	.306,	.154,	.028,	-.024,	
4	.492,	.514,	.533,	.547,	.561,	.569,	.580,	.590,	.601,
4	.613,	.628,	.643,	.637,	.606,	.575,	.543,	.511,	.499,
4	.521,	.544,	.568,	.569,	.534,	.320,	.148,	.084/	

DATA((CL304(I,J),J=1,26),I=5,7)/

5	.656,	.696,	.735,	.761,	.794,	.810,	.831,	.853,	.869,
5	.875,	.866,	.846,	.826,	.797,	.768,	.739,	.717,	.708,
5	.734,	.759,	.780,	.781,	.740,	.464,	.266,	.200,	
6	.831,	.888,	.930,	.958,	.991,	1.015,	1.036,	1.035,	1.023,
6	1.011,	.994,	.977,	.960,	.943,	.925,	.903,	.881,	.870,
6	.893,	.924,	.957,	.945,	.900,	.608,	.393,	.306,	
7	.977,	1.028,	1.069,	1.097,	1.137,	1.149,	1.155,	1.156,	1.151,
7	1.138,	1.126,	1.109,	1.090,	1.070,	1.051,	1.031,	1.011,	1.006,
7	1.026,	1.050,	1.072,	1.077,	1.038,	.746,	.524,	.415/	

DATA((CL306(I,J),J=1,26),I=1,4)/

1	-.184,	-.180,	-.178,	-.173,	-.168,	-.165,	-.159,	-.152,	-.146,
1	-.139,	-.131,	-.123,	-.119,	-.171,	-.246,	-.320,	-.374,	-.346,
1	-.301,	-.256,	-.221,	-.223,	-.232,	-.287,	-.322,	-.305,	
2	.073,	.071,	.075,	.078,	.084,	.089,	.096,	.102,	.109,
2	.119,	.129,	.137,	.115,	.056,	-.003,	-.063,	-.087,	-.063,
2	-.025,	.012,	.023,	.010,	-.003,	-.080,	-.134,	-.129,	
3	.276,	.292,	.312,	.325,	.338,	.348,	.357,	.367,	.377,
3	.387,	.397,	.395,	.355,	.304,	.252,	.201,	.182,	.200,
3	.238,	.275,	.295,	.282,	.259,	.120,	.020,	-.015,	
4	.501,	.514,	.537,	.554,	.572,	.581,	.590,	.599,	.618,
4	.636,	.645,	.608,	.565,	.521,	.477,	.433,	.413,	.447,
4	.483,	.520,	.523,	.495,	.462,	.266,	.129,	.093/	

DATA((CL306(I,J),J=1,26),I=5,7)/

5	.655,	.691,	.737,	.763,	.789,	.803,	.821,	.838,	.843,
5	.828,	.797,	.761,	.725,	.689,	.653,	.620,	.606,	.635,
5	.667,	.699,	.714,	.691,	.647,	.385,	.249,	.208,	
6	.815,	.867,	.919,	.952,	.985,	1.001,	1.004,	.989,	.963,
6	.936,	.909,	.882,	.848,	.813,	.779,	.744,	.728,	.749,
6	.782,	.814,	.837,	.821,	.782,	.553,	.396,	.322,	
7	.955,	1.003,	1.054,	1.087,	1.126,	1.134,	1.125,	1.113,	1.083,
7	1.053,	1.023,	.993,	.963,	.932,	.902,	.875,	.854,	.873,
7	.908,	.944,	.968,	.949,	.921,	.700,	.534,	.417/	

DATA((CL309(I,J),J=1,26),I=1,4)/

1	-.146,	-.146,	-.134,	-.127,	-.120,	-.116,	-.113,	-.109,	-.105,
1	-.095,	-.140,	-.232,	-.341,	-.416,	-.416,	-.385,	-.322,	-.279,
1	-.273,	-.274,	-.274,	-.275,	-.275,	-.283,	-.287,	-.281,	
2	.058,	.062,	.069,	.073,	.079,	.082,	.085,	.089,	.097,
2	.103,	.071,	-.013,	-.112,	-.184,	-.181,	-.132,	-.087,	-.057,
2	-.056,	-.061,	-.066,	-.071,	-.077,	-.107,	-.127,	-.132,	
3	.253,	.265,	.282,	.291,	.305,	.312,	.320,	.328,	.336,

3	.328,	.286,	.216,	.134,	.059,	.055,	.097,	.150,	.176,
3	.166,	.152,	.139,	.125,	.112,	.042,	-.003,	-.028,	
4	.461,	.487,	.512,	.529,	.552,	.563,	.574,	.580,	.575,
4	.526,	.449,	.372,	.303,	.256,	.260,	.306,	.355,	.378,
4	.368,	.349,	.330,	.311,	.291,	.195,	.131,	.086/	

DATA((CL309(I,J),J=1,26),I=5,7)/

5	.615,	.659,	.700,	.721,	.746,	.765,	.776,	.761,	.724,
5	.665,	.602,	.539,	.475,	.429,	.434,	.474,	.527,	.542,
5	.529,	.511,	.488,	.466,	.443,	.331,	.253,	.201,	
6	.758,	.815,	.861,	.893,	.930,	.942,	.926,	.892,	.837,
6	.781,	.726,	.670,	.618,	.581,	.596,	.639,	.681,	.699,
6	.683,	.658,	.633,	.608,	.583,	.459,	.366,	.296,	
7	.907,	.956,	1.012,	1.048,	1.040,	1.016,	.979,	.933,	.888,
7	.843,	.797,	.752,	.708,	.670,	.679,	.718,	.758,	.772,
7	.757,	.737,	.716,	.696,	.675,	.553,	.472,	.407/	

DATA((CL312(I,J),J=1,26),I=1,4)/

1	-.109,	-.115,	-.130,	-.142,	-.156,	-.163,	-.173,	-.182,	-.204,
1	-.240,	-.280,	-.328,	-.394,	-.412,	-.386,	-.285,	-.211,	-.187,
1	-.191,	-.200,	-.209,	-.218,	-.226,	-.262,	-.275,	-.273,	
2	.057,	.061,	.071,	.079,	.088,	.093,	.103,	.112,	.096,
2	.036,	-.033,	-.116,	-.207,	-.233,	-.203,	-.143,	-.080,	-.058,
2	-.066,	-.076,	-.085,	-.093,	-.102,	-.141,	-.153,	-.155,	
3	.214,	.227,	.242,	.250,	.261,	.266,	.272,	.279,	.282,
3	.232,	.143,	.054,	-.031,	-.059,	-.036,	.034,	.094,	.114,
3	.098,	.082,	.069,	.057,	.045,	-.008,	-.027,	-.041,	
4	.410,	.426,	.442,	.452,	.465,	.476,	.488,	.479,	.424,
4	.355,	.287,	.218,	.154,	.127,	.151,	.213,	.276,	.305,
4	.291,	.267,	.245,	.229,	.212,	.140,	.093,	.073/	

DATA((CL312(I,J),J=1,26),I=5,7)/

5	.553,	.585,	.613,	.632,	.654,	.669,	.649,	.593,	.538,
5	.483,	.423,	.361,	.299,	.274,	.305,	.364,	.423,	.449,
5	.434,	.414,	.394,	.375,	.360,	.278,	.219,	.184,	
6	.687,	.736,	.780,	.810,	.842,	.856,	.833,	.775,	.717,
6	.649,	.578,	.507,	.441,	.414,	.444,	.499,	.559,	.585,
6	.575,	.554,	.533,	.511,	.490,	.403,	.337,	.295,	
7	.828,	.871,	.903,	.928,	.968,	.945,	.895,	.838,	.772,
7	.707,	.641,	.575,	.513,	.489,	.518,	.569,	.635,	.655,
7	.640,	.625,	.610,	.596,	.582,	.505,	.448,	.406/	

DATA((CL315(I,J),J=1,26),I=1,4)/

1	-.124,	-.119,	-.119,	-.121,	-.122,	-.123,	-.124,	-.137,	-.212,
1	-.287,	-.362,	-.435,	-.458,	-.435,	-.352,	-.250,	-.194,	-.191,
1	-.190,	-.190,	-.190,	-.190,	-.190,	-.197,	-.213,	-.226,	
2	.023,	.026,	.033,	.037,	.042,	.044,	.046,	.043,	.007,
2	-.083,	-.180,	-.276,	-.303,	-.264,	-.192,	-.125,	-.099,	-.100,
2	-.101,	-.103,	-.104,	-.106,	-.107,	-.116,	-.119,	-.121,	
3	.197,	.194,	.198,	.202,	.211,	.215,	.217,	.200,	.144,
3	.055,	-.042,	-.135,	-.180,	-.145,	-.070,	.003,	.028,	.027,
3	.023,	.020,	.016,	.012,	.009,	-.009,	-.022,	-.023,	
4	.374,	.386,	.401,	.410,	.422,	.430,	.425,	.398,	.329,
4	.251,	.153,	.058,	.017,	.052,	.130,	.205,	.231,	.222,
4	.214,	.206,	.199,	.192,	.185,	.147,	.116,	.092/	

DATA((CL315(I,J),J=1,26),I=5,7)/

5	.515,	.538,	.562,	.583,	.605,	.604,	.576,	.525,	.464,
5	.381,	.285,	.196,	.169,	.210,	.285,	.356,	.380,	.374,
5	.364,	.355,	.345,	.336,	.326,	.274,	.229,	.197,	

6	.633,	.661,	.695,	.725,	.758,	.753,	.714,	.661,	.569,
6	.478,	.387,	.285,	.263,	.304,	.372,	.430,	.453,	.450,
6	.441,	.433,	.424,	.416,	.408,	.365,	.328,	.292,	
7	.742,	.777,	.813,	.842,	.874,	.857,	.802,	.730,	.641,
7	.553,	.464,	.353,	.319,	.357,	.432,	.503,	.530,	.525,
7	.519,	.512,	.506,	.499,	.492,	.452,	.422,	.393/	

DATA((CL318(I,J),J=1,26),I=1,4)/

1	-.157,	-.175,	-.196,	-.213,	-.236,	-.269,	-.319,	-.388,	-.457,
1	-.527,	-.599,	-.650,	-.631,	-.555,	-.473,	-.385,	-.371,	-.379,
1	-.386,	-.394,	-.402,	-.408,	-.410,	-.412,	-.411,	-.410,	
2	-.007,	-.011,	-.014,	-.015,	-.023,	-.052,	-.096,	-.153,	-.227,
2	-.313,	-.404,	-.492,	-.473,	-.347,	-.239,	-.204,	-.210,	-.215,
2	-.221,	-.227,	-.229,	-.232,	-.235,	-.244,	-.248,	-.256,	
3	.148,	.155,	.161,	.167,	.173,	.155,	.104,	.017,	-.072,
3	-.161,	-.243,	-.288,	-.243,	-.140,	-.048,	-.004,	-.006,	-.009,
3	-.013,	-.016,	-.020,	-.023,	-.027,	-.042,	-.053,	-.063,	
4	.318,	.331,	.337,	.339,	.341,	.305,	.248,	.162,	.076,
4	-.010,	-.079,	-.109,	-.070,	.033,	.123,	.147,	.144,	.140,
4	.135,	.130,	.125,	.119,	.114,	.086,	.066,	.048/	

DATA((CL318(I,J),J=1,26),I=5,7)/

5	.456,	.470,	.486,	.494,	.485,	.443,	.382,	.310,	.225,
5	.140,	.069,	.039,	.096,	.188,	.263,	.294,	.289,	.283,
5	.274,	.264,	.254,	.246,	.239,	.201,	.170,	.143,	
6	.552,	.598,	.637,	.656,	.642,	.589,	.508,	.427,	.347,
6	.262,	.165,	.150,	.195,	.295,	.381,	.400,	.395,	.387,
6	.379,	.371,	.363,	.355,	.347,	.301,	.264,	.232,	
7	.653,	.706,	.753,	.782,	.744,	.661,	.572,	.483,	.394,
7	.305,	.204,	.179,	.235,	.337,	.416,	.433,	.429,	.419,
7	.409,	.400,	.392,	.383,	.376,	.339,	.303,	.271/	

DATA((CL321(I,J),J=1,26),I=1,4)/

1	-.239,	-.242,	-.237,	-.232,	-.226,	-.236,	-.264,	-.323,	-.389,
1	-.454,	-.480,	-.457,	-.378,	-.298,	-.243,	-.243,	-.245,	-.247,
1	-.249,	-.252,	-.254,	-.256,	-.258,	-.272,	-.285,	-.295,	
2	-.065,	-.063,	-.062,	-.052,	-.046,	-.053,	-.091,	-.175,	-.259,
2	-.333,	-.360,	-.332,	-.269,	-.166,	-.082,	-.082,	-.085,	-.087,
2	-.090,	-.092,	-.095,	-.097,	-.100,	-.116,	-.133,	-.151,	
3	.095,	.095,	.098,	.105,	.117,	.113,	.093,	.012,	-.102,
3	-.216,	-.264,	-.242,	-.161,	-.035,	.020,	.020,	.017,	.014,
3	.012,	.009,	.006,	.004,	.001,	-.012,	-.024,	-.033,	
4	.243,	.255,	.263,	.281,	.295,	.291,	.255,	.176,	.033,
4	-.110,	-.162,	-.149,	-.070,	.071,	.124,	.122,	.117,	.111,
4	.106,	.100,	.095,	.089,	.084,	.062,	.044,	.026/	

DATA((CL321(I,J),J=1,26),I=5,7)/

5	.381,	.397,	.405,	.429,	.451,	.440,	.403,	.309,	.161,
5	.012,	-.035,	-.001,	.089,	.200,	.258,	.251,	.243,	.236,
5	.230,	.223,	.217,	.210,	.204,	.165,	.136,	.108,	
6	.450,	.471,	.492,	.537,	.560,	.544,	.498,	.379,	.243,
6	.106,	.056,	.071,	.161,	.289,	.336,	.332,	.326,	.320,
6	.313,	.306,	.299,	.293,	.286,	.246,	.207,	.170,	
7	.506,	.538,	.592,	.643,	.678,	.655,	.597,	.482,	.311,
7	.139,	.081,	.104,	.187,	.332,	.365,	.364,	.358,	.351,
7	.344,	.337,	.330,	.323,	.316,	.278,	.242,	.206/	

DATA((ALP304(J,N),N=1,9),J=1,13)/

&	-5.83,	-4.14,	-2.44,	-.59,	1.20,	3.32,	5.65,	8.32,	11.05,
&	-5.42,	-3.92,	-2.41,	-.73,	1.01,	2.95,	5.08,	7.60,	10.46,

&	-5.15,	-3.78,	-2.42,	-.86,	.83,	2.66,	4.67,	7.01,	9.88,
&	-5.00,	-3.71,	-2.41,	-.93,	.71,	2.50,	4.40,	6.60,	9.48,
&	-4.81,	-3.61,	-2.40,	-1.00,	.58,	2.33,	4.06,	6.12,	8.86,
&	-4.72,	-3.56,	-2.40,	-1.04,	.52,	2.26,	3.92,	5.85,	8.76,
&	-4.63,	-3.52,	-2.41,	-1.08,	.44,	2.16,	3.75,	5.65,	8.76,
&	-4.52,	-3.47,	-2.41,	-1.12,	.37,	2.08,	3.60,	5.62,	8.73,
&	-4.42,	-3.41,	-2.40,	-1.17,	.27,	1.99,	3.49,	5.70,	8.77,
&	-4.36,	-3.38,	-2.41,	-1.21,	.19,	1.89,	3.43,	5.84,	8.98,
&	-4.36,	-3.40,	-2.43,	-1.27,	.08,	1.76,	3.45,	6.09,	9.12,
&	-4.42,	-3.44,	-2.47,	-1.33,	-.05,	1.64,	3.55,	6.35,	9.38,
&	-4.57,	-3.54,	-2.52,	-1.36,	-.05,	1.68,	3.72,	6.62,	9.69/
DATA((ALP304(J,N),N=1,9),J=14,26)/									
&	-4.74,	-3.66,	-2.58,	-1.32,	.17,	1.95,	4.04,	6.90,	10.05,
&	-4.92,	-3.76,	-2.60,	-1.20,	.48,	2.26,	4.41,	7.19,	10.37,
&	-5.14,	-3.83,	-2.51,	-.94,	.78,	2.58,	4.74,	7.52,	10.64,
&	-5.53,	-3.88,	-2.22,	-.59,	1.07,	2.86,	5.01,	7.83,	10.91,
&	-5.83,	-3.90,	-1.98,	-.45,	1.18,	2.97,	5.14,	7.91,	10.85,
&	-5.61,	-3.90,	-2.18,	-.58,	1.02,	2.74,	4.83,	7.61,	10.62,
&	-5.35,	-3.86,	-2.37,	-.80,	.82,	2.52,	4.50,	7.21,	10.38,
&	-5.13,	-3.78,	-2.44,	-.97,	.61,	2.30,	4.23,	6.75,	10.23,
&	-4.97,	-3.73,	-2.48,	-1.03,	.59,	2.29,	4.23,	6.83,	9.86,
&	-4.89,	-3.66,	-2.43,	-.90,	.82,	2.64,	4.75,	7.45,	10.35,
&	-4.98,	-3.33,	-1.60,	.55,	3.11,	5.89,	8.78,	11.68,	14.58,
&	-5.19,	-2.94,	-.39,	2.88,	6.11,	9.16,	12.21,	15.27,	18.32,
&	-5.36,	-2.77,	.44,	4.00,	7.72,	11.39,	15.06,	18.73,	22.40/
DATA((ALP306(J,N),N=1,9),J=1,13)/									
&	-5.68,	-4.12,	-2.57,	-.75,	1.10,	3.29,	5.81,	8.64,	11.50,
&	-5.75,	-4.16,	-2.57,	-.83,	.97,	2.97,	5.24,	7.96,	10.90,
&	-5.75,	-4.17,	-2.59,	-.95,	.78,	2.63,	4.69,	7.20,	10.16,
&	-5.81,	-4.22,	-2.62,	-1.01,	.66,	2.44,	4.39,	6.71,	9.67,
&	-5.84,	-4.25,	-2.67,	-1.09,	.53,	2.26,	4.11,	6.21,	9.05,
&	-5.85,	-4.28,	-2.70,	-1.14,	.45,	2.17,	3.97,	5.99,	8.99,
&	-5.89,	-4.32,	-2.75,	-1.20,	.37,	2.09,	3.82,	5.96,	9.24,
&	-5.95,	-4.38,	-2.80,	-1.26,	.28,	2.01,	3.68,	6.18,	9.40,
&	-5.99,	-4.42,	-2.85,	-1.32,	.19,	1.85,	3.62,	6.62,	9.95,
&	-6.02,	-4.47,	-2.92,	-1.40,	.10,	1.71,	3.71,	7.09,	10.51,
&	-6.07,	-4.53,	-2.99,	-1.47,	.02,	1.64,	4.05,	7.60,	11.11,
&	-6.13,	-4.59,	-3.05,	-1.51,	.05,	1.92,	4.64,	8.13,	11.73,
&	-6.40,	-4.69,	-2.98,	-1.29,	.43,	2.44,	5.22,	8.64,	12.12/
DATA((ALP306(J,N),N=1,9),J=14,26)/									
&	-6.02,	-4.26,	-2.49,	-.84,	.88,	2.94,	5.79,	9.14,	12.50,
&	-5.27,	-3.62,	-1.98,	-.41,	1.32,	3.40,	6.34,	9.59,	12.85,
&	-4.62,	-3.07,	-1.52,	-.01,	1.72,	3.79,	6.85,	9.91,	12.96,
&	-4.18,	-2.79,	-1.35,	.16,	1.89,	3.94,	7.14,	10.32,	13.49,
&	-4.38,	-2.97,	-1.52,	0.00,	1.62,	3.63,	6.82,	10.05,	13.27,
&	-4.72,	-3.27,	-1.81,	-.29,	1.32,	3.27,	6.29,	9.46,	12.63,
&	-5.07,	-3.58,	-2.09,	-.57,	1.02,	2.89,	5.76,	8.86,	11.94,
&	-5.47,	-3.83,	-2.19,	-.70,	.92,	2.81,	5.40,	8.49,	11.54,
&	-5.52,	-3.80,	-2.09,	-.60,	1.11,	3.07,	5.68,	8.80,	11.92,
&	-5.47,	-3.72,	-1.98,	-.45,	1.39,	3.49,	6.26,	9.14,	12.01,
&	-5.09,	-3.16,	-1.20,	1.10,	4.18,	6.64,	9.36,	12.08,	14.80,
&	-4.83,	-2.70,	-.26,	3.18,	6.06,	8.96,	11.86,	14.75,	17.65,
&	-5.08,	-2.81,	.28,	3.86,	7.64,	11.85,	16.06,	20.27,	24.48/
DATA((ALP309(J,N),N=1,9),J=1,13)/									
&	-6.49,	-4.53,	-2.57,	-.54,	1.41,	3.81,	6.56,	9.25,	11.93,

&	-6.44,	-4.52,	-2.60,	-.64,	1.22,	3.31,	5.81,	8.62,	11.46,
&	-6.62,	-4.65,	-2.68,	-.77,	1.03,	2.94,	5.24,	7.84,	10.49,
&	-6.73,	-4.73,	-2.73,	-.83,	.92,	2.74,	4.92,	7.38,	9.96,
&	-6.81,	-4.80,	-2.79,	-.93,	.77,	2.49,	4.59,	7.27,	10.91,
&	-6.87,	-4.85,	-2.83,	-.97,	.70,	2.37,	4.40,	7.57,	12.97,
&	-6.90,	-4.88,	-2.86,	-1.02,	.63,	2.26,	4.32,	8.79,	16.34,
&	-6.94,	-4.92,	-2.90,	-1.07,	.57,	2.22,	4.60,	11.27,	21.02,
&	-6.92,	-4.94,	-2.96,	-1.14,	.54,	2.34,	5.35,	12.39,	20.24,
&	-7.08,	-5.06,	-3.04,	-1.14,	.73,	3.06,	6.61,	13.06,	19.52,
&	-6.46,	-4.57,	-2.67,	-.80,	1.40,	3.97,	8.08,	13.72,	19.35,
&	-5.53,	-3.71,	-1.89,	-.14,	2.34,	4.93,	9.17,	14.05,	18.93,
&	-4.52,	-2.77,	-1.09,	.78,	3.13,	5.75,	10.04,	14.49,	18.93/
DATA((ALP309(J,N),N=1,9),J=14,26)/									
&	-3.86,	-2.14,	-.49,	1.43,	3.66,	6.43,	10.92,	15.42,	19.91,
&	-3.86,	-2.16,	-.47,	1.41,	3.61,	6.10,	10.92,	15.73,	20.55,
&	-4.12,	-2.54,	-.85,	.99,	3.12,	5.53,	10.08,	15.14,	20.20,
&	-4.66,	-2.96,	-1.27,	.49,	2.52,	4.95,	9.09,	14.29,	19.48,
&	-5.09,	-3.29,	-1.51,	.24,	2.27,	4.74,	8.77,	14.25,	19.73,
&	-5.17,	-3.33,	-1.50,	.34,	2.40,	4.92,	9.16,	14.57,	19.97,
&	-5.18,	-3.31,	-1.43,	.49,	2.63,	5.21,	9.59,	14.66,	19.72,
&	-5.21,	-3.29,	-1.36,	.64,	2.89,	5.54,	10.02,	14.84,	19.66,
&	-5.23,	-3.26,	-1.28,	.81,	3.15,	5.89,	10.36,	14.91,	19.45,
&	-5.26,	-3.24,	-1.19,	.98,	3.43,	6.37,	10.72,	15.07,	19.41,
&	-5.33,	-3.06,	-.56,	2.07,	5.08,	9.00,	13.26,	17.51,	21.77,
&	-5.41,	-2.91,	.04,	3.13,	6.64,	10.42,	14.19,	17.96,	21.74,
&	-5.60,	-2.91,	.49,	3.98,	7.87,	11.48,	15.08,	18.68,	22.29/
DATA((ALP312(J,N),N=1,9),J=1,13)/									
&	-7.51,	-5.10,	-2.69,	-.18,	1.90,	4.70,	7.60,	10.44,	13.28,
&	-7.24,	-4.97,	-2.69,	-.33,	1.74,	4.20,	6.93,	9.94,	12.95,
&	-6.69,	-4.70,	-2.71,	-.49,	1.58,	3.85,	6.33,	9.58,	12.83,
&	-6.33,	-4.52,	-2.71,	-.58,	1.49,	3.64,	5.89,	9.22,	12.61,
&	-6.00,	-4.36,	-2.72,	-.71,	1.36,	3.43,	5.55,	8.51,	11.68,
&	-5.85,	-4.29,	-2.73,	-.76,	1.28,	3.28,	5.40,	9.24,	13.73,
&	-5.64,	-4.20,	-2.75,	-.85,	1.19,	3.39,	5.64,	11.39,	17.84,
&	-5.48,	-4.12,	-2.76,	-.95,	1.21,	4.08,	6.79,	13.14,	19.49,
&	-5.31,	-3.97,	-2.64,	-.88,	1.66,	4.69,	9.02,	16.29,	23.56,
&	-5.16,	-3.71,	-2.26,	-.33,	2.70,	5.41,	11.21,	18.10,	25.00,
&	-4.97,	-3.35,	-1.63,	.79,	3.66,	6.70,	13.05,	19.40,	25.75,
&	-4.68,	-2.79,	-.64,	1.78,	4.53,	8.74,	14.62,	20.50,	26.38,
&	-4.06,	-1.92,	.34,	2.63,	5.42,	10.42,	15.97,	21.53,	27.08/
DATA((ALP312(J,N),N=1,9),J=14,26)/									
&	-3.87,	-1.62,	.63,	2.99,	5.80,	10.96,	16.29,	21.63,	26.96,
&	-4.15,	-1.96,	.39,	2.64,	5.37,	10.22,	15.62,	21.03,	26.43,
&	-5.62,	-2.80,	-.38,	1.85,	4.53,	8.89,	14.60,	20.31,	26.03,
&	-6.89,	-3.83,	-1.08,	1.16,	3.69,	7.08,	12.34,	17.61,	22.87,
&	-7.30,	-4.20,	-1.33,	.90,	3.32,	6.43,	12.14,	17.86,	23.57,
&	-7.34,	-4.14,	-1.20,	1.06,	3.52,	6.77,	12.92,	19.08,	25.23,
&	-7.23,	-4.00,	-1.04,	1.28,	3.81,	7.30,	12.93,	18.56,	24.20,
&	-7.08,	-3.85,	-.90,	1.49,	4.09,	7.74,	12.94,	18.13,	23.32,
&	-6.91,	-3.71,	-.76,	1.66,	4.37,	8.09,	12.80,	17.51,	22.21,
&	-6.81,	-3.58,	-.61,	1.86,	4.62,	8.39,	12.74,	17.09,	21.43,
&	-6.28,	-2.98,	.11,	2.87,	5.95,	9.86,	13.78,	17.71,	21.63,
&	-6.05,	-2.77,	.45,	3.70,	7.14,	10.74,	14.34,	17.95,	21.55,
&	-6.15,	-2.76,	.72,	4.29,	7.89,	11.50,	15.10,	18.70,	22.31/
DATA((ALP315(J,N),N=1,9),J=1,13)/									

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& -7.76, -5.03, -2.31, .03, 2.37, 5.44, 9.06, 12.73, 16.40,
& -7.88, -5.12, -2.36, .06, 2.18, 5.01, 8.40, 11.84, 15.29,
& -7.70, -5.07, -2.43, .02, 1.99, 4.57, 7.78, 11.17, 14.56,
& -7.53, -5.00, -2.47, -.02, 1.90, 4.24, 7.28, 10.70, 14.12,
& -7.39, -4.95, -2.51, -.13, 1.79, 3.95, 6.72, 10.17, 13.62,
& -7.32, -4.92, -2.53, -.18, 1.72, 3.95, 6.90, 10.75, 14.60,
& -7.25, -4.89, -2.54, -.20, 1.76, 4.35, 7.95, 12.50, 17.05,
& -6.92, -4.70, -2.48, 0.00, 2.03, 5.10, 10.03, 15.83, 21.62,
& -5.72, -3.89, -2.06, .61, 3.05, 6.86, 12.42, 17.97, 23.53,
& -5.11, -3.15, -.80, 1.48, 4.39, 9.25, 14.59, 19.92, 25.25,
& -4.42, -2.22, .43, 2.71, 6.34, 11.53, 16.73, 21.92, 27.12,
& -3.56, -.92, 1.40, 4.09, 9.38, 15.26, 21.15, 27.03, 32.91,
& -3.25, -.33, 1.83, 4.66, 10.89, 18.04, 25.18, 32.32, 39.46/
DATA((ALP315(J,N),N=1,9),J=14,26)/
& -3.59, -.92, 1.47, 3.87, 9.62, 17.17, 24.72, 32.26, 39.81,
& -4.60, -2.10, .70, 2.90, 6.93, 13.60, 20.27, 26.93, 33.60,
& -6.40, -3.20, -.05, 1.95, 5.19, 10.66, 16.14, 21.62, 27.10,
& -8.34, -4.13, -.44, 1.69, 4.55, 9.82, 15.01, 20.21, 25.40,
& -8.59, -4.20, -.43, 1.77, 4.68, 10.00, 15.33, 20.67, 26.00,
& -8.72, -4.22, -.37, 1.85, 4.94, 10.08, 15.21, 20.33, 25.46,
& -8.83, -4.23, -.33, 1.94, 5.15, 10.23, 15.29, 20.35, 25.42,
& -8.88, -4.23, -.27, 2.01, 5.39, 10.29, 15.17, 20.05, 24.93,
& -9.00, -4.24, -.20, 2.11, 5.60, 10.43, 15.25, 20.07, 24.89,
& -9.06, -4.24, -.16, 2.21, 5.80, 10.57, 15.33, 20.10, 24.86,
& -9.01, -4.07, .12, 2.83, 6.80, 11.40, 16.00, 20.60, 25.20,
& -7.98, -3.72, .32, 3.49, 7.53, 11.79, 16.04, 20.30, 24.55,
& -7.31, -3.50, .40, 4.06, 8.14, 12.10, 16.06, 20.02, 23.98/
DATA((ALP318(J,N),N=1,9),J=1,13)/
& -7.24, -4.57, -1.91, .61, 3.19, 6.95, 10.91, 14.87, 18.83,
& -6.74, -4.30, -1.87, .51, 2.99, 6.04, 9.74, 13.44, 17.15,
& -6.24, -4.04, -1.84, .44, 2.85, 5.51, 8.81, 12.26, 15.71,
& -5.89, -3.87, -1.84, .38, 2.79, 5.31, 8.29, 11.46, 14.63,
& -5.54, -3.66, -1.77, .32, 2.82, 5.46, 9.10, 13.02, 16.94,
& -5.21, -3.36, -1.50, .60, 3.38, 6.31, 11.86, 17.42, 22.97,
& -4.73, -2.93, -1.04, 1.33, 4.29, 8.88, 15.13, 21.38, 27.63,
& -4.10, -2.40, -.20, 2.51, 5.54, 12.18, 19.32, 26.46, 33.61,
& -3.50, -1.65, .97, 3.66, 8.26, 16.77, 25.28, 33.79, 42.30,
& -2.81, -.51, 2.13, 4.98, 12.42, 21.72, 31.02, 40.33, 49.63,
& -1.95, .52, 3.07, 7.79, 18.05, 28.31, 38.56, 48.82, 59.08,
& -1.10, .98, 3.47, 9.45, 23.24, 37.03, 50.83, 64.62, 78.41,
& -1.37, .50, 2.84, 6.25, 16.25, 26.25, 36.25, 46.25, 56.25/
DATA((ALP318(J,N),N=1,9),J=14,26)/
& -2.51, -.58, 1.62, 4.22, 11.00, 20.52, 30.05, 39.57, 49.10,
& -3.38, -1.59, .56, 3.10, 7.09, 18.51, 29.94, 41.37, 52.80,
& -4.17, -1.96, .05, 2.72, 6.00, 18.12, 30.24, 42.36, 54.48,
& -4.36, -1.90, .08, 2.77, 6.29, 18.06, 29.82, 41.59, 53.35,
& -4.26, -1.85, .12, 2.84, 6.81, 19.31, 31.81, 44.31, 56.81,
& -4.17, -1.80, .18, 2.94, 7.40, 20.73, 34.07, 47.40, 60.73,
& -4.07, -1.74, .22, 3.04, 8.00, 21.79, 35.59, 49.38, 63.17,
& -3.98, -1.72, .28, 3.16, 8.55, 22.34, 36.14, 49.93, 63.72,
& -3.91, -1.69, .32, 3.28, 9.21, 23.50, 37.79, 52.07, 66.36,
& -3.89, -1.66, .38, 3.38, 9.66, 23.45, 37.24, 51.03, 64.83,
& -3.86, -1.56, .66, 3.98, 11.21, 21.74, 32.26, 42.79, 53.32,
& -3.87, -1.51, .89, 4.64, 12.97, 23.23, 33.49, 43.74, 54.00,
& -3.87, -1.42, 1.14, 5.28, 14.62, 24.87, 35.13, 45.38, 55.64/

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DATA((ALP321(J,N),N=1,9),J=1,13)/
& -5.85, -3.55, -1.19, 1.42, 4.55, 11.36, 18.50, 25.64, 32.79,
& -5.77, -3.53, -1.20, 1.31, 4.08, 9.85, 15.82, 21.79, 27.76,
& -5.86, -3.58, -1.23, 1.24, 3.93, 8.16, 12.16, 16.16, 20.16,
& -5.87, -3.64, -1.34, 1.08, 3.61, 7.19, 10.96, 14.74, 18.51,
& -5.93, -3.71, -1.44, .93, 3.35, 6.68, 10.07, 13.46, 16.85,
& -5.79, -3.61, -1.36, .98, 3.46, 7.01, 10.61, 14.22, 17.82,
& -5.57, -3.26, -1.01, 1.32, 3.96, 8.06, 12.10, 16.14, 20.18,
& -5.04, -2.34, -.13, 2.36, 6.41, 10.29, 14.17, 18.06, 21.94,
& -4.17, -1.25, 1.51, 4.95, 10.62, 16.50, 22.38, 28.26, 34.15,
& -3.11, .30, 3.80, 11.70, 23.82, 35.94, 48.06, 60.18, 72.30,
& -2.67, 1.25, 4.77, 17.52, 33.52, 49.52, 65.52, 81.52, 97.52,
& -3.09, .90, 4.03, 13.82, 25.94, 38.06, 50.18, 62.30, 74.42,
& -4.40, -.72, 2.88, 9.00, 24.38, 39.77, 55.15, 70.54, 85.92/
DATA((ALP321(J,N),N=1,9),J=14,26)/
& -5.55, -2.52, .66, 4.00, 11.16, 20.47, 29.77, 39.07, 48.37,
& -5.95, -3.47, -.39, 3.13, 10.41, 24.21, 38.00, 51.79, 65.59,
& -5.95, -3.47, -.39, 3.21, 10.25, 22.75, 35.25, 47.75, 60.25,
& -5.94, -3.44, -.33, 3.32, 10.63, 23.13, 35.63, 48.13, 60.63,
& -5.91, -3.41, -.28, 3.42, 11.16, 24.06, 36.97, 49.87, 62.77,
& -5.90, -3.38, -.24, 3.52, 11.61, 24.52, 37.42, 50.32, 63.23,
& -5.85, -3.35, -.18, 3.63, 12.06, 24.97, 37.87, 50.77, 63.68,
& -5.84, -3.32, -.12, 3.72, 12.52, 25.42, 38.32, 51.23, 64.13,
& -5.81, -3.30, -.08, 3.83, 13.13, 26.47, 39.80, 53.13, 66.47,
& -5.80, -3.27, -.02, 3.93, 13.60, 26.93, 40.27, 53.60, 66.93,
& -5.64, -3.08, .32, 4.86, 15.63, 28.13, 40.63, 53.13, 65.63,
& -5.51, -2.88, .71, 5.80, 17.03, 28.46, 39.89, 51.31, 62.74,
& -5.46, -2.68, 1.12, 7.67, 18.78, 29.89, 41.00, 52.11, 63.22/
DATA((CD304(I,J),J=1,26),I=1,5)/
1 .0095, .0093, .0092, .0092, .0091, .0091, .0091, .0091, .0091,
1 .0094, .0096, .0102, .0115, .0147, .0192, .0237, .0273, .0295,
1 .0318, .0332, .0345, .0357, .0365, .0319, .0240, .0193,
2 .0049, .0049, .0049, .0049, .0049, .0049, .0049, .0049, .0049,
2 .0049, .0049, .0054, .0080, .0120, .0167, .0207, .0237, .0265,
2 .0290, .0311, .0324, .0333, .0337, .0339, .0314, .0284,
3 .0049, .0049, .0049, .0049, .0049, .0049, .0049, .0049, .0049,
3 .0049, .0049, .0059, .0094, .0152, .0213, .0263, .0292, .0317,
3 .0336, .0354, .0367, .0380, .0393, .0469, .0549, .0629,
4 .0084, .0083, .0083, .0080, .0075, .0074, .0073, .0073, .0075,
4 .0078, .0085, .0121, .0176, .0237, .0309, .0383, .0459, .0532,
4 .0597, .0662, .0713, .0758, .0802, .0974, .1106, .1227,
5 .0435, .0220, .0150, .0133, .0121, .0116, .0116, .0118, .0124,
5 .0151, .0212, .0282, .0369, .0478, .0598, .0724, .0837, .0947,
5 .1046, .1130, .1215, .1292, .1349, .1574, .1728, .1843/
DATA((CD306(I,J),J=1,26),I=1,5)/
1 .0095, .0094, .0094, .0093, .0093, .0093, .0093, .0093, .0092,
1 .0092, .0096, .0108, .0159, .0218, .0277, .0336, .0390, .0431,
1 .0465, .0478, .0488, .0488, .0482, .0424, .0353, .0280,
2 .0044, .0045, .0045, .0045, .0045, .0045, .0045, .0045, .0045,
2 .0050, .0060, .0092, .0136, .0179, .0222, .0270, .0319, .0350,
2 .0378, .0407, .0420, .0426, .0432, .0433, .0397, .0350,
3 .0046, .0046, .0046, .0046, .0046, .0046, .0046, .0046, .0051,
3 .0058, .0097, .0138, .0180, .0221, .0262, .0308, .0361, .0398,
3 .0428, .0457, .0472, .0487, .0501, .0579, .0648, .0705,
4 .0073, .0073, .0073, .0072, .0067, .0065, .0065, .0067, .0076,

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4 .0110, .0171, .0231, .0292, .0353, .0414, .0478, .0559, .0641,
4 .0706, .0760, .0815, .0869, .0909, .1080, .1109, .1142,
5 .0292, .0207, .0161, .0144, .0137, .0134, .0139, .0145, .0166,
5 .0192, .0280, .0408, .0536, .0664, .0799, .0991, .1170, .1271,
5 .1373, .1472, .1555, .1639, .1722, .2071, .2243, .2266/

DATA((CD309(I,J),J=1,26),I=1,5)/

1 .0094, .0093, .0092, .0092, .0092, .0092, .0092, .0092, .0092,
1 .0099, .0129, .0171, .0217, .0274, .0331, .0387, .0447, .0509,
1 .0569, .0617, .0663, .0693, .0696, .0636, .0569, .0498,
2 .0059, .0059, .0059, .0058, .0058, .0059, .0059, .0061, .0065,
2 .0078, .0113, .0155, .0202, .0249, .0307, .0365, .0422, .0482,
2 .0542, .0601, .0640, .0680, .0707, .0691, .0642, .0583,
3 .0059, .0058, .0057, .0058, .0058, .0059, .0060, .0064, .0068,
3 .0083, .0121, .0175, .0234, .0299, .0367, .0442, .0516, .0582,
3 .0647, .0688, .0729, .0770, .0786, .0857, .0890, .0915,
4 .0114, .0094, .0080, .0076, .0077, .0079, .0083, .0091, .0114,
4 .0137, .0183, .0241, .0350, .0460, .0576, .0698, .0816, .0897,
4 .0977, .1058, .1100, .1142, .1185, .1300, .1353, .1353,
5 .0230, .0172, .0142, .0133, .0128, .0133, .0143, .0181, .0218,
5 .0273, .0361, .0473, .0620, .0773, .0934, .1089, .1222, .1354,
5 .1462, .1550, .1637, .1683, .1699, .1772, .1835, .1894/

DATA((CD312(I,J),J=1,26),I=1,5)/

1 .0099, .0099, .0098, .0098, .0098, .0098, .0097, .0097, .0098,
1 .0114, .0182, .0261, .0352, .0448, .0547, .0649, .0746, .0829,
1 .0908, .0955, .1001, .1011, .1009, .0973, .0872, .0736,
2 .0061, .0060, .0060, .0060, .0060, .0060, .0060, .0060, .0066,
2 .0095, .0156, .0235, .0327, .0429, .0526, .0619, .0707, .0784,
2 .0851, .0919, .0968, .1013, .1046, .0996, .0906, .0793,
3 .0061, .0061, .0061, .0060, .0060, .0060, .0061, .0073, .0098,
3 .0144, .0200, .0284, .0375, .0473, .0573, .0672, .0766, .0857,
3 .0936, .0996, .1057, .1098, .1135, .1135, .1110, .1082,
4 .0125, .0106, .0096, .0097, .0100, .0101, .0104, .0117, .0168,
4 .0226, .0320, .0423, .0525, .0647, .0780, .0903, .1011, .1109,
4 .1193, .1278, .1349, .1410, .1471, .1646, .1718, .1749,
5 .0204, .0180, .0169, .0168, .0168, .0170, .0185, .0242, .0365,
5 .0528, .0724, .0906, .1070, .1213, .1351, .1487, .1622, .1753,
5 .1879, .2004, .2130, .2226, .2309, .2661, .2646, .2631/

DATA((CD315(I,J),J=1,26),I=1,5)/

1 .0084, .0088, .0089, .0090, .0091, .0091, .0091, .0094, .0116,
1 .0206, .0319, .0438, .0563, .0688, .0803, .0912, .1016, .1117,
1 .1209, .1292, .1353, .1397, .1437, .1382, .1223, .1063,
2 .0078, .0078, .0078, .0078, .0082, .0086, .0093, .0104, .0141,
2 .0234, .0346, .0458, .0577, .0696, .0800, .0903, .0992, .1082,
2 .1172, .1234, .1291, .1348, .1390, .1393, .1330, .1236,
3 .0091, .0082, .0082, .0083, .0089, .0092, .0099, .0115, .0173,
3 .0276, .0394, .0511, .0630, .0749, .0853, .0953, .1053, .1152,
3 .1240, .1310, .1381, .1451, .1470, .1518, .1521, .1521,
4 .0090, .0115, .0128, .0134, .0140, .0149, .0169, .0204, .0275,
4 .0422, .0581, .0717, .0835, .0962, .1092, .1218, .1341, .1444,
4 .1533, .1623, .1688, .1743, .1799, .1975, .2035, .2095,
5 .0235, .0206, .0203, .0207, .0215, .0228, .0262, .0384, .0564,
5 .0782, .0993, .1199, .1383, .1548, .1699, .1836, .1974, .2101,
5 .2215, .2330, .2425, .2491, .2556, .2677, .2715, .2753/

DATA((CD318(I,J),J=1,26),I=1,5)/

1 .0106, .0136, .0151, .0158, .0166, .0169, .0173, .0186, .0228,

```

1 .0337, .0486, .0633, .0765, .0887, .1008, .1129, .1203, .1272,
1 .1340, .1401, .1448, .1495, .1520, .1519, .1490, .1449,
2 .0082, .0081, .0080, .0080, .0081, .0083, .0090, .0148, .0267,
2 .0386, .0516, .0693, .0851, .0994, .1112, .1228, .1316, .1367,
2 .1418, .1468, .1503, .1537, .1571, .1606, .1577, .1533,
3 .0096, .0096, .0097, .0097, .0097, .0102, .0117, .0195, .0313,
3 .0431, .0579, .0752, .0912, .1049, .1184, .1263, .1341, .1420,
3 .1498, .1563, .1617, .1670, .1723, .1752, .1765, .1779,
4 .0169, .0176, .0179, .0180, .0191, .0205, .0261, .0411, .0562,
4 .0713, .0877, .1044, .1181, .1305, .1430, .1554, .1663, .1735,
4 .1807, .1879, .1950, .2007, .2058, .2196, .2280, .2365,
5 .0282, .0331, .0355, .0367, .0392, .0419, .0489, .0651, .0887,
5 .1122, .1365, .1619, .1860, .2085, .2298, .2470, .2642, .2767,
5 .2863, .2959, .3022, .3083, .3118, .3252, .3386, .3520/
DATA((CD321(I,J),J=1,26),I=1,5)/
1 .0119, .0126, .0125, .0125, .0128, .0133, .0148, .0178, .0269,
1 .0411, .0565, .0721, .0879, .1038, .1179, .1304, .1428, .1545,
1 .1618, .1691, .1764, .1822, .1836, .1886, .1894, .1903,
2 .0095, .0094, .0094, .0094, .0094, .0101, .0121, .0221, .0320,
2 .0454, .0601, .0781, .0965, .1123, .1251, .1378, .1505, .1622,
2 .1700, .1779, .1857, .1936, .1956, .2014, .2014, .2014,
3 .0111, .0113, .0113, .0114, .0114, .0120, .0174, .0273, .0383,
3 .0542, .0703, .0874, .1044, .1191, .1322, .1452, .1583, .1713,
3 .1843, .1961, .2030, .2099, .2168, .2207, .2219, .2231,
4 .0269, .0213, .0208, .0211, .0231, .0264, .0368, .0533, .0705,
4 .0878, .1046, .1214, .1382, .1534, .1686, .1838, .1990, .2098,
4 .2186, .2274, .2362, .2450, .2538, .2649, .2663, .2676,
5 .0439, .0387, .0388, .0400, .0448, .0549, .0735, .0921, .1132,
5 .1344, .1548, .1750, .1969, .2210, .2450, .2664, .2843, .3022,
5 .3068, .3069, .3071, .3072, .3074, .3083, .3092, .3102/
DATA(XMI(J),J=1,26)/.3,.5,.6,.65,.7,.725,.75,.775,
& .8,.825,.85,.875,.9,.925,.95,.975,1.0,1.025,1.05,1.075,
& 1.1,1.125,1.15,1.3,1.45,1.6/
DATA(CLI(J),J=1,9)/-.4,-.2,0.0,.2,.4,.6,.8,1.0,1.2/
DATA(ALPI(J),J=1,7)/-4.0,-2.0,0.0,2.0,4.0,6.0,8.0/
DATA(CLII(J),J=1,5)/0.0,.2,.4,.6,.8/
IORDER(1)=IORDER(2)=1
IPT (1) = -1
IF (IKEY .EQ. 2) GO TO 1000
IF (TR .LT. .04) GO TO 9
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 1
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 2
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 3
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 4
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 5
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 6
IF (TR .GE. .21) GO TO 7
9 CALL IBI (7,ALPI,26,XMI,7,CL304,IORDER,IPT,AA,XM,CLFT04,IERR)
CL=CLFT04
GO TO 400
1 CALL IBI (7,ALPI,26,XMI,7,CL304,IORDER,IPT,AA,XM,CLFT04,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL306,IORDER,IPT,AA,XM,CLFT06,IERR)
CL=CLFT04 + (CLFT06-CLFT04)*((TR-.04)/(.06-.04))
GO TO 400

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2 CALL IBI (7,ALPI,26,XMI,7,CL306,IORDER,IPT,AA,XM,CLFT06,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL309,IORDER,IPT,AA,XM,CLFT09,IERR)
  CL=CLFT06 + (CLFT09 - CLFT06)*((TR-.06)/(.09-.06))
  GO TO 400
3 CALL IBI (7,ALPI,26,XMI,7,CL309,IORDER,IPT,AA,XM,CLFT09,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL312,IORDER,IPT,AA,XM,CLFT12,IERR)
  CL=CLFT09+(CLFT12-CLFT09)*((TR-.09)/(.12-.09))
  GO TO 400
4 CALL IBI (7,ALPI,26,XMI,7,CL312,IORDER,IPT,AA,XM,CLFT12,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL315,IORDER,IPT,AA,XM,CLFT15,IERR)
  CL=CLFT12 + (CLFT15-CLFT12)*((TR-.12)/(.15-.12))
  GO TO 400
5 CALL IBI (7,ALPI,26,XMI,7,CL315,IORDER,IPT,AA,XM,CLFT15,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL318,IORDER,IPT,AA,XM,CLFT18,IERR)
  CL=CLFT15+(CLFT18-CLFT15)*((TR-.15)/(.18-.15))
  GO TO 400
6 CALL IBI (7,ALPI,26,XMI,7,CL318,IORDER,IPT,AA,XM,CLFT18,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL321,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT18+(CLFT21-CLFT18)*((TR-.18)/(.21-.18))
  GO TO 400
7 CALL IBI (7,ALPI,26,XMI,7,CL321,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT21
  GO TO 400
1000 CONTINUE
  IPT (1)=-1
  IF (TR .LT. .04) GO TO 90
  IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 10
  IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 20
  IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 30
  IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 40
  IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 50
  IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 60
  IF (TR .GE. .21) GO TO 70
90 CALL IBI (26,XMI,9,CLI,26,ALP304,IORDER,IPT,XM,CL,AA04,IERR)
  AA=AA04
  GO TO 400
10 CALL IBI (26,XMI,9,CLI,26,ALP304,IORDER,IPT,XM,CL,AA04,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP306,IORDER,IPT,XM,CL,AA06,IERR)
  AA=AA04 + (AA06-AA04)*((TR-.04)/(.06-.04))
  GO TO 400
20 CALL IBI (26,XMI,9,CLI,26,ALP306,IORDER,IPT,XM,CL,AA06,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP309,IORDER,IPT,XM,CL,AA09,IERR)
  AA=AA06 + (AA09 - AA06)*((TR -.06)/(.09-.06))
  GO TO 400
30 CALL IBI (26,XMI,9,CLI,26,ALP309,IORDER,IPT,XM,CL,AA09,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP312,IORDER,IPT,XM,CL,AA12,IERR)
  AA=AA09+(AA12-AA09)*((TR-.09)/(.12-.09))

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GO TO 400
40 CALL IBI (26,XMI,9,CLI,26,ALP312,IORDER,IPT,XM,CL,AA12,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP315,IORDER,IPT,XM,CL,AA15,IERR)
   AA=AA12+(AA15-AA12)*((TR-.12)/(.15-.12))
   GO TO 400
50 CALL IBI (26,XMI,9,CLI,26,ALP315,IORDER,IPT,XM,CL,AA15,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP318,IORDER,IPT,XM,CL,AA18,IERR)
   AA=AA15+(AA18-AA15)*((TR-.15)/(.18-.15))
   GO TO 400
60 CALL IBI (26,XMI,9,CLI,26,ALP318,IORDER,IPT,XM,CL,AA18,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP321,IORDER,IPT,XM,CL,AA21,IERR)
   AA=AA18+(AA21-AA18)*((TR-.18)/(.21-.18))
   GO TO 400
70 CALL IBI (26,XMI,9,CLI,26,ALP321,IORDER,IPT,XM,CL,AA21,IERR)
   AA=AA21
400 CONTINUE
   IPT (1)=-1
   IF (TR .LT. .04) GO TO 91
   IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 11
   IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 21
   IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 31
   IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 41
   IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 51
   IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 61
   IF (TR .GE. .21) GO TO 71
91 CALL IBI (5,CLII,26,XMI,5,CD304,IORDER,IPT,CL,XM,CDRG04,IERR)
   CD=CDRG04
   WRITE (6,201) TR
201 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
&*/* THE VALUES FOR T/C=.04 HAVE BEEN RETURNED*)
   GO TO 250
11 CALL IBI (5,CLII,26,XMI,5,CD304,IORDER,IPT,CL,XM,CDRG04,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD306,IORDER,IPT,CL,XM,CDRG06,IERR)
   CD=CDRG04 + (CDRG06-CDRG04)*((TR-.04)/(.06-.04))
   GO TO 250
21 CALL IBI (5,CLII,26,XMI,5,CD306,IORDER,IPT,CL,XM,CDRG06,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD309,IORDER,IPT,CL,XM,CDRG09,IERR)
   CD=CDRG06 + (CDRG09 - CDRG06)*((TR-.06)/(.09-.06))
   GO TO 250
31 CALL IBI (5,CLII,26,XMI,5,CD309,IORDER,IPT,CL,XM,CDRG09,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD312,IORDER,IPT,CL,XM,CDRG12,IERR)
   CD=CDRG09+(CDRG12-CDRG09)*((TR-.09)/(.12-.09))
   GO TO 250
41 CALL IBI (5,CLII,26,XMI,5,CD312,IORDER,IPT,CL,XM,CDRG12,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD315,IORDER,IPT,CL,XM,CDRG15,IERR)
   CD=CDRG12 + (CDRG15-CDRG12)*((TR-.12)/(.15-.12))
   GO TO 250
51 CALL IBI (5,CLII,26,XMI,5,CD315,IORDER,IPT,CL,XM,CDRG15,IERR)

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IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD318,IORDER,IPT,CL,XM,CDRG18,IERR)
CD=CDRG15+(CDRG18-CDRG15)*((TR-.15)/(.18-.15))
GO TO 250
61 CALL IBI (5,CLII,26,XMI,5,CD318,IORDER,IPT,CL,XM,CDRG18,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD321,IORDER,IPT,CL,XM,CDRG21,IERR)
CD=CDRG18+(CDRG21-CDRG18)*((TR-.18)/(.21-.18))
GO TO 250
71 CALL IBI (5,CLII,26,XMI,5,CD321,IORDER,IPT,CL,XM,CDRG21,IERR)
CD=CDRG21
IF (TR .GT. .21) WRITE(6,204) TR
204 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
&*/* THE VALUES FOR T/C=.21 HAVE BEEN RETURNED.*)
250 IF (CL .GT. .8) GO TO 251
RETURN
251 CALL COMPUT(D,XM,ALT,COR,TR,AA,CDT,CL,CD,CLDES)
CD=CDT
RETURN
END

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SUBROUTINE AERO4(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)

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C
C
C THIS SUBROUTINE IS DESIGNED TO COMPUTE THE AIRFOIL
C CHARACTERISTICS FOR A 16 SERIES AIRFOIL WITH A GIVEN CAMBER.
C
C THIS SUBROUTINE RELATES CL,CD,CL/CD,MACH,T/C,AND ALPHA.
C IT REPRESENTS THE DATA OF A 16-4XX AIRFOIL.
C
C XM=RELATIVE MACH NO. AT BLADE ELEMENT
C AA=ANGLE OF ATTACK IN DEGREES
C IKEY1: CL=CL(MACH,ALPHA,T/C)
C       : CD=CD(MACH,CL,T/C)
C       : XLD=CL/CD
C IKEY2: ALPHA=ALPHA(MACH,CL,T/C)
C       : CD=CD(MACH,CL,T/C)
C       : XLD=CL/CD
C TR=T/C
C
C
C
C
C

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DIMENSION IORDER(2),IPT(2),ALP404(26,9),ALP406(26,9),
& ALP409(26,9),ALP412(26,9),ALP415(26,9),ALP418(26,9),
& ALP421(26,9),CLI(9),XMI(26),ALPI(7),CL404(7,26),
& CL406(7,26),CL409(7,26),CL412(7,26),CL415(7,26),
& CL418(7,26),CL421(7,26),CD404(5,26),CD406(5,26),
& CD409(5,26),CD412(5,26),CD415(5,26),CD418(5,26),
& CD421(5,26),CLII(5)

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DATA((CL404(I,J),J=1,26),I=1,4)/
1 -.107, -.122, -.130, -.132, -.131, -.129, -.126, -.124, -.120,
1 -.116, -.108, -.095, -.083, -.061, -.058, -.086, -.193, -.245,

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1	-.219,	-.194,	-.173,	-.164,	-.182,	-.262,	-.277,	-.258,	
2	.123,	.129,	.140,	.150,	.160,	.165,	.171,	.177,	.182,
2	.196,	.211,	.225,	.239,	.234,	.208,	.145,	.035,	.002,
2	.033,	.075,	.108,	.113,	.094,	-.035,	-.115,	-.123,	
3	.354,	.373,	.392,	.404,	.416,	.421,	.427,	.434,	.445,
3	.456,	.468,	.479,	.489,	.469,	.410,	.338,	.286,	.263,
3	.289,	.320,	.346,	.361,	.335,	.154,	.023,	-.015,	
4	.571,	.601,	.621,	.638,	.655,	.663,	.672,	.681,	.691,
4	.701,	.711,	.723,	.717,	.670,	.620,	.570,	.520,	.492,
4	.519,	.558,	.597,	.619,	.595,	.305,	.128,	.094/	

DATA((CL404(I,J),J=1,26),I=5,7)/

5	.713,	.757,	.793,	.821,	.849,	.868,	.888,	.908,	.927,
5	.942,	.940,	.923,	.901,	.869,	.825,	.775,	.730,	.717,
5	.747,	.790,	.821,	.828,	.786,	.478,	.272,	.209,	
6	.874,	.933,	.980,	1.006,	1.042,	1.060,	1.077,	1.089,	1.097,
6	1.092,	1.073,	1.052,	1.027,	.998,	.969,	.928,	.882,	.868,
6	.891,	.937,	.972,	.978,	.938,	.618,	.395,	.314,	
7	1.019,	1.074,	1.123,	1.152,	1.193,	1.213,	1.222,	1.215,	1.204,
7	1.183,	1.161,	1.135,	1.108,	1.081,	1.054,	1.030,	1.006,	.995,
7	1.020,	1.059,	1.098,	1.108,	1.075,	.761,	.534,	.425/	

DATA((CL406(I,J),J=1,26),I=1,4)/

1	-.142,	-.126,	-.117,	-.110,	-.104,	-.100,	-.097,	-.094,	-.090,
1	-.086,	-.081,	-.077,	-.113,	-.207,	-.317,	-.426,	-.484,	-.452,
1	-.398,	-.343,	-.313,	-.323,	-.337,	-.398,	-.421,	-.433,	
2	.117,	.128,	.138,	.144,	.154,	.159,	.165,	.171,	.176,
2	.182,	.178,	.149,	.086,	.017,	-.052,	-.121,	-.137,	-.112,
2	-.071,	-.032,	-.012,	-.030,	-.056,	-.150,	-.161,	-.161,	
3	.349,	.368,	.388,	.405,	.423,	.432,	.441,	.449,	.461,
3	.473,	.477,	.446,	.381,	.317,	.252,	.184,	.157,	.188,
3	.231,	.271,	.281,	.257,	.227,	.072,	-.014,	-.024,	
4	.549,	.596,	.627,	.645,	.663,	.674,	.687,	.699,	.710,
4	.708,	.685,	.635,	.581,	.527,	.473,	.425,	.398,	.419,
4	.461,	.501,	.515,	.479,	.434,	.219,	.112,	.091/	

DATA((CL406(I,J),J=1,26),I=5,7)/

5	.693,	.740,	.785,	.812,	.841,	.859,	.879,	.900,	.912,
5	.896,	.860,	.816,	.772,	.727,	.674,	.621,	.595,	.624,
5	.669,	.714,	.726,	.681,	.625,	.361,	.236,	.199,	
6	.856,	.905,	.944,	.970,	1.002,	1.016,	1.019,	1.005,	.987,
6	.962,	.935,	.908,	.870,	.830,	.790,	.746,	.735,	.770,
6	.806,	.842,	.862,	.830,	.771,	.502,	.375,	.305,	
7	1.010,	1.064,	1.119,	1.157,	1.195,	1.196,	1.175,	1.143,	1.111,
7	1.079,	1.047,	1.016,	.984,	.952,	.920,	.882,	.858,	.887,
7	.929,	.969,	.987,	.958,	.913,	.659,	.508,	.423/	

DATA((CL409(I,J),J=1,26),I=1,4)/

1	-.079,	-.067,	-.044,	-.032,	-.018,	-.011,	-.004,	.004,	.011,
1	.016,	.015,	-.019,	-.096,	-.212,	-.421,	-.457,	-.425,	-.345,
1	-.276,	-.271,	-.276,	-.281,	-.285,	-.306,	-.309,	-.303,	
2	.125,	.138,	.153,	.160,	.173,	.179,	.185,	.191,	.198,
2	.209,	.174,	.099,	-.006,	-.111,	-.207,	-.217,	-.169,	-.107,
2	-.060,	-.056,	-.070,	-.083,	-.094,	-.130,	-.148,	-.164,	
3	.329,	.336,	.353,	.365,	.381,	.389,	.397,	.406,	.415,
3	.415,	.400,	.324,	.210,	.083,	.011,	.010,	.062,	.119,
3	.160,	.161,	.149,	.135,	.121,	.043,	-.015,	-.028,	
4	.520,	.544,	.568,	.585,	.607,	.620,	.634,	.646,	.652,
4	.632,	.583,	.493,	.393,	.293,	.225,	.219,	.270,	.329,

```

4 .367, .371, .353, .331, .310, .195, .124, .082/
DATA((CL409(I,J),J=1,26),I=5,7)/
5 .666, .709, .750, .776, .803, .815, .828, .836, .818,
5 .767, .687, .606, .526, .445, .387, .387, .439, .497,
5 .542, .537, .515, .491, .467, .338, .240, .196,
6 .798, .867, .917, .943, .973, .988, .992, .974, .927,
6 .862, .796, .731, .665, .600, .551, .559, .611, .666,
6 .708, .703, .681, .658, .634, .499, .385, .300,
7 .947, 1.008, 1.062, 1.094, 1.110, 1.099, 1.072, 1.042, .988,
7 .930, .871, .813, .755, .696, .650, .657, .712, .772,
7 .813, .800, .779, .758, .737, .613, .501, .414/
DATA((CL412(I,J),J=1,26),I=1,4)/
1 -.053, -.046, -.053, -.057, -.061, -.065, -.075, -.085, -.096,
1 -.179, -.274, -.370, -.465, -.518, -.498, -.419, -.316, -.270,
1 -.271, -.274, -.277, -.279, -.282, -.297, -.313, -.328,
2 .115, .140, .154, .164, .178, .185, .190, .186, .139,
2 .069, -.023, -.145, -.298, -.374, -.341, -.245, -.153, -.129,
2 -.123, -.124, -.128, -.132, -.136, -.159, -.187, -.197,
3 .285, .306, .318, .324, .333, .341, .349, .352, .336,
3 .282, .170, .043, -.078, -.124, -.091, -.009, .062, .091,
3 .088, .077, .065, .054, .047, .007, -.027, -.053,
4 .469, .495, .514, .529, .544, .552, .555, .540, .490,
4 .410, .309, .199, .100, .061, .098, .172, .246, .275,
4 .266, .253, .241, .229, .217, .153, .106, .063/
DATA((CL412(I,J),J=1,26),I=5,7)/
5 .607, .649, .681, .705, .729, .734, .716, .638, .561,
5 .484, .406, .329, .260, .224, .263, .339, .408, .436,
5 .423, .410, .397, .384, .371, .296, .234, .175,
6 .738, .802, .847, .877, .909, .898, .854, .792, .716,
6 .639, .563, .487, .411, .386, .424, .492, .561, .595,
6 .589, .574, .558, .542, .526, .428, .356, .286,
7 .862, .918, .970, 1.008, 1.030, 1.002, .958, .888, .811,
7 .735, .659, .582, .506, .469, .507, .577, .649, .678,
7 .669, .653, .638, .622, .607, .525, .456, .394/
DATA((CL415(I,J),J=1,26),I=1,4)/
1 -.070, -.073, -.082, -.088, -.094, -.098, -.111, -.157, -.226,
1 -.322, -.426, -.553, -.570, -.532, -.452, -.364, -.305, -.299,
1 -.299, -.299, -.299, -.299, -.299, -.300, -.303, -.305,
2 .073, .083, .097, .104, .110, .110, .105, .087, .034,
2 -.062, -.194, -.346, -.403, -.389, -.309, -.227, -.199, -.194,
2 -.194, -.194, -.193, -.193, -.193, -.194, -.206, -.218,
3 .240, .246, .254, .259, .263, .265, .266, .242, .184,
3 .092, -.040, -.196, -.263, -.228, -.122, -.033, -.012, -.014,
3 -.016, -.017, -.019, -.021, -.023, -.033, -.040, -.041,
4 .422, .438, .453, .461, .467, .473, .452, .412, .345,
4 .267, .127, -.018, -.063, -.014, .082, .150, .178, .174,
4 .168, .163, .157, .151, .145, .115, .089, .069/
DATA((CL415(I,J),J=1,26),I=5,7)/
5 .557, .585, .607, .621, .635, .630, .600, .531, .430,
5 .329, .228, .141, .108, .151, .240, .321, .350, .341,
5 .332, .323, .314, .305, .297, .248, .210, .180,
6 .671, .711, .746, .771, .791, .778, .741, .667, .575,
6 .466, .356, .253, .194, .237, .332, .424, .455, .451,
6 .442, .433, .424, .415, .405, .353, .321, .294,
7 .769, .809, .847, .882, .910, .898, .857, .770, .655,

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7	.539,	.423,	.315,	.269,	.310,	.401,	.484,	.514,	.507,
7	.500,	.491,	.481,	.471,	.463,	.423,	.388,	.363/	
DATA((CL418(I,J),J=1,26),I=1,4)/									
1	-.098,	-.101,	-.120,	-.129,	-.149,	-.205,	-.302,	-.398,	-.495,
1	-.591,	-.684,	-.745,	-.727,	-.636,	-.516,	-.405,	-.378,	-.377,
1	-.378,	-.379,	-.379,	-.380,	-.380,	-.383,	-.373,	-.361,	
2	.056,	.054,	.054,	.059,	.060,	.005,	-.087,	-.199,	-.310,
2	-.421,	-.521,	-.572,	-.531,	-.433,	-.309,	-.247,	-.246,	-.246,
2	-.246,	-.246,	-.246,	-.246,	-.246,	-.247,	-.248,	-.249,	
3	.204,	.213,	.221,	.226,	.225,	.185,	.091,	-.018,	-.126,
3	-.235,	-.344,	-.390,	-.358,	-.236,	-.116,	-.082,	-.083,	-.084,
3	-.085,	-.086,	-.088,	-.089,	-.090,	-.097,	-.096,	-.095,	
4	.378,	.387,	.398,	.404,	.397,	.334,	.250,	.146,	.033,
4	-.081,	-.171,	-.211,	-.174,	-.039,	.075,	.097,	.099,	.095,
4	.090,	.085,	.080,	.076,	.072,	.052,	.036,	.023/	
DATA((CL418(I,J),J=1,26),I=5,7)/									
5	.526,	.534,	.548,	.556,	.539,	.457,	.364,	.272,	.179,
5	.087,	.004,	-.037,	.008,	.132,	.259,	.278,	.276,	.269,
5	.261,	.253,	.245,	.237,	.230,	.188,	.159,	.131,	
6	.624,	.649,	.689,	.721,	.663,	.573,	.480,	.388,	.295,
6	.202,	.123,	.098,	.133,	.261,	.374,	.404,	.401,	.392,
6	.384,	.377,	.369,	.361,	.354,	.311,	.273,	.236,	
7	.720,	.761,	.808,	.839,	.795,	.722,	.629,	.519,	.396,
7	.271,	.160,	.127,	.177,	.301,	.413,	.435,	.435,	.426,
7	.417,	.409,	.401,	.394,	.386,	.342,	.300,	.263/	
DATA((CL421(I,J),J=1,26),I=1,4)/									
1	-.318,	-.310,	-.297,	-.287,	-.293,	-.325,	-.382,	-.450,	-.522,
1	-.611,	-.639,	-.613,	-.547,	-.453,	-.369,	-.363,	-.372,	-.381,
1	-.391,	-.400,	-.411,	-.423,	-.433,	-.443,	-.439,	-.433,	
2	-.094,	-.078,	-.065,	-.062,	-.080,	-.121,	-.172,	-.262,	-.351,
2	-.445,	-.487,	-.450,	-.368,	-.263,	-.173,	-.147,	-.158,	-.169,
2	-.177,	-.182,	-.188,	-.194,	-.200,	-.216,	-.223,	-.229,	
3	.117,	.126,	.135,	.137,	.116,	.086,	.028,	-.069,	-.186,
3	-.321,	-.368,	-.327,	-.188,	-.063,	-.026,	-.028,	-.031,	-.035,
3	-.039,	-.044,	-.048,	-.052,	-.056,	-.067,	-.076,	-.084,	
4	.305,	.312,	.324,	.328,	.310,	.271,	.189,	.054,	-.088,
4	-.224,	-.264,	-.224,	-.074,	.046,	.070,	.068,	.065,	.061,
4	.057,	.052,	.048,	.044,	.039,	.018,	.002,	-.012/	
DATA((CL421(I,J),J=1,26),I=5,7)/									
5	.453,	.466,	.489,	.497,	.476,	.430,	.348,	.232,	.095,
5	-.040,	-.107,	-.061,	.101,	.197,	.229,	.227,	.226,	.219,
5	.212,	.205,	.198,	.191,	.186,	.154,	.132,	.110,	
6	.555,	.578,	.605,	.620,	.590,	.525,	.446,	.319,	.192,
6	.064,	.008,	.054,	.178,	.299,	.337,	.331,	.325,	.319,
6	.313,	.307,	.300,	.294,	.288,	.251,	.222,	.186,	
7	.608,	.655,	.729,	.750,	.691,	.621,	.514,	.394,	.255,
7	.116,	.050,	.087,	.220,	.337,	.380,	.373,	.367,	.360,
7	.354,	.348,	.342,	.336,	.330,	.293,	.258,	.232/	
DATA((ALP404(J,N),N=1,9),J=1,13)/									
&	-6.55,	-4.81,	-3.07,	-1.33,	.42,	2.41,	5.08,	7.74,	10.50,
&	-6.22,	-4.62,	-3.03,	-1.42,	.24,	1.99,	4.49,	6.95,	9.79,
&	-6.00,	-4.52,	-3.04,	-1.52,	.07,	1.82,	4.07,	6.28,	9.08,
&	-5.90,	-4.48,	-3.06,	-1.61,	-.03,	1.68,	3.77,	5.94,	8.66,
&	-5.85,	-4.47,	-3.10,	-1.69,	-.13,	1.54,	3.49,	5.56,	8.09,
&	-5.84,	-4.48,	-3.12,	-1.73,	-.16,	1.48,	3.34,	5.38,	7.83,

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& -5.85, -4.50, -3.15, -1.77, -.21, 1.41, 3.19, 5.19, 7.70,
& -5.83, -4.50, -3.18, -1.82, -.26, 1.34, 3.05, 5.02, 7.76,
& -5.85, -4.53, -3.21, -1.86, -.34, 1.26, 2.92, 4.86, 7.93,
& -5.82, -4.54, -3.26, -1.97, -.43, 1.18, 2.82, 4.77, 8.37,
& -5.83, -4.58, -3.32, -2.07, -.53, 1.09, 2.78, 4.90, 8.89,
& -5.91, -4.66, -3.41, -2.16, -.62, .99, 2.77, 5.19, 9.57,
& -5.97, -4.73, -3.48, -2.24, -.71, .97, 2.90, 5.57, 10.27/
DATA((ALP404(J,N),N=1,9),J=14,26)/
& -6.30, -4.94, -3.59, -2.23, -.59, 1.30, 3.31, 6.05, 10.87,
& -6.57, -5.07, -3.56, -2.06, -.10, 1.81, 3.76, 6.73, 11.44,
& -6.72, -4.99, -3.26, -1.43, .53, 2.29, 4.33, 7.41, 11.33,
& -5.82, -4.06, -2.31, -.69, .97, 2.76, 4.92, 7.90, 11.13,
& -5.26, -3.64, -2.02, -.48, 1.20, 2.96, 5.10, 8.08, 11.23,
& -5.44, -3.85, -2.26, -.70, .97, 2.71, 4.74, 7.69, 10.79,
& -5.53, -4.04, -2.56, -.98, .67, 2.36, 4.14, 7.03, 10.31,
& -5.62, -4.19, -2.77, -1.23, .43, 2.03, 3.81, 6.44, 9.62,
& -5.70, -4.26, -2.82, -1.30, .30, 1.85, 3.73, 6.34, 9.42,
& -5.58, -4.13, -2.68, -1.12, .50, 2.05, 4.18, 6.91, 9.82,
& -5.22, -3.45, -1.63, .61, 3.10, 5.74, 8.55, 11.34, 14.14,
& -5.52, -3.05, -.33, 3.00, 6.07, 8.95, 11.83, 14.71, 17.58,
& -6.10, -3.14, .28, 3.84, 7.55, 11.15, 14.76, 18.36, 21.96/
DATA((ALP406(J,N),N=1,9),J=1,13)/
& -5.99, -4.45, -2.90, -1.28, .51, 2.71, 5.31, 7.87, 10.47,
& -6.16, -4.58, -3.01, -1.40, .28, 2.06, 4.73, 7.19, 9.71,
& -6.22, -4.65, -3.08, -1.50, .10, 1.77, 4.19, 6.64, 8.93,
& -6.28, -4.71, -3.13, -1.57, -.04, 1.63, 3.86, 6.32, 8.46,
& -6.29, -4.74, -3.19, -1.66, -.17, 1.48, 3.54, 5.98, 8.05,
& -6.32, -4.77, -3.23, -1.70, -.23, 1.39, 3.36, 5.80, 8.04,
& -6.31, -4.79, -3.26, -1.75, -.30, 1.29, 3.18, 5.73, 8.32,
& -6.31, -4.80, -3.29, -1.79, -.35, 1.21, 3.00, 5.90, 8.83,
& -6.33, -4.83, -3.32, -1.83, -.43, 1.12, 2.89, 6.21, 9.44,
& -6.34, -4.85, -3.36, -1.88, -.50, 1.08, 2.98, 6.65, 10.07,
& -6.46, -4.92, -3.37, -1.85, -.52, 1.18, 3.31, 7.16, 10.73,
& -6.86, -5.09, -3.32, -1.66, -.31, 1.63, 3.82, 7.70, 11.41,
& -6.88, -4.87, -2.86, -1.23, .19, 2.20, 4.57, 8.28, 11.79/
DATA((ALP406(J,N),N=1,9),J=14,26)/
& -5.72, -3.94, -2.15, -.78, .79, 2.73, 5.42, 8.79, 12.07,
& -4.63, -3.12, -1.66, -.34, 1.34, 3.26, 6.15, 9.23, 12.31,
& -3.83, -2.52, -1.21, .13, 1.79, 3.79, 6.79, 9.74, 12.68,
& -3.52, -2.36, -1.07, .36, 2.02, 4.07, 7.06, 10.31, 13.56,
& -3.69, -2.52, -1.25, .10, 1.84, 3.77, 6.51, 9.93, 13.35,
& -4.01, -2.79, -1.53, -.21, 1.47, 3.34, 5.91, 9.15, 12.41,
& -4.37, -3.08, -1.79, -.47, 1.12, 2.93, 5.34, 8.49, 11.64,
& -4.58, -3.25, -1.92, -.55, 1.02, 2.81, 5.09, 8.21, 11.41,
& -4.53, -3.16, -1.79, -.40, 1.29, 3.20, 5.60, 8.66, 11.78,
& -4.45, -3.02, -1.60, -.19, 1.67, 3.74, 6.41, 9.23, 12.04,
& -4.02, -2.40, -.65, 1.74, 4.55, 7.25, 9.80, 12.34, 14.89,
& -3.84, -2.30, .22, 3.42, 6.38, 9.38, 12.39, 15.40, 18.41,
& -3.76, -2.29, .42, 4.02, 7.61, 11.00, 14.39, 17.78, 21.17/
DATA((ALP409(J,N),N=1,9),J=1,13)/
& -7.15, -5.19, -3.23, -1.26, .74, 3.10, 6.03, 8.71, 11.40,
& -7.25, -5.30, -3.35, -1.37, .62, 2.68, 5.15, 7.89, 10.72,
& -7.61, -5.58, -3.55, -1.53, .44, 2.35, 4.60, 7.14, 9.90,
& -7.83, -5.75, -3.67, -1.61, .32, 2.16, 4.29, 6.75, 9.40,
& -8.00, -5.91, -3.81, -1.74, .17, 1.94, 3.97, 6.39, 9.31,

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& -8.09, -5.99, -3.88, -1.80, .10, 1.83, 3.85, 6.22, 9.82,
& -8.19, -6.07, -3.96, -1.86, .03, 1.71, 3.71, 6.20, 11.20,
& -8.32, -6.18, -4.04, -1.92, -.06, 1.62, 3.62, 6.76, 12.65,
& -8.40, -6.26, -4.12, -1.98, -.14, 1.56, 3.78, 8.39, 14.95,
& -8.31, -6.24, -4.17, -2.09, -.15, 1.71, 4.69, 10.06, 15.94,
& -9.22, -6.70, -4.19, -1.77, 0.00, 2.33, 6.11, 11.44, 16.77,
& -10.46, -7.07, -3.68, -1.10, .90, 3.89, 7.68, 12.56, 17.44,
& -10.76, -6.31, -1.94, -.09, 2.11, 5.06, 9.00, 13.44, 17.89/
DATA((ALP409(J,N),N=1,9),J=14,26)/
& -7.72, -3.76, -.86, 1.11, 3.41, 6.00, 10.17, 14.33, 18.50,
& -3.80, -1.94, -.10, 1.77, 4.16, 6.99, 11.03, 15.07, 19.11,
& -3.53, -1.85, -.09, 1.82, 4.15, 6.84, 10.92, 15.00, 19.08,
& -3.80, -2.24, -.54, 1.33, 3.54, 5.87, 9.74, 13.70, 17.66,
& -4.46, -2.78, -1.05, .77, 2.85, 5.22, 8.53, 12.30, 16.08,
& -5.15, -3.30, -1.45, .39, 2.38, 4.70, 7.75, 11.56, 15.37,
& -5.20, -3.34, -1.48, .37, 2.35, 4.76, 8.00, 12.12, 16.25,
& -5.20, -3.26, -1.36, .50, 2.58, 5.02, 8.43, 12.51, 16.59,
& -5.20, -3.18, -1.24, .66, 2.86, 5.31, 8.84, 12.84, 16.84,
& -5.20, -3.11, -1.13, .84, 3.15, 5.59, 9.22, 13.11, 16.99,
& -5.07, -2.80, -.50, 2.07, 4.77, 7.77, 11.28, 14.79, 18.30,
& -5.13, -2.65, .22, 3.31, 6.26, 9.71, 13.16, 16.60, 20.05,
& -5.40, -2.52, .51, 4.08, 7.75, 11.26, 14.77, 18.28, 21.79/
DATA((ALP412(J,N),N=1,9),J=1,13)/
& -8.13, -5.75, -3.37, -1.00, 1.25, 3.90, 7.00, 10.23, 13.45,
& -7.81, -5.66, -3.51, -1.28, .99, 3.36, 5.97, 9.41, 12.86,
& -7.35, -5.42, -3.49, -1.44, .84, 3.03, 5.43, 8.49, 11.74,
& -7.10, -5.29, -3.48, -1.55, .74, 2.81, 5.10, 7.88, 10.93,
& -6.84, -5.16, -3.49, -1.72, .64, 2.61, 4.79, 7.50, 10.81,
& -6.68, -5.08, -3.48, -1.81, .56, 2.53, 4.80, 7.96, 11.81,
& -6.45, -4.94, -3.43, -1.87, .50, 2.56, 5.22, 8.81, 12.65,
& -6.32, -4.85, -3.37, -1.83, .51, 3.22, 6.17, 10.33, 14.50,
& -6.59, -4.89, -3.18, -1.38, .83, 4.50, 7.77, 11.98, 16.19,
& -5.78, -4.17, -2.56, -.77, 1.84, 5.50, 9.35, 13.52, 17.69,
& -5.00, -3.41, -1.76, .43, 3.88, 6.77, 10.94, 15.10, 19.27,
& -4.27, -2.49, -.46, 2.02, 4.90, 8.38, 12.59, 16.80, 21.01,
& -3.22, -1.11, .88, 3.25, 5.85, 9.98, 14.19, 18.40, 22.61/
DATA((ALP412(J,N),N=1,9),J=14,26)/
& -2.36, -.61, 1.34, 3.71, 6.34, 11.16, 15.98, 20.80, 25.61,
& -2.75, -.87, .96, 3.24, 5.70, 10.24, 15.06, 19.88, 24.70,
& -3.78, -1.62, .10, 2.34, 4.80, 8.54, 13.25, 17.95, 22.66,
& -5.03, -2.58, -.58, 1.50, 3.90, 6.89, 11.43, 15.98, 20.52,
& -5.84, -3.01, -.83, 1.18, 3.55, 6.12, 10.94, 15.76, 20.58,
& -5.74, -3.04, -.83, 1.26, 3.71, 6.28, 11.28, 16.28, 21.28,
& -5.68, -3.01, -.77, 1.40, 3.87, 6.66, 11.72, 16.78, 21.85,
& -5.65, -2.97, -.67, 1.53, 4.04, 7.05, 12.05, 17.05, 22.05,
& -5.65, -2.93, -.58, 1.67, 4.20, 7.45, 12.45, 17.45, 22.45,
& -5.62, -2.88, -.51, 1.80, 4.37, 7.83, 12.77, 17.70, 22.64,
& -5.49, -2.59, -.08, 2.66, 5.58, 9.55, 13.67, 17.79, 21.92,
& -5.38, -2.21, .41, 3.47, 6.88, 10.88, 14.88, 18.88, 22.88,
& -5.10, -2.05, .91, 4.45, 8.11, 11.81, 15.52, 19.22, 22.93/
DATA((ALP415(J,N),N=1,9),J=1,13)/
& -8.62, -5.82, -3.02, -.48, 1.76, 4.75, 8.63, 12.71, 16.80,
& -8.19, -5.63, -3.06, -.56, 1.60, 4.24, 7.82, 11.90, 15.98,
& -7.55, -5.32, -3.08, -.69, 1.47, 3.91, 7.07, 11.03, 14.99,
& -7.25, -5.17, -3.08, -.76, 1.40, 3.74, 6.52, 10.13, 13.73,

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& -7.00, -5.04, -3.08, -.82, 1.34, 3.58, 6.15, 9.51, 12.87,
& -6.90, -4.98, -3.06, -.84, 1.30, 3.62, 6.37, 9.70, 13.03,
& -6.68, -4.82, -2.97, -.82, 1.44, 4.00, 7.02, 10.47, 13.91,
& -5.99, -4.35, -2.71, -.54, 1.86, 5.01, 8.58, 12.47, 16.35,
& -5.34, -3.80, -2.26, .20, 3.29, 6.63, 11.63, 16.63, 21.63,
& -4.60, -3.06, -1.19, 1.23, 5.04, 9.67, 15.15, 20.63, 26.11,
& -3.78, -2.05, .48, 3.45, 7.31, 13.28, 19.25, 25.22, 31.19,
& -2.52, -.05, 2.23, 5.05, 10.74, 17.19, 23.65, 30.10, 36.55,
& -1.96, .63, 2.74, 6.16, 11.49, 16.83, 22.16, 27.49, 32.83/
DATA((ALP415(J,N),N=1,9),J=14,26)/
& -2.15, .26, 2.17, 5.14, 10.47, 15.95, 21.42, 26.90, 32.38,
& -3.27, -.83, 1.20, 3.49, 7.97, 13.77, 19.57, 25.36, 31.16,
& -4.53, -1.72, .36, 2.58, 5.53, 11.87, 18.53, 25.20, 31.87,
& -5.79, -2.02, .13, 2.26, 4.95, 10.92, 17.69, 24.47, 31.25,
& -5.92, -2.11, .15, 2.31, 5.07, 11.32, 18.46, 25.61, 32.75,
& -5.92, -2.11, .17, 2.39, 5.24, 11.45, 18.34, 25.24, 32.14,
& -5.92, -2.11, .19, 2.46, 5.40, 11.76, 18.66, 25.55, 32.45,
& -5.91, -2.13, .22, 2.55, 5.56, 12.18, 19.19, 26.21, 33.23,
& -5.91, -2.13, .24, 2.64, 5.73, 12.61, 19.75, 26.89, 34.04,
& -5.91, -2.13, .27, 2.72, 5.91, 12.72, 19.62, 26.52, 33.41,
& -5.89, -2.11, .45, 3.28, 7.34, 13.06, 18.77, 24.49, 30.20,
& -6.00, -1.93, .62, 3.83, 8.36, 14.33, 20.30, 26.27, 32.24,
& -6.18, -1.80, .75, 4.35, 9.07, 14.87, 20.67, 26.46, 32.26/
DATA((ALP418(J,N),N=1,9),J=1,13)/
& -7.92, -5.32, -2.73, -.05, 2.30, 5.51, 9.67, 13.83, 18.00,
& -7.86, -5.28, -2.70, -.16, 2.18, 5.15, 8.70, 12.27, 15.84,
& -7.22, -4.92, -2.62, -.25, 2.03, 4.74, 7.87, 11.23, 14.59,
& -6.88, -4.76, -2.63, -.31, 1.96, 4.53, 7.34, 10.73, 14.12,
& -6.40, -4.49, -2.57, -.30, 2.04, 4.99, 8.08, 11.11, 14.14,
& -5.86, -3.95, -2.05, .20, 3.07, 6.36, 9.05, 11.73, 14.42,
& -4.91, -3.05, -1.02, 1.37, 4.62, 7.61, 10.30, 12.98, 15.66,
& -4.02, -2.01, .22, 2.86, 6.18, 9.24, 12.29, 15.34, 18.40,
& -2.97, -.80, 1.58, 4.36, 8.08, 12.04, 16.00, 19.96, 23.92,
& -1.77, .45, 2.96, 5.97, 11.74, 17.54, 23.33, 29.13, 34.93,
& -.63, 1.66, 3.95, 10.16, 20.97, 31.78, 42.59, 53.41, 64.22,
& -.11, 2.13, 4.55, 13.03, 26.83, 40.62, 54.41, 68.21, 82.00,
& -.49, 1.72, 3.91, 9.05, 18.14, 27.23, 36.32, 45.41, 54.50/
DATA((ALP418(J,N),N=1,9),J=14,26)/
& -1.66, .37, 2.46, 5.05, 12.95, 22.95, 32.95, 42.95, 52.95,
& -2.88, -.87, 1.21, 3.36, 7.33, 17.59, 27.85, 38.10, 48.36,
& -3.94, -1.43, .92, 3.14, 5.94, 18.65, 31.55, 44.45, 57.35,
& -4.33, -1.44, .91, 3.14, 5.98, 17.71, 29.47, 41.24, 53.00,
& -4.35, -1.43, .94, 3.21, 6.47, 18.24, 30.00, 41.76, 53.53,
& -4.33, -1.43, .97, 3.29, 6.97, 19.09, 31.21, 43.33, 55.45,
& -4.32, -1.43, 1.01, 3.37, 7.44, 19.94, 32.44, 44.94, 57.44,
& -4.32, -1.42, 1.05, 3.45, 7.94, 20.44, 32.94, 45.44, 57.94,
& -4.30, -1.41, 1.08, 3.54, 8.36, 20.48, 32.61, 44.73, 56.85,
& -4.30, -1.41, 1.11, 3.62, 8.88, 21.38, 33.88, 46.38, 58.88,
& -4.25, -1.37, 1.30, 4.20, 11.74, 24.65, 37.55, 50.45, 63.35,
& -4.43, -1.37, 1.45, 4.72, 15.41, 30.22, 45.04, 59.85, 74.67,
& -4.70, -1.36, 1.61, 5.31, 18.15, 32.96, 47.78, 62.59, 77.41/
DATA((ALP421(J,N),N=1,9),J=1,13)/
& -4.73, -2.95, -1.11, .88, 3.28, 7.70, 15.25, 22.79, 30.34,
& -4.78, -3.05, -1.24, .80, 3.14, 6.57, 11.77, 16.96, 22.16,
& -4.89, -3.16, -1.35, .69, 2.92, 5.91, 9.15, 12.37, 15.60,

```


&	-5.00,	-3.23,	-1.38,	.66,	2.85,	5.67,	8.77,	11.85,	14.92,
&	-5.00,	-3.13,	-1.18,	.87,	3.08,	6.20,	10.16,	14.12,	18.08,
&	-4.74,	-2.77,	-.83,	1.23,	3.62,	7.56,	11.73,	15.90,	20.06,
&	-4.17,	-2.27,	-.28,	2.14,	5.06,	10.53,	16.41,	22.29,	28.18,
&	-3.47,	-1.36,	1.12,	3.64,	8.16,	13.49,	18.83,	24.16,	29.49,
&	-2.57,	-.17,	2.96,	6.25,	12.60,	18.95,	25.30,	31.65,	38.00,
&	-1.27,	2.26,	4.77,	11.23,	18.92,	26.62,	34.31,	42.00,	49.69,
&	-.54,	2.82,	5.86,	15.14,	24.67,	34.19,	43.71,	53.24,	62.76,
&	-1.19,	2.29,	5.06,	14.85,	26.97,	39.09,	51.21,	63.33,	75.45,
&	-2.36,	-.13,	2.85,	7.05,	16.57,	26.10,	35.62,	45.14,	54.67/

DATA((ALP421(J,N),N=1,9),J=14,26)/

&	-3.44,	-1.37,	1.16,	4.06,	11.32,	21.84,	32.37,	42.89,	53.42,
&	-4.32,	-2.28,	.54,	3.64,	8.93,	18.23,	27.53,	36.84,	46.14,
&	-4.34,	-2.49,	.58,	3.66,	9.29,	18.81,	28.33,	37.86,	47.38,
&	-4.26,	-2.39,	.65,	3.68,	9.57,	19.10,	28.62,	38.14,	47.67,
&	-4.18,	-2.29,	.73,	3.76,	9.95,	19.71,	29.46,	39.22,	48.98,
&	-4.08,	-2.21,	.81,	3.85,	10.24,	20.00,	29.76,	39.51,	49.27,
&	-4.00,	-2.17,	.92,	3.93,	10.54,	20.29,	30.05,	39.80,	49.56,
&	-3.90,	-2.11,	1.00,	4.04,	10.76,	20.29,	29.81,	39.33,	48.86,
&	-3.80,	-2.05,	1.08,	4.17,	11.05,	20.57,	30.10,	39.62,	49.14,
&	-3.72,	-2.00,	1.18,	4.27,	11.33,	20.86,	30.38,	39.90,	49.43,
&	-3.62,	-1.79,	1.58,	4.95,	13.10,	22.62,	32.14,	41.67,	51.19,
&	-3.64,	-1.69,	1.95,	5.51,	15.89,	27.00,	38.11,	49.22,	60.33,
&	-3.68,	-1.60,	2.20,	6.61,	15.30,	24.00,	32.70,	41.39,	50.09/

DATA((CD404(I,J),J=1,26),I=1,5)/

1	.0134,	.0132,	.0131,	.0131,	.0130,	.0130,	.0130,	.0130,	.0129,
1	.0129,	.0129,	.0136,	.0158,	.0204,	.0261,	.0329,	.0401,	.0434,
1	.0465,	.0489,	.0501,	.0505,	.0501,	.0409,	.0299,	.0241,	
2	.0063,	.0061,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,	.0053,
2	.0056,	.0059,	.0083,	.0116,	.0154,	.0212,	.0268,	.0315,	.0340,
2	.0365,	.0384,	.0397,	.0410,	.0423,	.0403,	.0360,	.0339,	
3	.0049,	.0049,	.0048,	.0048,	.0048,	.0048,	.0048,	.0049,	.0050,
3	.0053,	.0061,	.0077,	.0112,	.0175,	.0254,	.0306,	.0348,	.0387,
3	.0406,	.0424,	.0442,	.0459,	.0470,	.0531,	.0596,	.0692,	
4	.0068,	.0066,	.0058,	.0057,	.0056,	.0056,	.0056,	.0057,	.0058,
4	.0061,	.0069,	.0093,	.0154,	.0230,	.0325,	.0408,	.0482,	.0539,
4	.0591,	.0644,	.0698,	.0752,	.0803,	.0963,	.1089,	.1298,	
5	.0231,	.0143,	.0105,	.0096,	.0091,	.0091,	.0091,	.0093,	.0096,
5	.0108,	.0153,	.0237,	.0337,	.0460,	.0568,	.0686,	.0817,	.0927,
5	.1019,	.1112,	.1205,	.1298,	.1379,	.1722,	.1959,	.2106/	

DATA((CD406(I,J),J=1,26),I=1,5)/

1	.0126,	.0124,	.0124,	.0123,	.0123,	.0122,	.0122,	.0122,	.0122,
1	.0122,	.0125,	.0139,	.0183,	.0235,	.0299,	.0365,	.0432,	.0478,
1	.0516,	.0543,	.0570,	.0583,	.0589,	.0523,	.0393,	.0291,	
2	.0057,	.0056,	.0056,	.0056,	.0057,	.0057,	.0057,	.0059,	.0062,
2	.0072,	.0093,	.0124,	.0158,	.0203,	.0251,	.0299,	.0350,	.0400,
2	.0434,	.0467,	.0483,	.0499,	.0506,	.0493,	.0439,	.0403,	
3	.0049,	.0049,	.0047,	.0046,	.0046,	.0046,	.0046,	.0047,	.0050,
3	.0059,	.0074,	.0110,	.0151,	.0192,	.0253,	.0318,	.0379,	.0429,
3	.0460,	.0489,	.0512,	.0532,	.0551,	.0635,	.0697,	.0759,	
4	.0059,	.0056,	.0055,	.0055,	.0054,	.0053,	.0052,	.0052,	.0056,
4	.0067,	.0097,	.0130,	.0177,	.0257,	.0358,	.0455,	.0543,	.0624,
4	.0695,	.0757,	.0820,	.0867,	.0903,	.1088,	.1225,	.1313,	
5	.0205,	.0133,	.0113,	.0107,	.0104,	.0106,	.0108,	.0111,	.0123,
5	.0147,	.0181,	.0268,	.0422,	.0610,	.0798,	.0979,	.1106,	.1233,

```

5 .1348, .1458, .1568, .1663, .1744, .2053, .2201, .2248/
DATA((CD409(I,J),J=1,26),I=1,5)/
1 .0106, .0106, .0106, .0106, .0106, .0107, .0107, .0107, .0110,
1 .0122, .0147, .0192, .0245, .0305, .0379, .0459, .0537, .0614,
1 .0693, .0772, .0832, .0869, .0891, .0829, .0635, .0493,
2 .0062, .0062, .0062, .0062, .0062, .0062, .0062, .0063, .0066,
2 .0085, .0121, .0165, .0220, .0283, .0349, .0416, .0483, .0546,
2 .0607, .0664, .0717, .0746, .0768, .0741, .0681, .0579,
3 .0062, .0062, .0062, .0062, .0062, .0062, .0062, .0062, .0062,
3 .0062, .0062, .0062, .0062, .0062, .0062, .0062, .0062, .0062,
3 .0062, .0062, .0062, .0062, .0062, .0062, .0062, .0062, .0062,
4 .0054, .0055, .0055, .0056, .0056, .0056, .0058, .0059, .0069,
4 .0093, .0131, .0177, .0240, .0306, .0403, .0499, .0588, .0661,
4 .0710, .0754, .0792, .0830, .0846, .0890, .0907, .0924,
5 .0084, .0071, .0064, .0063, .0063, .0065, .0068, .0072, .0087,
5 .0127, .0189, .0251, .0314, .0405, .0541, .0690, .0814, .0891,
5 .0966, .1038, .1092, .1135, .1177, .1336, .1443, .1516/
DATA((CD412(I,J),J=1,26),I=1,5)/
1 .0058, .0058, .0058, .0058, .0058, .0058, .0058, .0058, .0058,
1 .0061, .0068, .0129, .0235, .0348, .0456, .0547, .0607, .0649,
1 .0684, .0706, .0723, .0741, .0751, .0754, .0752, .0700,
2 .0083, .0083, .0083, .0083, .0083, .0083, .0084, .0084, .0084,
2 .0091, .0146, .0241, .0340, .0444, .0539, .0614, .0670, .0708,
2 .0738, .0759, .0775, .0787, .0794, .0820, .0826, .0812,
3 .0150, .0150, .0150, .0150, .0150, .0151, .0152, .0153, .0158,
3 .0187, .0262, .0354, .0454, .0556, .0650, .0721, .0784, .0839,
3 .0882, .0912, .0942, .0965, .0986, .1058, .1100, .1142,
4 .0233, .0251, .0259, .0264, .0268, .0270, .0272, .0283, .0312,
4 .0428, .0598, .0776, .0917, .1023, .1106, .1188, .1251, .1309,
4 .1356, .1381, .1406, .1431, .1459, .1583, .1664, .1710,
5 .0338, .0390, .0416, .0427, .0447, .0462, .0509, .0592, .0715,
5 .0894, .1082, .1263, .1432, .1581, .1707, .1799, .1864, .1900,
5 .1934, .1935, .1936, .1937, .1938, .1944, .1950, .1956/
DATA((CD415(I,J),J=1,26),I=1,5)/
1 .0107, .0138, .0153, .0161, .0169, .0173, .0176, .0190, .0219,
1 .0266, .0376, .0501, .0642, .0750, .0858, .0967, .1062, .1152,
1 .1242, .1306, .1368, .1430, .1445, .1400, .1245, .1071,
2 .0093, .0093, .0094, .0094, .0096, .0100, .0107, .0120, .0169,
2 .0271, .0388, .0515, .0655, .0784, .0906, .1009, .1107, .1193,
2 .1267, .1328, .1382, .1436, .1464, .1380, .1291, .1177,
3 .0084, .0083, .0083, .0083, .0085, .0091, .0104, .0130, .0198,
3 .0310, .0432, .0550, .0689, .0820, .0948, .1048, .1147, .1244,
3 .1330, .1416, .1500, .1532, .1563, .1623, .1560, .1497,
4 .0096, .0096, .0096, .0096, .0102, .0108, .0124, .0158, .0224,
4 .0351, .0497, .0657, .0797, .0926, .1056, .1183, .1308, .1433,
4 .1557, .1634, .1706, .1777, .1849, .2016, .2093, .2158,
5 .0192, .0163, .0158, .0162, .0178, .0193, .0215, .0350, .0543,
5 .0771, .0977, .1154, .1352, .1561, .1724, .1858, .1993, .2114,
5 .2205, .2297, .2388, .2455, .2510, .2702, .2753, .2803/
DATA((CD418(I,J),J=1,26),I=1,5)/
1 .0122, .0154, .0170, .0180, .0190, .0200, .0219, .0253, .0369,
1 .0555, .0737, .0897, .1011, .1118, .1199, .1279, .1360, .1419,
1 .1469, .1518, .1557, .1574, .1590, .1624, .1569, .1480,
2 .0100, .0099, .0098, .0097, .0101, .0107, .0131, .0210, .0420,
2 .0601, .0772, .0939, .1071, .1176, .1282, .1386, .1420, .1453,

```

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2 .1487, .1520, .1554, .1587, .1621, .1720, .1660, .1530,
3 .0102, .0104, .0105, .0106, .0113, .0124, .0150, .0217, .0419,
3 .0624, .0822, .1017, .1148, .1275, .1387, .1475, .1563, .1652,
3 .1710, .1755, .1799, .1843, .1888, .1904, .1887, .1772,
4 .0162, .0137, .0131, .0135, .0147, .0159, .0194, .0278, .0459,
4 .0681, .0902, .1111, .1276, .1420, .1564, .1669, .1766, .1864,
4 .1936, .2002, .2068, .2122, .2154, .2299, .2336, .2336,
5 .0231, .0287, .0315, .0329, .0352, .0378, .0444, .0588, .0839,
5 .1165, .1453, .1712, .1945, .2177, .2329, .2480, .2630, .2723,
5 .2809, .2895, .2981, .3024, .3055, .3204, .3284, .3364/

```

```
DATA(CD421(I,J),J=1,26),I=1,5)/
```

```

1 .0141, .0150, .0154, .0156, .0159, .0166, .0204, .0316, .0471,
1 .0636, .0797, .0950, .1109, .1273, .1437, .1563, .1687, .1781,
1 .1842, .1903, .1935, .1956, .1977, .1994, .2002, .2010,
2 .0123, .0127, .0129, .0130, .0134, .0146, .0216, .0350, .0507,
2 .0694, .0857, .1019, .1178, .1337, .1501, .1667, .1798, .1891,
2 .1985, .2047, .2098, .2149, .2178, .2178, .2178, .2178,
3 .0138, .0143, .0146, .0147, .0151, .0167, .0243, .0400, .0584,
3 .0766, .0945, .1141, .1331, .1503, .1676, .1801, .1921, .2041,
3 .2122, .2185, .2247, .2310, .2352, .2428, .2449, .2470,
4 .0152, .0159, .0163, .0165, .0171, .0187, .0244, .0356, .0550,
4 .0788, .1033, .1260, .1472, .1670, .1836, .2003, .2169, .2279,
4 .2386, .2492, .2599, .2657, .2706, .2809, .2821, .2833,
5 .0329, .0321, .0337, .0355, .0382, .0417, .0606, .0877, .1144,
5 .1406, .1662, .1919, .2139, .2359, .2578, .2743, .2896, .3049,
5 .3203, .3260, .3310, .3360, .3402, .3389, .3376, .3363/

```

```
DATA(XMI(J),J=1,26)/.3,.5,.6,.65,.7,.725,.75,.775,
```

```
& .8,.825,.85,.875,.9,.925,.95,.975,1.0,1.025,1.05,1.075,
&1.1,1.125,1.15,1.3,1.45,1.6/
```

```
DATA(CLI(J),J=1,9)/-.4,-.2,0.0,.2,.4,.6,.8,1.0,1.2/
```

```
DATA(ALPI(J),J=1,7)/-4.0,-2.0,0.0,2.0,4.0,6.0,8.0/
```

```
DATA(CLII(J),J=1,5)/0.0,.2,.4,.6,.8/
```

```
IORDER(1)=IORDER(2)=1
```

```
IPT (1) = -1
```

```
IF (IKEY .EQ. 2) GO TO 1000
```

```
IF (TR .LT. .04) GO TO 9
```

```
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 1
```

```
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 2
```

```
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 3
```

```
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 4
```

```
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 5
```

```
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 6
```

```
IF (TR .GE. .21) GO TO 7
```

```
9 CALL IBI (7,ALPI,26,XMI,7,CL404,IORDER,IPT,AA,XM,CLFT04,IERR)
```

```
CL=CLFT04
```

```
GO TO 400
```

```
1 CALL IBI (7,ALPI,26,XMI,7,CL404,IORDER,IPT,AA,XM,CLFT04,IERR)
```

```
IPT (1)=-1
```

```
CALL IBI (7,ALPI,26,XMI,7,CL406,IORDER,IPT,AA,XM,CLFT06,IERR)
```

```
CL=CLFT04 + (CLFT06-CLFT04)*((TR-.04)/(.06-.04))
```

```
GO TO 400
```

```
2 CALL IBI (7,ALPI,26,XMI,7,CL406,IORDER,IPT,AA,XM,CLFT06,IERR)
```

```
IPT (1)=-1
```

```
CALL IBI (7,ALPI,26,XMI,7,CL409,IORDER,IPT,AA,XM,CLFT09,IERR)
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CL=CLFT06 + (CLFT09 - CLFT06)*((TR-.06)/(.09-.06))
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GO TO 400
3 CALL IBI (7,ALPI,26,XMI,7,CL409,IORDER,IPT,AA,XM,CLFT09,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL412,IORDER,IPT,AA,XM,CLFT12,IERR)
  CL=CLFT09+(CLFT12-CLFT09)*((TR-.09)/(.12-.09))
  GO TO 400
4 CALL IBI (7,ALPI,26,XMI,7,CL412,IORDER,IPT,AA,XM,CLFT12,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL415,IORDER,IPT,AA,XM,CLFT15,IERR)
  CL=CLFT12 + (CLFT15-CLFT12)*((TR-.12)/(.15-.12))
  GO TO 400
5 CALL IBI (7,ALPI,26,XMI,7,CL415,IORDER,IPT,AA,XM,CLFT15,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL418,IORDER,IPT,AA,XM,CLFT18,IERR)
  CL=CLFT15+(CLFT18-CLFT15)*((TR-.15)/(.18-.15))
  GO TO 400
6 CALL IBI (7,ALPI,26,XMI,7,CL418,IORDER,IPT,AA,XM,CLFT18,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL421,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT18+(CLFT21-CLFT18)*((TR-.18)/(.21-.18))
  GO TO 400
7 CALL IBI (7,ALPI,26,XMI,7,CL421,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT21
  GO TO 400
1000 CONTINUE
  IPT (1)=-1
  IF (TR .LT. .04) GO TO 90
  IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 10
  IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 20
  IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 30
  IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 40
  IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 50
  IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 60
  IF (TR .GE. .21) GO TO 70
90 CALL IBI (26,XMI,9,CLI,26,ALP404,IORDER,IPT,XM,CL,AA04,IERR)
  AA=AA04
  GO TO 400
10 CALL IBI (26,XMI,9,CLI,26,ALP404,IORDER,IPT,XM,CL,AA04,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP406,IORDER,IPT,XM,CL,AA06,IERR)
  AA=AA04 + (AA06-AA04)*((TR-.04)/(.06-.04))
  GO TO 400
20 CALL IBI (26,XMI,9,CLI,26,ALP406,IORDER,IPT,XM,CL,AA06,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP409,IORDER,IPT,XM,CL,AA09,IERR)
  AA=AA06 + (AA09 - AA06)*((TR -.06)/(.09-.06))
  GO TO 400
30 CALL IBI (26,XMI,9,CLI,26,ALP409,IORDER,IPT,XM,CL,AA09,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP412,IORDER,IPT,XM,CL,AA12,IERR)
  AA=AA09+(AA12-AA09)*((TR-.09)/(.12-.09))
  GO TO 400
40 CALL IBI (26,XMI,9,CLI,26,ALP412,IORDER,IPT,XM,CL,AA12,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP415,IORDER,IPT,XM,CL,AA15,IERR)

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AA=AA12+(AA15-AA12)*((TR-.12)/(.15-.12))
GO TO 400
50 CALL IBI (26,XMI,9,CLI,26,ALP415,IORDER,IPT,XM,CL,AA15,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP418,IORDER,IPT,XM,CL,AA18,IERR)
AA=AA15+(AA18-AA15)*((TR-.15)/(.18-.15))
GO TO 400
60 CALL IBI (26,XMI,9,CLI,26,ALP418,IORDER,IPT,XM,CL,AA18,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP421,IORDER,IPT,XM,CL,AA21,IERR)
AA=AA18+(AA21-AA18)*((TR-.18)/(.21-.18))
GO TO 400
70 CALL IBI (26,XMI,9,CLI,26,ALP421,IORDER,IPT,XM,CL,AA21,IERR)
AA=AA21
400 CONTINUE
IPT (1)=-1
IF (TR .LT. .04) GO TO 91
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 11
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 21
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 31
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 41
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 51
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 61
IF (TR .GE. .21) GO TO 71
91 CALL IBI (5,CLII,26,XMI,5,CD404,IORDER,IPT,CL,XM,CDRG04,IERR)
CD=CDRG04
WRITE (6,201) TR
201 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
&*/* THE VALUES FOR T/C=.04 HAVE BEEN RETURNED*)
GO TO 250
11 CALL IBI (5,CLII,26,XMI,5,CD404,IORDER,IPT,CL,XM,CDRG04,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD406,IORDER,IPT,CL,XM,CDRG06,IERR)
CD=CDRG04 + (CDRG06-CDRG04)*((TR-.04)/(.06-.04))
GO TO 250
21 CALL IBI (5,CLII,26,XMI,5,CD406,IORDER,IPT,CL,XM,CDRG06,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD409,IORDER,IPT,CL,XM,CDRG09,IERR)
CD=CDRG06 + (CDRG09 - CDRG06)*((TR-.06)/(.09-.06))
GO TO 250
31 CALL IBI (5,CLII,26,XMI,5,CD409,IORDER,IPT,CL,XM,CDRG09,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD412,IORDER,IPT,CL,XM,CDRG12,IERR)
CD=CDRG09+(CDRG12-CDRG09)*((TR-.09)/(.12-.09))
GO TO 250
41 CALL IBI (5,CLII,26,XMI,5,CD412,IORDER,IPT,CL,XM,CDRG12,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD415,IORDER,IPT,CL,XM,CDRG15,IERR)
CD=CDRG12 + (CDRG15-CDRG12)*((TR-.12)/(.15-.12))
GO TO 250
51 CALL IBI (5,CLII,26,XMI,5,CD415,IORDER,IPT,CL,XM,CDRG15,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD418,IORDER,IPT,CL,XM,CDRG18,IERR)
CD=CDRG15+(CDRG18-CDRG15)*((TR-.15)/(.18-.15))
GO TO 250

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3	.407,	.431,	.453,	.464,	.478,	.485,	.492,	.499,	.509,
3	.519,	.530,	.539,	.529,	.469,	.396,	.322,	.256,	.230,
3	.259,	.306,	.345,	.354,	.328,	.148,	.012,	-.033,	
4	.620,	.651,	.676,	.693,	.709,	.717,	.730,	.742,	.754,
4	.770,	.779,	.767,	.728,	.665,	.602,	.539,	.482,	.449,
4	.479,	.528,	.573,	.586,	.550,	.314,	.139,	.075/	

DATA((CL504(I,J),J=1,26),I=5,7)/

5	.755,	.807,	.845,	.871,	.898,	.916,	.935,	.954,	.974,
5	.996,	1.000,	.973,	.920,	.866,	.812,	.759,	.711,	.687,
5	.723,	.775,	.820,	.828,	.788,	.477,	.265,	.182,	
6	.912,	.971,	1.016,	1.042,	1.069,	1.086,	1.102,	1.119,	1.134,
6	1.141,	1.118,	1.078,	1.037,	.995,	.953,	.911,	.869,	.848,
6	.880,	.923,	.967,	.985,	.946,	.614,	.389,	.290,	
7	1.069,	1.123,	1.163,	1.192,	1.229,	1.256,	1.273,	1.289,	1.307,
7	1.289,	1.250,	1.212,	1.169,	1.126,	1.083,	1.040,	1.002,	.983,
7	1.022,	1.074,	1.115,	1.127,	1.089,	.757,	.512,	.406/	

DATA((CL506(I,J),J=1,26),I=1,4)/

1	.002,	-.006,	-.018,	-.026,	-.037,	-.043,	-.050,	-.064,	-.088,
1	-.121,	-.168,	-.216,	-.273,	-.339,	-.406,	-.472,	-.486,	-.440,
1	-.383,	-.326,	-.315,	-.315,	-.316,	-.316,	-.317,	-.318,	
2	.210,	.214,	.221,	.224,	.235,	.240,	.244,	.248,	.248,
2	.242,	.212,	.146,	.069,	-.008,	-.084,	-.160,	-.185,	-.146,
2	-.092,	-.038,	-.021,	-.039,	-.047,	-.090,	-.118,	-.123,	
3	.413,	.446,	.474,	.489,	.504,	.513,	.524,	.534,	.544,
3	.554,	.537,	.463,	.384,	.304,	.225,	.146,	.125,	.166,
3	.223,	.278,	.287,	.266,	.240,	.099,	.008,	-.012,	
4	.625,	.667,	.697,	.713,	.731,	.742,	.754,	.766,	.778,
4	.751,	.717,	.664,	.612,	.539,	.462,	.392,	.377,	.414,
4	.469,	.522,	.532,	.503,	.466,	.249,	.119,	.093/	

DATA((CL506(I,J),J=1,26),I=5,7)/

5	.746,	.804,	.847,	.873,	.910,	.929,	.951,	.974,	.963,
5	.924,	.868,	.812,	.756,	.700,	.644,	.596,	.579,	.610,
5	.665,	.718,	.738,	.704,	.655,	.392,	.246,	.206,	
6	.906,	.964,	1.010,	1.039,	1.070,	1.091,	1.105,	1.091,	1.054,
6	1.006,	.959,	.911,	.863,	.815,	.768,	.723,	.709,	.746,
6	.798,	.847,	.867,	.836,	.793,	.535,	.375,	.313,	
7	1.052,	1.115,	1.164,	1.203,	1.229,	1.221,	1.207,	1.180,	1.148,
7	1.106,	1.065,	1.023,	.981,	.940,	.900,	.862,	.858,	.904,
7	.959,	1.013,	1.020,	.985,	.937,	.682,	.517,	.428/	

DATA((CL509(I,J),J=1,26),I=1,4)/

1	.018,	.016,	.015,	.015,	.015,	.017,	.024,	.011,	-.029,
1	-.078,	-.135,	-.203,	-.271,	-.346,	-.428,	-.458,	-.392,	-.298,
1	-.228,	-.224,	-.229,	-.235,	-.240,	-.274,	-.295,	-.296,	
2	.233,	.254,	.268,	.277,	.285,	.297,	.310,	.320,	.308,
2	.276,	.196,	.110,	-.000,	-.137,	-.237,	-.236,	-.168,	-.084,
2	-.041,	-.044,	-.057,	-.069,	-.079,	-.120,	-.142,	-.158,	
3	.435,	.457,	.468,	.483,	.499,	.506,	.514,	.520,	.519,
3	.490,	.404,	.287,	.170,	.053,	-.027,	-.019,	.032,	.102,
3	.155,	.159,	.145,	.133,	.121,	.054,	.003,	-.035,	
4	.605,	.642,	.672,	.688,	.712,	.723,	.735,	.736,	.707,
4	.616,	.522,	.429,	.335,	.241,	.194,	.204,	.264,	.338,
4	.378,	.372,	.357,	.341,	.325,	.226,	.149,	.090/	

DATA((CL509(I,J),J=1,26),I=5,7)/

5	.749,	.806,	.849,	.870,	.895,	.908,	.893,	.863,	.789,
5	.714,	.640,	.565,	.490,	.416,	.366,	.375,	.434,	.508,

5	.552,	.548,	.529,	.510,	.490,	.371,	.278,	.190,	
6	.870,	.932,	.988,	1.018,	1.054,	1.046,	1.027,	.962,	.896,
6	.830,	.764,	.699,	.633,	.567,	.534,	.539,	.604,	.686,
6	.713,	.697,	.677,	.655,	.634,	.503,	.400,	.301,	
7	1.001,	1.052,	1.110,	1.158,	1.159,	1.137,	1.102,	1.043,	.984,
7	.925,	.866,	.807,	.748,	.689,	.644,	.663,	.732,	.813,
7	.836,	.824,	.801,	.778,	.754,	.618,	.505,	.409/	
DATA((CL512(I,J),J=1,26),I=1,4)/									
1	.014,	.012,	.013,	.016,	.020,	.021,	.014,	-.013,	-.068,
1	-.166,	-.273,	-.387,	-.510,	-.547,	-.520,	-.404,	-.259,	-.210,
1	-.210,	-.211,	-.212,	-.213,	-.215,	-.225,	-.238,	-.252,	
2	.195,	.210,	.224,	.234,	.245,	.247,	.235,	.211,	.154,
2	.074,	-.025,	-.162,	-.327,	-.403,	-.364,	-.236,	-.122,	-.088,
2	-.089,	-.091,	-.092,	-.094,	-.095,	-.105,	-.116,	-.128,	
3	.363,	.383,	.399,	.407,	.418,	.426,	.433,	.418,	.373,
3	.268,	.152,	-.011,	-.157,	-.192,	-.147,	-.057,	.023,	.049,
3	.042,	.029,	.021,	.017,	.012,	-.013,	-.024,	-.029,	
4	.537,	.572,	.600,	.614,	.628,	.631,	.622,	.568,	.475,
4	.382,	.288,	.167,	.050,	.005,	.045,	.134,	.234,	.255,
4	.245,	.235,	.226,	.216,	.206,	.156,	.113,	.086/	
DATA((CL512(I,J),J=1,26),I=5,7)/									
5	.691,	.732,	.751,	.781,	.795,	.782,	.743,	.658,	.567,
5	.477,	.386,	.295,	.214,	.184,	.222,	.307,	.391,	.423,
5	.415,	.403,	.390,	.377,	.364,	.294,	.239,	.193,	
6	.804,	.862,	.915,	.950,	.958,	.921,	.859,	.780,	.701,
6	.622,	.543,	.465,	.393,	.347,	.390,	.483,	.574,	.599,
6	.585,	.570,	.556,	.542,	.528,	.441,	.362,	.305,	
7	.913,	.976,	1.041,	1.075,	1.052,	1.012,	.958,	.882,	.799,
7	.717,	.635,	.553,	.478,	.449,	.493,	.594,	.683,	.696,
7	.683,	.669,	.655,	.641,	.627,	.545,	.474,	.412/	
DATA((CL515(I,J),J=1,26),I=1,4)/									
1	.028,	.041,	.048,	.051,	.053,	.043,	.001,	-.069,	-.177,
1	-.308,	-.467,	-.540,	-.561,	-.525,	-.466,	-.386,	-.324,	-.304,
1	-.302,	-.301,	-.301,	-.301,	-.300,	-.298,	-.297,	-.295,	
2	.155,	.179,	.192,	.201,	.206,	.189,	.155,	.097,	-.005,
2	-.177,	-.343,	-.430,	-.446,	-.416,	-.342,	-.257,	-.211,	-.202,
2	-.200,	-.200,	-.199,	-.199,	-.198,	-.195,	-.200,	-.207,	
3	.312,	.321,	.326,	.329,	.335,	.329,	.309,	.255,	.185,
3	.044,	-.102,	-.308,	-.352,	-.299,	-.195,	-.085,	-.057,	-.054,
3	-.051,	-.049,	-.046,	-.044,	-.041,	-.041,	-.039,	-.037,	
4	.492,	.510,	.524,	.533,	.543,	.525,	.496,	.413,	.328,
4	.193,	.041,	-.124,	-.145,	-.085,	.034,	.137,	.157,	.154,
4	.150,	.145,	.140,	.136,	.131,	.106,	.085,	.073/	
DATA((CL515(I,J),J=1,26),I=5,7)/									
5	.636,	.666,	.681,	.694,	.689,	.664,	.605,	.532,	.423,
5	.314,	.205,	.090,	.066,	.113,	.230,	.328,	.357,	.349,
5	.342,	.334,	.327,	.319,	.312,	.266,	.220,	.187,	
6	.734,	.779,	.813,	.836,	.822,	.771,	.719,	.616,	.507,
6	.397,	.288,	.176,	.164,	.216,	.329,	.428,	.455,	.448,
6	.440,	.432,	.424,	.416,	.408,	.360,	.328,	.295,	
7	.835,	.871,	.919,	.960,	.930,	.865,	.792,	.719,	.620,
7	.492,	.364,	.253,	.233,	.286,	.395,	.496,	.526,	.524,
7	.517,	.509,	.502,	.494,	.486,	.443,	.407,	.374/	
DATA((CL518(I,J),J=1,26),I=1,4)/									
1	-.054,	-.054,	-.060,	-.070,	-.124,	-.203,	-.307,	-.425,	-.538,

1	-.628,	-.704,	-.754,	-.760,	-.724,	-.620,	-.483,	-.424,	-.422,
1	-.422,	-.422,	-.422,	-.422,	-.421,	-.421,	-.420,	-.419,	
2	.098,	.101,	.107,	.119,	.077,	.004,	-.103,	-.239,	-.375,
2	-.499,	-.580,	-.629,	-.613,	-.541,	-.433,	-.322,	-.304,	-.303,
2	-.303,	-.302,	-.302,	-.302,	-.301,	-.299,	-.296,	-.294,	
3	.249,	.261,	.272,	.278,	.222,	.157,	.061,	-.049,	-.182,
3	-.351,	-.475,	-.503,	-.462,	-.330,	-.199,	-.151,	-.147,	-.146,
3	-.147,	-.148,	-.148,	-.149,	-.150,	-.152,	-.149,	-.146,	
4	.424,	.436,	.449,	.456,	.397,	.310,	.223,	.120,	-.002,
4	-.132,	-.262,	-.310,	-.285,	-.139,	.000,	.045,	.045,	.043,
4	.038,	.034,	.029,	.024,	.020,	.007,	-.005,	-.018/	

DATA((CL518(I,J),J=1,26),I=5,7)/

5	.565,	.585,	.606,	.607,	.552,	.484,	.407,	.307,	.196,
5	.004,	-.086,	-.126,	-.094,	.060,	.193,	.235,	.229,	.223,
5	.217,	.211,	.206,	.200,	.195,	.162,	.130,	.097,	
6	.674,	.708,	.754,	.766,	.661,	.572,	.480,	.387,	.276,
6	.161,	.071,	.023,	.062,	.266,	.395,	.435,	.424,	.414,
6	.404,	.394,	.384,	.374,	.364,	.309,	.257,	.209,	
7	.779,	.824,	.892,	.895,	.767,	.672,	.573,	.455,	.321,
7	.200,	.104,	.067,	.102,	.306,	.443,	.482,	.473,	.461,
7	.450,	.439,	.428,	.417,	.406,	.349,	.292,	.242/	

DATA((CL521(I,J),J=1,26),I=1,4)/

1	-.102,	-.085,	-.069,	-.063,	-.070,	-.181,	-.322,	-.463,	-.603,
1	-.744,	-.789,	-.758,	-.644,	-.471,	-.393,	-.361,	-.369,	-.377,
1	-.384,	-.392,	-.400,	-.405,	-.409,	-.429,	-.438,	-.436,	
2	.048,	.070,	.081,	.083,	.065,	-.045,	-.199,	-.352,	-.505,
2	-.605,	-.644,	-.582,	-.442,	-.302,	-.229,	-.221,	-.229,	-.237,
2	-.245,	-.251,	-.257,	-.263,	-.269,	-.298,	-.306,	-.315,	
3	.169,	.188,	.207,	.221,	.207,	.128,	-.025,	-.177,	-.330,
3	-.447,	-.493,	-.454,	-.297,	-.155,	-.111,	-.115,	-.121,	-.127,
3	-.133,	-.140,	-.146,	-.152,	-.158,	-.184,	-.202,	-.211,	
4	.329,	.350,	.370,	.381,	.352,	.268,	.106,	-.055,	-.216,
4	-.349,	-.394,	-.362,	-.203,	-.052,	-.008,	-.013,	-.018,	-.024,
4	-.029,	-.034,	-.040,	-.045,	-.051,	-.084,	-.102,	-.119/	

DATA((CL521(I,J),J=1,26),I=5,7)/

5	.486,	.499,	.519,	.533,	.492,	.403,	.259,	.115,	-.029,
5	-.141,	-.189,	-.143,	-.003,	.145,	.187,	.186,	.178,	.170,
5	.162,	.154,	.146,	.137,	.129,	.092,	.063,	.037,	
6	.578,	.609,	.640,	.653,	.588,	.464,	.332,	.199,	.067,
6	-.044,	-.090,	-.058,	.111,	.248,	.298,	.292,	.284,	.276,
6	.268,	.260,	.253,	.245,	.237,	.194,	.172,	.149,	
7	.686,	.737,	.781,	.778,	.669,	.531,	.392,	.254,	.115,
7	.015,	-.027,	.014,	.175,	.313,	.352,	.348,	.338,	.328,
7	.319,	.311,	.304,	.297,	.290,	.252,	.230,	.207/	

DATA((ALP504(J,N),N=1,9),J=1,13)/

&	-7.17,	-5.38,	-3.59,	-1.80,	-.06,	1.81,	4.57,	7.12,	9.67,
&	-6.85,	-5.20,	-3.54,	-1.88,	-.25,	1.54,	3.91,	6.38,	9.01,
&	-6.59,	-5.06,	-3.52,	-1.99,	-.42,	1.32,	3.47,	5.81,	8.50,
&	-6.40,	-4.96,	-3.52,	-2.07,	-.50,	1.19,	3.20,	5.51,	8.11,
&	-6.21,	-4.86,	-3.52,	-2.17,	-.62,	1.06,	2.96,	5.19,	7.64,
&	-6.11,	-4.81,	-3.51,	-2.21,	-.67,	.99,	2.83,	4.99,	7.34,
&	-6.02,	-4.76,	-3.51,	-2.26,	-.73,	.91,	2.68,	4.78,	7.15,
&	-5.93,	-4.72,	-3.51,	-2.30,	-.79,	.83,	2.55,	4.56,	6.95,
&	-5.84,	-4.68,	-3.52,	-2.37,	-.89,	.74,	2.42,	4.33,	6.76,
&	-5.77,	-4.66,	-3.54,	-2.43,	-.99,	.65,	2.27,	4.06,	6.80,

&	-5.75,	-4.67,	-3.58,	-2.50,	-1.09,	.56,	2.19,	4.00,	7.24,
&	-5.77,	-4.70,	-3.64,	-2.57,	-1.20,	.54,	2.32,	4.51,	7.82,
&	-5.85,	-4.76,	-3.68,	-2.60,	-1.18,	.71,	2.75,	5.37,	8.47/
DATA((ALP504(J,N),N=1,9),J=14,26)/									
&	-6.16,	-4.91,	-3.67,	-2.43,	-.69,	1.34,	3.34,	6.08,	9.13,
&	-6.42,	-4.89,	-3.36,	-1.79,	.04,	1.98,	3.89,	6.72,	9.80,
&	-5.90,	-4.30,	-2.69,	-1.03,	.72,	2.55,	4.54,	7.38,	10.48,
&	-4.88,	-3.45,	-2.03,	-.44,	1.27,	3.03,	5.13,	7.97,	10.98,
&	-4.46,	-3.20,	-1.92,	-.25,	1.55,	3.27,	5.40,	8.25,	11.21,
&	-4.70,	-3.44,	-2.18,	-.51,	1.28,	2.99,	4.98,	7.69,	10.51,
&	-4.94,	-3.70,	-2.46,	-.91,	.85,	2.58,	4.34,	7.02,	9.67,
&	-5.15,	-3.92,	-2.69,	-1.24,	.48,	2.22,	3.84,	6.45,	9.15,
&	-5.30,	-4.03,	-2.77,	-1.32,	.40,	2.12,	3.77,	6.21,	9.03,
&	-5.11,	-3.86,	-2.60,	-1.10,	.65,	2.42,	4.15,	6.76,	9.55,
&	-4.95,	-3.31,	-1.57,	.63,	3.06,	5.80,	8.60,	11.40,	14.20,
&	-5.20,	-2.76,	-.16,	2.97,	6.18,	9.43,	12.68,	15.93,	19.19,
&	-5.32,	-2.62,	.61,	4.33,	7.90,	11.34,	14.79,	18.24,	21.69/
DATA((ALP506(J,N),N=1,9),J=1,13)/									
&	-7.87,	-5.94,	-4.02,	-2.10,	-.13,	1.76,	4.68,	7.29,	10.03,
&	-7.58,	-5.76,	-3.95,	-2.13,	-.40,	1.39,	3.94,	6.48,	9.13,
&	-7.20,	-5.52,	-3.85,	-2.18,	-.58,	1.13,	3.37,	5.88,	8.47,
&	-6.99,	-5.39,	-3.79,	-2.19,	-.67,	.99,	3.09,	5.53,	7.96,
&	-6.67,	-5.20,	-3.73,	-2.26,	-.77,	.85,	2.77,	5.13,	7.64,
&	-6.52,	-5.11,	-3.70,	-2.28,	-.83,	.76,	2.62,	4.88,	7.68,
&	-6.38,	-5.02,	-3.66,	-2.30,	-.89,	.66,	2.47,	4.64,	7.86,
&	-6.15,	-4.87,	-3.59,	-2.31,	-.94,	.57,	2.33,	4.44,	8.45,
&	-5.86,	-4.67,	-3.48,	-2.29,	-.97,	.48,	2.24,	4.81,	9.11,
&	-5.54,	-4.44,	-3.33,	-2.23,	-.99,	.47,	2.57,	5.85,	9.88,
&	-5.22,	-4.17,	-3.12,	-2.06,	-.84,	.70,	3.10,	6.77,	10.55,
&	-5.02,	-3.91,	-2.81,	-1.66,	-.40,	1.36,	3.84,	7.59,	11.16,
&	-4.74,	-3.57,	-2.40,	-1.17,	.14,	1.89,	4.82,	8.32,	11.71/
DATA((ALP506(J,N),N=1,9),J=14,26)/									
&	-4.37,	-3.16,	-1.95,	-.67,	.82,	2.76,	5.74,	8.96,	12.16,
&	-3.96,	-2.72,	-1.46,	-.16,	1.48,	3.52,	6.48,	9.52,	12.55,
&	-3.54,	-2.26,	-.95,	.44,	2.08,	4.06,	7.11,	9.99,	12.86,
&	-3.43,	-2.10,	-.81,	.60,	2.23,	4.32,	7.22,	9.91,	12.59,
&	-3.73,	-2.37,	-1.06,	.27,	1.89,	3.90,	6.68,	9.22,	11.75,
&	-4.12,	-2.74,	-1.42,	-.15,	1.44,	3.34,	6.02,	8.51,	10.99,
&	-4.51,	-3.13,	-1.76,	-.49,	1.00,	2.80,	5.27,	7.84,	10.25,
&	-4.58,	-3.22,	-1.86,	-.56,	.92,	2.66,	4.96,	7.74,	10.35,
&	-4.62,	-3.17,	-1.74,	-.43,	1.13,	2.97,	5.45,	8.20,	10.89,
&	-4.62,	-3.14,	-1.67,	-.28,	1.42,	3.42,	6.10,	8.88,	11.65,
&	-4.74,	-2.97,	-1.05,	1.35,	4.11,	6.88,	9.61,	12.33,	15.05,
&	-4.83,	-2.82,	-.13,	3.28,	6.35,	9.17,	11.99,	14.80,	17.62,
&	-4.84,	-2.79,	.23,	3.89,	7.51,	10.99,	14.47,	17.95,	21.43/
DATA((ALP509(J,N),N=1,9),J=1,13)/									
&	-7.89,	-6.03,	-4.17,	-2.31,	-.35,	1.94,	4.84,	7.98,	11.04,
&	-7.50,	-5.82,	-4.13,	-2.45,	-.56,	1.55,	3.93,	7.13,	10.47,
&	-7.28,	-5.70,	-4.12,	-2.54,	-.68,	1.29,	3.45,	6.20,	9.48,
&	-7.17,	-5.64,	-4.11,	-2.59,	-.81,	1.14,	3.23,	5.76,	8.60,
&	-7.07,	-5.59,	-4.11,	-2.63,	-.93,	.95,	2.96,	5.32,	8.78,
&	-6.98,	-5.55,	-4.12,	-2.69,	-1.01,	.87,	2.83,	5.33,	9.38,
&	-6.97,	-5.57,	-4.17,	-2.77,	-1.12,	.78,	2.82,	5.60,	10.61,
&	-6.66,	-5.37,	-4.07,	-2.78,	-1.20,	.74,	3.01,	6.94,	11.88,
&	-6.20,	-5.01,	-3.83,	-2.64,	-1.13,	.86,	4.21,	8.36,	12.91,

& -5.82, -4.69, -3.56, -2.43, -.84, 1.75, 5.48, 9.58, 13.79,
 & -5.60, -4.39, -3.18, -1.96, -.04, 3.32, 6.71, 10.63, 14.55,
 & -5.26, -3.98, -2.70, -.98, 1.59, 4.52, 7.87, 11.57, 15.28,
 & -4.95, -3.48, -2.00, .36, 2.84, 5.54, 8.90, 12.38, 15.86/

DATA((ALP509(J,N),N=1,9),J=14,26)/

& -4.52, -2.60, -.56, 1.56, 3.82, 6.54, 9.82, 13.10, 16.38,
 & -3.71, -1.65, .24, 2.07, 4.40, 7.20, 10.84, 14.47, 18.11,
 & -3.48, -1.67, .17, 1.96, 4.30, 6.98, 10.21, 13.44, 16.66,
 & -4.07, -2.29, -.32, 1.45, 3.60, 5.95, 9.06, 12.19, 15.31,
 & -4.95, -3.08, -1.10, .83, 2.73, 5.03, 7.80, 10.94, 14.09,
 & -5.84, -3.70, -1.58, .40, 2.25, 4.60, 7.41, 10.67, 13.92,
 & -5.96, -3.73, -1.57, .38, 2.32, 4.70, 7.62, 10.77, 13.92,
 & -5.99, -3.66, -1.44, .52, 2.50, 4.96, 7.98, 11.21, 14.44,
 & -5.99, -3.58, -1.32, .64, 2.70, 5.24, 8.36, 11.61, 14.86,
 & -5.99, -3.50, -1.21, .77, 2.91, 5.53, 8.77, 12.10, 15.43,
 & -5.64, -3.04, -.62, 1.70, 4.44, 7.69, 11.17, 14.64, 18.12,
 & -5.37, -2.76, -.04, 2.79, 6.00, 9.81, 13.62, 17.43, 21.24,
 & -5.51, -2.61, .56, 4.18, 7.83, 11.54, 15.24, 18.94, 22.65/

DATA((ALP512(J,N),N=1,9),J=1,13)/

& -8.57, -6.36, -4.15, -1.94, .43, 2.82, 5.93, 9.60, 13.27,
 & -8.16, -6.14, -4.12, -2.10, .18, 2.35, 5.05, 8.42, 11.93,
 & -7.91, -6.02, -4.12, -2.23, .01, 2.00, 4.51, 7.35, 10.52,
 & -7.82, -5.98, -4.15, -2.31, -.08, 1.86, 4.22, 6.80, 10.00,
 & -7.73, -5.96, -4.18, -2.40, -.21, 1.73, 4.06, 6.89, 11.15,
 & -7.73, -5.96, -4.19, -2.42, -.29, 1.70, 4.26, 7.74, 12.13,
 & -7.75, -5.94, -4.13, -2.32, -.33, 1.77, 4.98, 8.85, 12.89,
 & -7.46, -5.67, -3.88, -2.10, -.17, 2.71, 6.39, 10.31, 14.24,
 & -6.99, -5.19, -3.39, -1.58, .53, 4.49, 8.02, 12.10, 16.18,
 & -5.95, -4.28, -2.62, -.70, 2.38, 5.70, 9.75, 13.96, 18.17,
 & -5.02, -3.41, -1.72, .71, 4.18, 7.24, 11.59, 15.93, 20.28,
 & -4.12, -2.34, .12, 2.52, 5.24, 9.07, 13.61, 18.16, 22.70,
 & -2.80, -.51, 1.52, 3.83, 6.16, 10.87, 15.58, 20.28, 24.99/

DATA((ALP512(J,N),N=1,9),J=14,26)/

& -1.97, -.08, 1.95, 4.20, 7.04, 10.96, 14.88, 18.80, 22.73,
 & -2.46, -.49, 1.53, 3.75, 6.19, 10.08, 13.96, 17.84, 21.73,
 & -3.95, -1.60, .60, 2.76, 5.06, 8.11, 11.71, 15.32, 18.92,
 & -6.06, -3.14, -.32, 1.68, 4.10, 6.48, 10.15, 13.82, 17.49,
 & -7.11, -3.84, -.72, 1.47, 3.73, 6.02, 10.14, 14.27, 18.39,
 & -7.14, -3.83, -.64, 1.56, 3.82, 6.31, 10.39, 14.47, 18.55,
 & -7.15, -3.82, -.48, 1.66, 3.96, 6.61, 10.65, 14.69, 18.73,
 & -7.13, -3.80, -.37, 1.75, 4.12, 6.89, 10.93, 14.97, 19.01,
 & -7.14, -3.78, -.31, 1.84, 4.28, 7.17, 11.21, 15.25, 19.29,
 & -7.08, -3.75, -.22, 1.94, 4.44, 7.45, 11.49, 15.54, 19.58,
 & -6.92, -3.58, .15, 2.64, 5.44, 9.06, 12.90, 16.75, 20.60,
 & -6.66, -3.38, .35, 3.38, 6.68, 10.25, 13.82, 17.39, 20.96,
 & -6.39, -3.16, .50, 4.13, 7.78, 11.51, 15.25, 18.99, 22.73/

DATA((ALP515(J,N),N=1,9),J=1,13)/

& -10.74, -7.59, -4.44, -1.43, .98, 3.50, 7.31, 11.27, 15.23,
 & -10.39, -7.49, -4.59, -1.70, .84, 3.15, 6.46, 10.80, 15.15,
 & -10.22, -7.44, -4.67, -1.88, .75, 2.97, 5.80, 9.53, 13.30,
 & -10.01, -7.35, -4.68, -2.01, .70, 2.83, 5.49, 8.65, 11.87,
 & -9.92, -7.31, -4.69, -2.08, .63, 2.78, 5.67, 9.30, 13.00,
 & -10.07, -7.33, -4.59, -1.84, .72, 3.08, 6.62, 10.87, 15.13,
 & -9.21, -6.61, -4.01, -1.42, .97, 3.91, 8.22, 13.70, 19.18,
 & -7.99, -5.58, -3.17, -.70, 1.84, 5.62, 9.57, 13.46, 17.34,

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& -6.59, -4.27, -1.95, .21, 3.52, 7.65, 11.19, 14.73, 18.27,
& -5.40, -2.35, -.40, 2.12, 6.06, 10.27, 14.48, 18.69, 22.91,
& -2.92, -.81, 1.43, 3.94, 8.95, 14.21, 19.47, 24.74, 30.00,
& -1.51, 1.17, 3.16, 6.62, 11.82, 17.01, 22.21, 27.40, 32.60,
& -1.02, 1.47, 3.37, 7.04, 12.84, 18.64, 24.43, 30.23, 36.03/
DATA((ALP515(J,N),N=1,9),J=14,26)/
& -1.73, .93, 2.86, 5.69, 11.26, 16.97, 22.69, 28.40, 34.11,
& -2.94, -.07, 1.70, 3.69, 8.15, 14.21, 20.27, 26.33, 32.39,
& -4.22, -1.34, .77, 2.66, 5.44, 11.06, 16.94, 22.82, 28.71,
& -5.35, -1.86, .53, 2.43, 4.88, 10.08, 15.72, 21.35, 26.99,
& -5.88, -1.97, .52, 2.47, 5.03, 10.00, 15.26, 20.53, 25.79,
& -5.92, -2.00, .51, 2.52, 5.18, 10.16, 15.35, 20.55, 25.74,
& -5.96, -2.00, .51, 2.58, 5.35, 10.36, 15.56, 20.75, 25.95,
& -5.94, -2.02, .49, 2.64, 5.51, 10.51, 15.64, 20.77, 25.90,
& -5.94, -2.02, .49, 2.70, 5.67, 10.72, 15.85, 20.97, 26.10,
& -5.96, -2.04, .48, 2.76, 5.83, 10.92, 16.05, 21.18, 26.31,
& -5.98, -2.10, .56, 3.18, 6.96, 11.78, 16.60, 21.42, 26.24,
& -6.12, -2.00, .63, 3.70, 7.82, 12.89, 17.95, 23.01, 28.08,
& -6.39, -1.92, .67, 4.24, 8.66, 13.72, 18.78, 23.85, 28.91/
DATA((ALP518(J,N),N=1,9),J=1,13)/
& -8.55, -5.92, -3.29, -.65, 1.73, 4.64, 8.40, 12.21, 16.02,
& -8.46, -5.88, -3.30, -.76, 1.59, 4.24, 7.59, 11.03, 14.48,
& -8.07, -5.68, -3.28, -.87, 1.45, 3.92, 6.67, 9.57, 12.46,
& -7.49, -5.38, -3.26, -.98, 1.37, 3.91, 6.53, 9.63, 12.73,
& -6.75, -4.76, -2.77, -.30, 2.04, 4.98, 8.62, 12.40, 16.17,
& -5.90, -3.97, -2.04, .56, 3.03, 6.56, 10.56, 14.56, 18.56,
& -4.91, -2.95, -.74, 1.72, 3.92, 8.58, 12.88, 17.18, 21.48,
& -3.73, -1.59, .58, 2.86, 6.38, 12.26, 18.15, 24.03, 29.91,
& -2.31, -.19, 2.02, 4.10, 11.51, 20.40, 29.29, 38.18, 47.07,
& -.66, 1.38, 3.94, 8.00, 18.26, 28.51, 38.77, 49.03, 59.28,
& .70, 2.70, 5.10, 13.82, 25.94, 38.06, 50.18, 62.30, 74.42,
& 1.07, 3.20, 5.69, 14.05, 23.14, 32.23, 41.32, 50.41, 59.50,
& .70, 2.89, 5.21, 12.90, 22.90, 32.90, 42.90, 52.90, 62.90/
DATA((ALP518(J,N),N=1,9),J=14,26)/
& -.66, 1.36, 3.40, 5.36, 12.70, 22.70, 32.70, 42.70, 52.70,
& -1.72, -.01, 2.00, 4.07, 6.21, 14.54, 22.88, 31.21, 39.54,
& -2.97, -.57, 1.54, 3.63, 5.65, 13.02, 21.53, 30.04, 38.55,
& -3.60, -.68, 1.53, 3.68, 5.75, 13.18, 21.35, 29.51, 37.67,
& -3.63, -.69, 1.54, 3.74, 5.85, 13.91, 22.43, 30.94, 39.45,
& -3.63, -.68, 1.59, 3.81, 5.96, 14.52, 23.22, 31.91, 40.61,
& -3.63, -.68, 1.63, 3.88, 6.27, 15.16, 24.04, 32.93, 41.82,
& -3.63, -.68, 1.67, 3.93, 6.73, 15.82, 24.91, 34.00, 43.09,
& -3.63, -.67, 1.72, 4.00, 7.21, 16.51, 25.81, 35.12, 44.42,
& -3.65, -.66, 1.76, 4.06, 7.71, 17.24, 26.76, 36.29, 45.81,
& -3.66, -.65, 1.91, 4.52, 10.55, 20.55, 30.55, 40.55, 50.55,
& -3.68, -.69, 2.07, 5.10, 14.17, 25.60, 37.03, 48.46, 59.89,
& -3.70, -.73, 2.31, 5.84, 17.58, 29.70, 41.82, 53.94, 66.06/
DATA((ALP521(J,N),N=1,9),J=1,13)/
& -7.97, -5.31, -2.64, .39, 2.90, 6.41, 10.11, 13.81, 17.52,
& -8.06, -5.48, -2.90, .15, 2.67, 5.84, 8.98, 12.11, 15.23,
& -8.41, -5.75, -3.08, -.11, 2.40, 5.34, 8.27, 11.11, 13.94,
& -8.62, -5.88, -3.14, -.30, 2.25, 5.12, 8.35, 11.55, 14.75,
& -8.89, -5.93, -2.96, -.10, 2.69, 6.30, 11.23, 16.17, 21.11,
& -7.22, -4.28, -1.48, 1.03, 3.96, 10.06, 16.03, 22.00, 27.97,
& -5.27, -2.02, .38, 3.23, 8.27, 14.93, 21.60, 28.27, 34.93,

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& -2.86, -.26, 2.65, 6.04, 13.31, 20.58, 27.85, 35.13, 42.40,
& -.80, 2.17, 4.60, 11.54, 19.88, 28.21, 36.54, 44.88, 53.21,
& .96, 3.43, 7.49, 14.27, 21.05, 27.83, 34.61, 41.39, 48.17,
& 1.88, 3.89, 8.86, 15.21, 21.56, 27.90, 34.25, 40.60, 46.95,
& 1.17, 3.48, 7.61, 13.17, 18.72, 24.28, 29.83, 35.39, 40.94,
& -1.42, 2.03, 4.05, 8.78, 15.03, 21.28, 27.53, 33.78, 40.03/

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DATA((ALP521(J,N),N=1,9),J=14,26)/
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& -3.16, -.61, 2.53, 5.07, 10.68, 16.83, 22.98, 29.14, 35.29,
& -4.09, -1.51, 2.08, 4.23, 9.78, 17.19, 24.59, 32.00, 39.41,
& -4.56, -1.60, 2.13, 4.26, 9.86, 17.00, 24.14, 31.29, 38.43,
& -4.44, -1.46, 2.18, 4.42, 10.30, 17.70, 25.11, 32.52, 39.93,
& -4.33, -1.33, 2.25, 4.57, 10.77, 18.46, 26.15, 33.85, 41.54,
& -4.23, -1.20, 2.30, 4.72, 11.18, 19.02, 26.86, 34.71, 42.55,
& -4.11, -1.08, 2.36, 4.87, 11.49, 19.33, 27.18, 35.02, 42.86,
& -4.00, -.97, 2.43, 5.01, 11.76, 19.61, 27.45, 35.29, 43.14,
& -3.93, -.86, 2.49, 5.17, 11.96, 19.65, 27.35, 35.04, 42.73,
& -3.87, -.76, 2.57, 5.31, 12.15, 19.70, 27.25, 34.79, 42.34,
& -3.56, -.28, 2.95, 6.21, 13.10, 20.00, 26.90, 33.79, 40.69,
& -3.42, .04, 3.24, 6.97, 13.86, 20.76, 27.66, 34.55, 41.45,
& -3.40, .24, 3.53, 7.76, 14.66, 21.55, 28.45, 35.34, 42.24/

```

```
DATA((CD504(I,J),J=1,26),I=1,5)/
```

```

1 .0164, .0173, .0177, .0179, .0181, .0182, .0183, .0184, .0186,
1 .0187, .0190, .0205, .0231, .0282, .0345, .0401, .0445, .0477,
1 .0501, .0521, .0531, .0541, .0542, .0516, .0401, .0280,
2 .0093, .0090, .0088, .0088, .0087, .0087, .0087, .0087, .0086,
2 .0088, .0093, .0118, .0165, .0230, .0293, .0341, .0379, .0407,
2 .0435, .0451, .0466, .0474, .0482, .0472, .0418, .0346,
3 .0050, .0050, .0050, .0050, .0050, .0050, .0050, .0050, .0050,
3 .0051, .0060, .0081, .0125, .0182, .0251, .0313, .0365, .0406,
3 .0444, .0463, .0481, .0499, .0512, .0583, .0639, .0704,
4 .0050, .0050, .0050, .0050, .0050, .0050, .0050, .0050, .0050,
4 .0056, .0066, .0087, .0145, .0215, .0293, .0369, .0440, .0511,
4 .0571, .0631, .0679, .0720, .0761, .0971, .1108, .1240,
5 .0123, .0088, .0072, .0069, .0069, .0069, .0070, .0070, .0074,
5 .0089, .0122, .0190, .0267, .0378, .0492, .0607, .0724, .0838,
5 .0948, .1057, .1157, .1239, .1322, .1544, .1629, .1672/

```

```
DATA((CD506(I,J),J=1,26),I=1,5)/
```

```

1 .0158, .0157, .0156, .0156, .0155, .0155, .0155, .0155, .0155,
1 .0158, .0168, .0201, .0252, .0315, .0381, .0445, .0509, .0568,
1 .0610, .0639, .0666, .0685, .0704, .0645, .0525, .0385,
2 .0083, .0083, .0083, .0083, .0083, .0083, .0083, .0083, .0084,
2 .0094, .0114, .0147, .0191, .0243, .0305, .0371, .0435, .0474,
2 .0514, .0547, .0574, .0601, .0629, .0668, .0590, .0453,
3 .0055, .0055, .0055, .0055, .0055, .0056, .0056, .0056, .0056,
3 .0067, .0097, .0126, .0188, .0251, .0320, .0391, .0456, .0512,
3 .0558, .0592, .0623, .0644, .0666, .0742, .0779, .0779,
4 .0055, .0055, .0055, .0055, .0055, .0056, .0056, .0056, .0059,
4 .0077, .0110, .0157, .0212, .0297, .0409, .0505, .0579, .0643,
4 .0707, .0765, .0818, .0871, .0924, .1106, .1213, .1308,
5 .0128, .0106, .0094, .0094, .0094, .0094, .0095, .0098, .0149,
5 .0236, .0323, .0411, .0498, .0585, .0751, .0937, .1085, .1202,
5 .1311, .1411, .1512, .1605, .1694, .2017, .2196, .2241/

```

```
DATA((CD509(I,J),J=1,26),I=1,5)/
```

```

1 .0141, .0141, .0141, .0141, .0141, .0141, .0141, .0141, .0144,
1 .0169, .0216, .0262, .0309, .0381, .0454, .0536, .0629, .0715,

```

1	.0788,	.0853,	.0896,	.0921,	.0940,	.0940,	.0767,	.0541,	
2	.0083,	.0082,	.0081,	.0081,	.0081,	.0081,	.0084,	.0088,	.0100,
2	.0127,	.0164,	.0210,	.0263,	.0332,	.0404,	.0478,	.0557,	.0634,
2	.0700,	.0747,	.0776,	.0792,	.0802,	.0791,	.0706,	.0566,	
3	.0058,	.0059,	.0059,	.0059,	.0059,	.0059,	.0061,	.0066,	.0084,
3	.0121,	.0165,	.0217,	.0276,	.0347,	.0425,	.0511,	.0600,	.0683,
3	.0749,	.0806,	.0847,	.0873,	.0887,	.0897,	.0890,	.0883,	
4	.0059,	.0059,	.0059,	.0059,	.0059,	.0059,	.0062,	.0068,	.0090,
4	.0127,	.0169,	.0227,	.0297,	.0388,	.0498,	.0618,	.0759,	.0884,
4	.0949,	.1003,	.1050,	.1098,	.1136,	.1326,	.1480,	.1616,	
5	.0135,	.0108,	.0090,	.0086,	.0085,	.0085,	.0090,	.0114,	.0162,
5	.0216,	.0285,	.0374,	.0471,	.0619,	.0766,	.0952,	.1125,	.1257,
5	.1363,	.1448,	.1513,	.1579,	.1649,	.2024,	.2218,	.2313/	

DATA((CD512(I,J),J=1,26),I=1,5)/

1	.0137,	.0146,	.0151,	.0153,	.0155,	.0163,	.0191,	.0223,	.0286,
1	.0371,	.0455,	.0540,	.0670,	.0804,	.0941,	.1053,	.1132,	.1178,
1	.1216,	.1244,	.1273,	.1301,	.1297,	.1150,	.0970,	.0905,	
2	.0103,	.0103,	.0103,	.0103,	.0103,	.0103,	.0111,	.0145,	.0187,
2	.0266,	.0354,	.0444,	.0531,	.0619,	.0711,	.0804,	.0896,	.0985,
2	.1073,	.1150,	.1223,	.1264,	.1293,	.1231,	.1046,	.0872,	
3	.0074,	.0074,	.0075,	.0075,	.0075,	.0078,	.0090,	.0127,	.0172,
3	.0241,	.0317,	.0406,	.0509,	.0627,	.0738,	.0851,	.0964,	.1077,
3	.1156,	.1233,	.1309,	.1363,	.1395,	.1378,	.1264,	.1131,	
4	.0074,	.0075,	.0075,	.0075,	.0076,	.0079,	.0089,	.0109,	.0147,
4	.0218,	.0297,	.0404,	.0522,	.0670,	.0823,	.0984,	.1115,	.1231,
4	.1339,	.1433,	.1527,	.1605,	.1652,	.1708,	.1676,	.1634,	
5	.0128,	.0126,	.0124,	.0124,	.0126,	.0142,	.0173,	.0238,	.0315,
5	.0447,	.0609,	.0786,	.0945,	.1102,	.1256,	.1411,	.1533,	.1655,
5	.1778,	.1895,	.2005,	.2115,	.2225,	.2689,	.2951,	.3213/	

DATA((CD515(I,J),J=1,26),I=1,5)/

1	.0138,	.0206,	.0240,	.0257,	.0274,	.0283,	.0297,	.0348,	.0444,
1	.0543,	.0642,	.0751,	.0860,	.0959,	.1049,	.1138,	.1225,	.1312,
1	.1382,	.1437,	.1491,	.1523,	.1550,	.1502,	.1332,	.1164,	
2	.0103,	.0114,	.0119,	.0126,	.0132,	.0139,	.0166,	.0238,	.0331,
2	.0435,	.0580,	.0725,	.0841,	.0953,	.1065,	.1173,	.1262,	.1350,
2	.1431,	.1486,	.1541,	.1587,	.1582,	.1514,	.1369,	.1220,	
3	.0093,	.0094,	.0095,	.0096,	.0098,	.0106,	.0134,	.0209,	.0287,
3	.0431,	.0575,	.0718,	.0861,	.1003,	.1117,	.1223,	.1329,	.1435,
3	.1520,	.1574,	.1627,	.1669,	.1691,	.1703,	.1603,	.1515,	
4	.0094,	.0100,	.0104,	.0105,	.0108,	.0119,	.0140,	.0181,	.0276,
4	.0417,	.0570,	.0739,	.0884,	.1025,	.1166,	.1301,	.1427,	.1552,
4	.1651,	.1739,	.1827,	.1897,	.1937,	.2040,	.2079,	.2061,	
5	.0138,	.0142,	.0144,	.0149,	.0163,	.0174,	.0243,	.0399,	.0587,
5	.0793,	.1003,	.1199,	.1391,	.1582,	.1758,	.1933,	.2082,	.2194,
5	.2306,	.2418,	.2510,	.2583,	.2657,	.2763,	.2728,	.2676/	

DATA((CD518(I,J),J=1,26),I=1,5)/

1	.0180,	.0223,	.0243,	.0252,	.0261,	.0272,	.0292,	.0389,	.0549,
1	.0750,	.0911,	.1066,	.1184,	.1274,	.1363,	.1453,	.1505,	.1548,
1	.1591,	.1633,	.1676,	.1685,	.1683,	.1669,	.1574,	.1470,	
2	.0158,	.0155,	.0153,	.0152,	.0151,	.0161,	.0227,	.0389,	.0586,
2	.0782,	.0975,	.1141,	.1291,	.1384,	.1477,	.1544,	.1607,	.1670,
2	.1718,	.1745,	.1772,	.1798,	.1806,	.1787,	.1712,	.1591,	
3	.0137,	.0138,	.0139,	.0140,	.0146,	.0177,	.0237,	.0406,	.0624,
3	.0831,	.1017,	.1174,	.1306,	.1437,	.1550,	.1629,	.1709,	.1788,
3	.1840,	.1885,	.1930,	.1975,	.2020,	.2019,	.1922,	.1826,	

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4 .0137, .0137, .0144, .0147, .0157, .0181, .0292, .0450, .0651,
4 .0851, .1036, .1221, .1390, .1543, .1695, .1812, .1910, .2009,
4 .2108, .2151, .2188, .2225, .2262, .2367, .2356, .2345,
5 .0197, .0239, .0261, .0273, .0298, .0363, .0572, .0782, .0991,
5 .1201, .1435, .1721, .1931, .2109, .2287, .2437, .2572, .2707,
5 .2843, .2913, .2918, .2923, .2927, .2956, .2984, .3012/
DATA((CD521(I,J),J=1,26),I=1,5)/
1 .0195, .0227, .0243, .0251, .0264, .0303, .0420, .0591, .0757,
1 .0925, .1095, .1265, .1435, .1586, .1738, .1889, .2018, .2101,
1 .2185, .2268, .2301, .2324, .2347, .2388, .2388, .2388,
2 .0213, .0230, .0239, .0243, .0265, .0351, .0491, .0649, .0808,
2 .0972, .1136, .1312, .1496, .1673, .1819, .1965, .2097, .2166,
2 .2236, .2305, .2375, .2443, .2462, .2533, .2545, .2557,
3 .0155, .0182, .0195, .0201, .0216, .0273, .0451, .0633, .0805,
3 .0969, .1133, .1327, .1537, .1720, .1865, .2009, .2154, .2291,
3 .2366, .2441, .2516, .2591, .2666, .2715, .2742, .2769,
4 .0176, .0201, .0214, .0221, .0250, .0366, .0520, .0690, .0864,
4 .1047, .1261, .1474, .1687, .1887, .2074, .2260, .2447, .2561,
4 .2647, .2733, .2818, .2898, .2912, .2993, .2998, .2998,
5 .0241, .0269, .0283, .0290, .0338, .0517, .0738, .0950, .1188,
5 .1459, .1730, .1989, .2247, .2472, .2634, .2797, .2960, .3123,
5 .3239, .3350, .3462, .3471, .3467, .3443, .3420, .3396/
DATA(XMI(J),J=1,26)/.3,.5,.6,.65,.7,.725,.75,.775,
& .8,.825,.85,.875,.9,.925,.95,.975,1.0,1.025,1.05,1.075,
&1.1,1.125,1.15,1.3,1.45,1.6/
DATA(CLI(J),J=1,9)/-.4,-.2,0.0,.2,.4,.6,.8,1.0,1.2/
DATA(ALPI(J),J=1,7)/-4.0,-2.0,0.0,2.0,4.0,6.0,8.0/
DATA(CLII(J),J=1,5)/0.0,.2,.4,.6,.8/
IORDER(1)=IORDER(2)=1
IPT (1) = -1
IF (IKEY .EQ. 2) GO TO 1000
IF (TR .LT. .04) GO TO 9
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 1
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 2
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 3
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 4
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 5
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 6
IF (TR .GE. .21) GO TO 7
9 CALL IBI (7,ALPI,25,XMI,7,CL504,IORDER,IPT,AA,XM,CLFT04,IERR)
CL=CLFT04
GO TO 400
1 CALL IBI (7,ALPI,26,XMI,7,CL504,IORDER,IPT,AA,XM,CLFT04,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL506,IORDER,IPT,AA,XM,CLFT06,IERR)
CL=CLFT04 + (CLFT06-CLFT04)*((TR-.04)/(.06-.04))
GO TO 400
2 CALL IBI (7,ALPI,26,XMI,7,CL506,IORDER,IPT,AA,XM,CLFT06,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL509,IORDER,IPT,AA,XM,CLFT09,IERR)
CL=CLFT06 + (CLFT09 - CLFT06)*((TR-.06)/(.09-.06))
GO TO 400
3 CALL IBI (7,ALPI,26,XMI,7,CL509,IORDER,IPT,AA,XM,CLFT09,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL512,IORDER,IPT,AA,XM,CLFT12,IERR)

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CL=CLFT09+(CLFT12-CLFT09)*((TR-.09)/(.12-.09))
GO TO 400
4 CALL IBI (7,ALPI,26,XMI,7,CL512,IORDER,IPT,AA,XM,CLFT12,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL515,IORDER,IPT,AA,XM,CLFT15,IERR)
  CL=CLFT12 + (CLFT15-CLFT12)*((TR-.12)/(.15-.12))
  GO TO 400
5 CALL IBI (7,ALPI,26,XMI,7,CL515,IORDER,IPT,AA,XM,CLFT15,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL518,IORDER,IPT,AA,XM,CLFT18,IERR)
  CL=CLFT15+(CLFT18-CLFT15)*((TR-.15)/(.18-.15))
  GO TO 400
6 CALL IBI (7,ALPI,26,XMI,7,CL518,IORDER,IPT,AA,XM,CLFT18,IERR)
  IPT (1)=-1
  CALL IBI (7,ALPI,26,XMI,7,CL521,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT18+(CLFT21-CLFT18)*((TR-.18)/(.21-.18))
  GO TO 400
7 CALL IBI (7,ALPI,26,XMI,7,CL521,IORDER,IPT,AA,XM,CLFT21,IERR)
  CL=CLFT21
  GO TO 400
1000 CONTINUE
  IPT (1)=-1
  IF (TR .LT. .04) GO TO 90
  IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 10
  IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 20
  IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 30
  IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 40
  IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 50
  IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 60
  IF (TR .GE. .21) GO TO 70
90 CALL IBI (26,XMI,9,CLI,26,ALP504,IORDER,IPT,XM,CL,AA04,IERR)
  AA=AA04
  GO TO 400
10 CALL IBI (26,XMI,9,CLI,26,ALP504,IORDER,IPT,XM,CL,AA04,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP506,IORDER,IPT,XM,CL,AA06,IERR)
  AA=AA04 + (AA06-AA04)*((TR-.04)/(.06-.04))
  GO TO 400
20 CALL IBI (26,XMI,9,CLI,26,ALP506,IORDER,IPT,XM,CL,AA06,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP509,IORDER,IPT,XM,CL,AA09,IERR)
  AA=AA06 + (AA09 - AA06)*((TR -.06)/(.09-.06))
  GO TO 400
30 CALL IBI (26,XMI,9,CLI,26,ALP509,IORDER,IPT,XM,CL,AA09,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP512,IORDER,IPT,XM,CL,AA12,IERR)
  AA=AA09+(AA12-AA09)*((TR-.09)/(.12-.09))
  GO TO 400
40 CALL IBI (26,XMI,9,CLI,26,ALP512,IORDER,IPT,XM,CL,AA12,IERR)
  IPT (1) = -1
  CALL IBI (26,XMI,9,CLI,26,ALP515,IORDER,IPT,XM,CL,AA15,IERR)
  AA=AA12+(AA15-AA12)*((TR-.12)/(.15-.12))
  GO TO 400
50 CALL IBI (26,XMI,9,CLI,26,ALP515,IORDER,IPT,XM,CL,AA15,IERR)
  IPT (1) = -1

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CALL IBI (26,XMI,9,CLI,26,ALP518,IORDER,IPT,XM,CL,AA18,IERR)
AA=AA15+(AA18-AA15)*((TR-.15)/(.18-.15))
GO TO 400
60 CALL IBI (26,XMI,9,CLI,26,ALP518,IORDER,IPT,XM,CL,AA18,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP521,IORDER,IPT,XM,CL,AA21,IERR)
AA=AA18+(AA21-AA18)*((TR-.18)/(.21-.18))
GO TO 400
70 CALL IBI (26,XMI,9,CLI,26,ALP521,IORDER,IPT,XM,CL,AA21,IERR)
AA=AA21
400 CONTINUE
IPT (1)=-1
IF (TR .LT. .04) GO TO 91
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 11
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 21
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 31
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 41
IF (TR .GE. .15 .AND. TR .LT. .18) GO TO 51
IF (TR .GE. .18 .AND. TR .LT. .21) GO TO 61
IF (TR .GE. .21) GO TO 71
91 CALL IBI (5,CLII,26,XMI,5,CD504,IORDER,IPT,CL,XM,CDRG04,IERR)
CD=CDRG04
WRITE (6,201) TR
201 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
&*/* THE VALUES FOR T/C=.04 HAVE BEEN RETURNED*)
GO TO 250
11 CALL IBI (5,CLII,26,XMI,5,CD504,IORDER,IPT,CL,XM,CDRG04,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD506,IORDER,IPT,CL,XM,CDRG06,IERR)
CD=CDRG04 + (CDRG06-CDRG04)*((TR-.04)/(.06-.04))
GO TO 250
21 CALL IBI (5,CLII,26,XMI,5,CD506,IORDER,IPT,CL,XM,CDRG06,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD509,IORDER,IPT,CL,XM,CDRG09,IERR)
CD=CDRG06 + (CDRG09 - CDRG06)*((TR-.06)/(.09-.06))
GO TO 250
31 CALL IBI (5,CLII,26,XMI,5,CD509,IORDER,IPT,CL,XM,CDRG09,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD512,IORDER,IPT,CL,XM,CDRG12,IERR)
CD=CDRG09+(CDRG12-CDRG09)*((TR-.09)/(.12-.09))
GO TO 250
41 CALL IBI (5,CLII,26,XMI,5,CD512,IORDER,IPT,CL,XM,CDRG12,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD515,IORDER,IPT,CL,XM,CDRG15,IERR)
CD=CDRG12 + (CDRG15-CDRG12)*((TR-.12)/(.15-.12))
GO TO 250
51 CALL IBI (5,CLII,26,XMI,5,CD515,IORDER,IPT,CL,XM,CDRG15,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD518,IORDER,IPT,CL,XM,CDRG18,IERR)
CD=CDRG15+(CDRG18-CDRG15)*((TR-.15)/(.18-.15))
GO TO 250
61 CALL IBI (5,CLII,26,XMI,5,CD518,IORDER,IPT,CL,XM,CDRG18,IERR)
IPT (1)=-1
CALL IBI (5,CLII,26,XMI,5,CD521,IORDER,IPT,CL,XM,CDRG21,IERR)
CD=CDRG18+(CDRG21-CDRG18)*((TR-.18)/(.21-.18))

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GO TO 250
71 CALL IBI (5,CLII,26,XMI,5,CD521,IORDER,IPT,CL,XM,CDRG21,IERR)
   CD=CDRG21
   IF (TR .GT. .21) WRITE(6,204) TR
204 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
   &*/* THE VALUES FOR T/C=.21 HAVE BEEN RETURNED.*)
250 IF (CL .GT. .8) GO TO 251
   RETURN
251 CALL COMPUT(D,XM,ALT,COR,TR,AA,CDT,CL,CD,CLDES)
   CD=CDT
   RETURN
   END

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SUBROUTINE AER06(XLD,CL,CD,XM,AA,IKEY,TR,CLDES,ALT,COR,D)

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C
C
C THIS SUBROUTINE IS DESIGNED TO COMPUTE THE AIRFOIL
C CHARACTERISTICS FOR A 16 SERIES AIRFOIL WITH A GIVEN CAMBER.
C
C THIS SUBROUTINE RELATES CL,CD,CL/CD,MACH,T/C,AND ALPHA.
C IT REPRESENTS THE DATA OF A 16-6XX AIRFOIL.
C
C XM=RELATIVE MACH NO. AT BLADE ELEMENT
C AA=ANGLE OF ATTACK IN DEGREES
C IKEY1: CL=CL(MACH,ALPHA,T/C)
C       : CD=CD(MACH,CL,T/C)
C       : XLD=CL/CD
C IKEY2: ALPHA=ALPHA(MACH,CL,T/C)
C       : CD=CD(MACH,CL,T/C)
C       : XLD=CL/CD
C TR=T/C
C
C
C
C

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DIMENSION IORDER(2),IPT(2),ALP604(26,9),ALP606(26,9),
& ALP609(26,9),ALP612(26,9),ALP615(26,9),
& CLI(9),XMI(26),ALPI(7),CL604(7,26),
& CL606(7,26),CL609(7,26),CL612(7,26),CL615(7,26),
& CD604(5,26),CD606(5,26),
& CD609(5,26),CD612(5,26),CD615(5,26),CLII(5)
DATA((CL604(I,J),J=1,26),I=1,4)/
1 .021, .021, .021, .025, .030, .033, .035, .040, .060,
1 .086, .111, .125, .112, .052, -.017, -.085, -.154, -.214,
1 -.202, -.127, -.051, -.018, -.026, -.194, -.263, -.235,
2 .246, .259, .279, .289, .305, .312, .320, .328, .336,
2 .343, .351, .349, .313, .254, .190, .116, .037, .009,
2 .030, .098, .158, .190, .174, .002, -.126, -.149,
3 .467, .497, .523, .540, .559, .569, .579, .591, .603,
3 .616, .629, .616, .559, .485, .404, .324, .249, .214,
3 .235, .287, .352, .378, .356, .172, .027, -.031,
4 .673, .699, .727, .742, .762, .771, .781, .791, .804,
4 .818, .828, .808, .739, .670, .600, .530, .463, .422,

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4 .455, .518, .573, .595, .578, .356, .163, .080/
DATA((CL604(I,J),J=1,26),I=5,7)/
5 .820, .858, .895, .919, .948, .968, .989, 1.010, 1.032,
5 1.042, 1.028, .997, .943, .877, .812, .746, .681, .663,
5 .699, .757, .811, .830, .799, .520, .298, .191,
6 .953, 1.016, 1.060, 1.086, 1.121, 1.139, 1.157, 1.175, 1.192,
6 1.190, 1.170, 1.134, 1.078, 1.021, .965, .908, .849, .824,
6 .859, .918, .975, 1.005, .975, .655, .415, .309,
7 1.114, 1.169, 1.215, 1.239, 1.271, 1.288, 1.304, 1.324, 1.337,
7 1.321, 1.293, 1.254, 1.212, 1.165, 1.109, 1.053, .993, .960,
7 1.007, 1.083, 1.148, 1.158, 1.137, .802, .547, .420/
DATA((CL606(I,J),J=1,26),I=1,4)/
1 .057, .055, .060, .065, .070, .072, .073, .071, .044,
1 -.032, -.114, -.197, -.279, -.362, -.444, -.512, -.516, -.485,
1 -.420, -.357, -.336, -.345, -.352, -.361, -.366, -.371,
2 .273, .282, .298, .309, .326, .334, .342, .345, .337,
2 .296, .210, .124, .037, -.049, -.135, -.211, -.231, -.183,
2 -.120, -.058, -.034, -.051, -.068, -.132, -.154, -.148,
3 .479, .504, .543, .563, .582, .592, .603, .616, .633,
3 .624, .576, .474, .369, .264, .160, .079, .067, .105,
3 .187, .267, .272, .251, .230, .107, .007, -.038,
4 .685, .727, .757, .777, .796, .806, .815, .824, .831,
4 .801, .734, .664, .577, .488, .400, .311, .307, .368,
4 .435, .497, .508, .481, .450, .278, .142, .087/
DATA((CL606(I,J),J=1,26),I=5,7)/
5 .806, .867, .913, .941, .970, .984, .998, .999, .975,
5 .921, .855, .789, .723, .657, .590, .533, .520, .557,
5 .638, .711, .721, .680, .639, .421, .260, .188,
6 .936, .994, 1.036, 1.068, 1.103, 1.122, 1.138, 1.136, 1.100,
6 1.055, .998, .941, .884, .817, .746, .680, .668, .714,
6 .793, .862, .873, .835, .791, .546, .366, .283,
7 1.099, 1.158, 1.208, 1.237, 1.271, 1.288, 1.305, 1.278, 1.238,
7 1.191, 1.135, 1.078, 1.022, .965, .907, .847, .830, .880,
7 .952, 1.023, 1.034, .995, .949, .680, .493, .403/
DATA((CL609(I,J),J=1,26),I=1,4)/
1 .077, .097, .099, .100, .107, .112, .113, .111, .082,
1 -.022, -.126, -.246, -.369, -.475, -.528, -.522, -.457, -.377,
1 -.299, -.268, -.274, -.284, -.293, -.304, -.309, -.309,
2 .288, .308, .334, .347, .369, .379, .376, .358, .304,
2 .227, .111, -.005, -.123, -.247, -.304, -.308, -.234, -.141,
2 -.081, -.076, -.087, -.097, -.104, -.146, -.167, -.173,
3 .480, .513, .542, .557, .573, .581, .590, .581, .546,
3 .482, .373, .234, .081, -.067, -.111, -.095, -.023, .066,
3 .119, .111, .101, .089, .078, .017, -.013, -.044,
4 .675, .718, .755, .776, .798, .809, .788, .738, .672,
4 .607, .542, .415, .288, .163, .097, .114, .200, .290,
4 .337, .333, .319, .302, .284, .191, .121, .080/
DATA((CL609(I,J),J=1,26),I=5,7)/
5 .785, .830, .885, .912, .950, .952, .925, .857, .787,
5 .717, .634, .533, .433, .346, .307, .328, .401, .490,
5 .535, .526, .507, .487, .466, .349, .256, .190,
6 .908, .970, 1.032, 1.074, 1.100, 1.087, 1.026, .963, .899,
6 .836, .755, .669, .583, .505, .464, .488, .576, .678,
6 .713, .693, .671, .648, .624, .483, .365, .285,
7 1.019, 1.085, 1.146, 1.183, 1.196, 1.167, 1.121, 1.075, 1.013,

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7 .937, .861, .785, .709, .641, .607, .625, .705, .793,
7 .845, .840, .819, .793, .767, .619, .495, .394/
DATA((CL612(I,J),J=1,26),I=1,4)/
1 .063, .079, .087, .093, .099, .095, .070, -.002, -.113,
1 -.238, -.363, -.487, -.598, -.607, -.568, -.459, -.325, -.276,
1 -.278, -.280, -.282, -.284, -.286, -.298, -.310, -.321,
2 .247, .277, .295, .305, .297, .282, .247, .173, .057,
2 -.071, -.199, -.361, -.450, -.470, -.423, -.307, -.178, -.121,
2 -.123, -.125, -.127, -.129, -.130, -.142, -.153, -.164,
3 .424, .447, .466, .480, .493, .487, .457, .367, .245,
3 .122, -.000, -.122, -.241, -.279, -.247, -.118, -.014, .019,
3 .015, .011, .006, .002, -.002, -.028, -.035, -.032,
4 .601, .631, .659, .676, .679, .657, .590, .482, .374,
4 .267, .159, .051, -.047, -.077, -.038, .096, .187, .221,
4 .219, .205, .192, .179, .168, .118, .095, .072/
DATA((CL612(I,J),J=1,26),I=5,7)/
5 .752, .790, .820, .839, .840, .788, .700, .604, .507,
5 .411, .315, .218, .133, .109, .145, .275, .383, .407,
5 .393, .378, .363, .348, .337, .269, .225, .187,
6 .844, .907, .969, 1.006, 1.014, .965, .869, .773, .677,
6 .581, .485, .389, .312, .291, .332, .461, .554, .585,
6 .573, .554, .534, .515, .495, .410, .346, .295,
7 .958, 1.022, 1.083, 1.120, 1.124, 1.072, .988, .904, .820,
7 .717, .611, .505, .428, .404, .443, .561, .665, .699,
7 .681, .663, .646, .628, .611, .527, .463, .416/
DATA((CL615(I,J),J=1,26),I=1,4)/
1 .072, .080, .084, .086, .072, .045, -.003, -.076, -.233,
1 -.407, -.627, -.835, -.922, -.895, -.769, -.591, -.439, -.417,
1 -.413, -.410, -.406, -.403, -.400, -.387, -.372, -.357,
2 .213, .224, .226, .216, .205, .200, .134, .055, -.086,
2 -.265, -.444, -.616, -.696, -.630, -.506, -.353, -.258, -.250,
2 -.245, -.244, -.243, -.242, -.240, -.227, -.209, -.190,
3 .367, .378, .384, .394, .377, .341, .284, .207, .105,
3 -.041, -.232, -.416, -.474, -.415, -.283, -.156, -.114, -.107,
3 -.105, -.103, -.100, -.098, -.096, -.083, -.065, -.046,
4 .544, .567, .579, .586, .560, .528, .449, .369, .246,
4 .110, -.057, -.201, -.252, -.207, -.071, .057, .094, .093,
4 .091, .090, .088, .086, .084, .071, .062, .062/
DATA((CL615(I,J),J=1,26),I=5,7)/
5 .688, .717, .734, .745, .725, .676, .602, .515, .398,
5 .281, .160, .046, .003, .046, .182, .308, .341, .335,
5 .328, .322, .314, .306, .298, .253, .212, .172,
6 .789, .839, .870, .880, .826, .777, .702, .601, .500,
6 .375, .239, .133, .087, .130, .281, .404, .435, .433,
6 .425, .418, .410, .403, .395, .353, .313, .274,
7 .887, .939, .991, 1.015, .953, .889, .824, .728, .607,
7 .487, .349, .218, .172, .212, .361, .490, .521, .514,
7 .506, .499, .492, .485, .478, .435, .394, .355/
DATA((ALP604(J,N),N=1,9),J=1,13)/
& -7.74, -5.96, -4.19, -2.41, -.61, 1.29, 3.73, 6.58, 9.07,
& -7.54, -5.86, -4.18, -2.50, -.82, 1.02, 3.27, 5.80, 8.41,
& -7.26, -5.71, -4.16, -2.61, -1.01, .75, 2.87, 5.27, 7.81,
& -7.22, -5.70, -4.19, -2.67, -1.12, .59, 2.66, 4.97, 7.49,
& -7.13, -5.67, -4.22, -2.76, -1.25, .40, 2.41, 4.60, 7.05,
& -7.10, -5.67, -4.24, -2.80, -1.32, .31, 2.29, 4.37, 6.82,

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&	-7.05,	-5.65,	-4.25,	-2.84,	-1.38,	.21,	2.18,	4.13,	6.59,
&	-7.06,	-5.67,	-4.28,	-2.89,	-1.45,	.09,	2.08,	3.91,	6.34,
&	-7.33,	-5.88,	-4.43,	-2.99,	-1.52,	-.02,	1.96,	3.72,	6.11,
&	-7.78,	-6.23,	-4.67,	-3.11,	-1.58,	-.12,	1.82,	3.63,	6.15,
&	-8.26,	-6.59,	-4.93,	-3.26,	-1.65,	-.21,	1.72,	3.72,	6.49,
&	-8.69,	-6.90,	-5.12,	-3.33,	-1.62,	-.12,	1.92,	4.04,	7.10,
&	-9.09,	-7.10,	-5.11,	-3.12,	-1.29,	.46,	2.60,	4.84,	7.82/
DATA((ALP604(J,N),N=1,9),J=14,26)/									
&	-8.48,	-6.50,	-4.51,	-2.53,	-.74,	1.24,	3.26,	5.71,	8.49,
&	-7.70,	-5.77,	-3.84,	-1.91,	-.04,	2.00,	3.89,	6.49,	9.26,
&	-7.13,	-5.14,	-3.15,	-1.19,	.74,	2.65,	4.67,	7.27,	10.03,
&	-6.58,	-4.48,	-2.39,	-.46,	1.41,	3.26,	5.42,	8.10,	10.88,
&	-5.67,	-3.87,	-2.08,	-.14,	1.79,	3.48,	5.70,	8.59,	11.53,
&	-5.71,	-3.98,	-2.26,	-.34,	1.50,	3.19,	5.26,	7.91,	10.61,
&	-6.43,	-4.65,	-2.87,	-.92,	.98,	2.69,	4.53,	6.99,	9.42,
&	-7.34,	-5.43,	-3.51,	-1.57,	.43,	2.23,	3.91,	6.29,	8.60,
&	-7.67,	-5.75,	-3.83,	-1.89,	.20,	2.04,	3.74,	5.94,	8.55,
&	-7.74,	-5.74,	-3.74,	-1.71,	.40,	2.20,	4.01,	6.31,	8.78,
&	-6.10,	-4.06,	-2.02,	.30,	2.54,	5.19,	7.97,	10.69,	13.41,
&	-6.00,	-3.08,	-.35,	2.55,	5.74,	8.80,	11.83,	14.86,	17.89,
&	-7.84,	-3.19,	.56,	4.15,	7.64,	11.24,	14.85,	18.45,	22.05/
DATA((ALP606(J,N),N=1,9),J=1,13)/									
&	-8.23,	-6.38,	-4.53,	-2.68,	-.77,	1.17,	3.90,	6.79,	9.24,
&	-8.01,	-6.25,	-4.48,	-2.72,	-.94,	.86,	3.04,	6.07,	8.51,
&	-7.87,	-6.18,	-4.50,	-2.82,	-1.17,	.53,	2.55,	5.41,	7.91,
&	-7.81,	-6.17,	-4.53,	-2.89,	-1.28,	.35,	2.28,	4.93,	7.56,
&	-7.67,	-6.11,	-4.55,	-2.98,	-1.42,	.17,	2.05,	4.45,	7.15,
&	-7.60,	-6.08,	-4.55,	-3.02,	-1.49,	.07,	1.94,	4.23,	6.94,
&	-7.52,	-6.03,	-4.54,	-3.06,	-1.56,	-.02,	1.86,	4.03,	6.74,
&	-7.44,	-5.98,	-4.52,	-3.06,	-1.59,	-.12,	1.77,	4.01,	6.90,
&	-7.03,	-5.67,	-4.30,	-2.94,	-1.57,	-.22,	1.69,	4.40,	7.45,
&	-6.24,	-5.02,	-3.80,	-2.59,	-1.37,	-.15,	1.99,	5.18,	8.13,
&	-5.77,	-4.53,	-3.30,	-2.06,	-.96,	.30,	3.09,	6.03,	8.95,
&	-5.26,	-4.02,	-2.77,	-1.57,	-.42,	1.33,	4.14,	6.86,	9.78,
&	-4.77,	-3.50,	-2.23,	-1.02,	.30,	2.32,	4.96,	7.68,	10.58/
DATA((ALP606(J,N),N=1,9),J=14,26)/									
&	-4.24,	-2.96,	-1.69,	-.41,	1.21,	3.33,	5.79,	8.47,	11.18,
&	-3.72,	-2.42,	-1.08,	.33,	2.00,	4.13,	6.67,	9.16,	11.64,
&	-3.26,	-1.92,	-.54,	1.04,	2.80,	4.91,	7.44,	9.83,	12.23,
&	-3.19,	-1.79,	-.45,	1.11,	2.87,	5.08,	7.63,	10.10,	12.57,
&	-3.44,	-2.11,	-.73,	.72,	2.34,	4.55,	7.04,	9.45,	11.86,
&	-3.87,	-2.53,	-1.22,	.10,	1.72,	3.63,	6.09,	8.60,	11.12,
&	-4.29,	-2.95,	-1.64,	-.41,	1.16,	2.96,	5.18,	7.71,	10.20,
&	-4.42,	-3.10,	-1.78,	-.47,	1.08,	2.86,	5.04,	7.58,	10.06,
&	-4.37,	-3.01,	-1.66,	-.34,	1.30,	3.20,	5.55,	8.06,	10.56,
&	-4.34,	-2.93,	-1.54,	-.20,	1.55,	3.59,	6.11,	8.65,	11.18,
&	-4.34,	-2.59,	-.90,	1.09,	3.71,	6.81,	9.79,	12.78,	15.76,
&	-4.32,	-2.43,	-.09,	2.98,	6.54,	9.69,	12.83,	15.98,	19.13,
&	-4.26,	-2.47,	.61,	4.25,	7.95,	11.28,	14.62,	17.95,	21.28/
DATA((ALP609(J,N),N=1,9),J=1,13)/									
&	-8.52,	-6.63,	-4.73,	-2.83,	-.83,	1.23,	4.24,	7.66,	11.26,
&	-8.71,	-6.82,	-4.92,	-3.02,	-1.10,	.85,	3.46,	6.52,	10.00,
&	-8.25,	-6.54,	-4.84,	-3.14,	-1.37,	.54,	2.69,	5.56,	8.95,
&	-8.05,	-6.43,	-4.81,	-3.19,	-1.50,	.39,	2.35,	5.09,	8.31,
&	-7.87,	-6.34,	-4.82,	-3.29,	-1.70,	.24,	2.03,	4.67,	8.08,

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& -7.84, -6.34, -4.84, -3.34, -1.79, .17, 1.92, 4.71, 8.83,
& -7.90, -6.38, -4.86, -3.34, -1.78, .10, 2.18, 5.49, 9.66,
& -8.14, -6.52, -4.90, -3.28, -1.62, .24, 3.04, 6.66, 10.23,
& -8.34, -6.54, -4.74, -2.94, -1.21, .86, 4.23, 7.77, 11.28,
& -7.04, -5.43, -3.82, -2.22, -.64, 1.89, 5.39, 9.25, 13.21,
& -6.31, -4.62, -2.94, -1.32, .32, 3.26, 6.85, 10.62, 14.40,
& -5.28, -3.62, -1.96, -.28, 1.83, 4.99, 8.26, 11.71, 15.16,
& -4.25, -2.63, -.79, 1.15, 3.54, 6.27, 9.44, 12.62, 15.79/
DATA((ALP609(J,N),N=1,9),J=14,26)/
& -3.34, -1.48, .58, 2.40, 4.68, 7.40, 10.34, 13.28, 16.22,
& -2.86, -.92, 1.07, 2.98, 5.18, 7.90, 10.70, 13.50, 16.29,
& -2.86, -.99, .91, 2.80, 4.90, 7.64, 10.55, 13.47, 16.39,
& -3.49, -1.68, .21, 2.00, 3.99, 6.37, 9.47, 12.57, 15.67,
& -4.19, -2.50, -.64, 1.20, 3.10, 5.17, 8.12, 11.60, 15.08,
& -4.93, -3.09, -1.19, .74, 2.64, 4.73, 7.32, 10.35, 13.38,
& -5.38, -3.29, -1.19, .80, 2.69, 4.89, 7.46, 10.18, 12.90,
& -5.35, -3.21, -1.07, .91, 2.86, 5.13, 7.74, 10.45, 13.15,
& -5.24, -3.10, -.96, 1.04, 3.06, 5.40, 8.10, 10.86, 13.61,
& -5.13, -3.02, -.86, 1.18, 3.27, 5.70, 8.46, 11.26, 14.06,
& -5.22, -2.68, -.21, 2.11, 4.76, 7.72, 10.66, 13.60, 16.54,
& -5.28, -2.46, .19, 3.17, 6.54, 9.62, 12.69, 15.77, 18.85,
& -5.34, -2.40, .71, 4.21, 8.11, 11.78, 15.45, 19.12, 22.79/
DATA((ALP612(J,N),N=1,9),J=1,13)/
& -9.03, -6.86, -4.68, -2.51, -.27, 1.99, 5.04, 8.74, 12.25,
& -8.84, -6.82, -4.80, -2.78, -.55, 1.66, 4.17, 7.62, 11.10,
& -8.68, -6.76, -4.84, -2.91, -.77, 1.39, 3.75, 6.54, 10.05,
& -8.65, -6.76, -4.88, -2.99, -.91, 1.22, 3.52, 5.93, 9.40,
& -9.04, -7.02, -5.00, -2.98, -.95, 1.15, 3.50, 5.84, 9.38,
& -9.29, -7.16, -5.02, -2.88, -.85, 1.33, 4.14, 6.65, 10.39,
& -9.31, -7.05, -4.79, -2.53, -.54, 2.18, 5.18, 8.20, 11.56,
& -8.55, -6.26, -3.98, -1.72, .57, 3.93, 6.41, 9.47, 12.52,
& -7.38, -5.02, -2.67, -.48, 2.39, 5.09, 7.72, 10.52, 13.31,
& -5.94, -3.54, -1.26, 1.08, 3.85, 6.28, 9.22, 12.16, 15.10,
& -4.45, -2.01, 0.00, 2.53, 5.00, 7.83, 11.00, 14.17, 17.35,
& -2.62, -.65, 1.41, 3.78, 6.19, 9.64, 13.09, 16.53, 19.98,
& -1.52, .42, 2.52, 4.75, 7.52, 10.97, 14.41, 17.86, 21.31/
DATA((ALP612(J,N),N=1,9),J=14,26)/
& -1.27, .78, 2.83, 5.00, 7.93, 11.47, 15.01, 18.55, 22.09,
& -1.74, .45, 2.42, 4.59, 7.23, 10.83, 14.43, 18.04, 21.64,
& -3.22, -.87, 1.10, 3.16, 5.34, 8.78, 12.78, 16.78, 20.78,
& -5.02, -2.30, .14, 2.13, 4.20, 6.83, 10.43, 14.04, 17.64,
& -5.60, -3.02, -.27, 1.79, 3.92, 6.26, 9.77, 13.28, 16.79,
& -5.57, -2.99, -.22, 1.81, 4.08, 6.50, 10.20, 13.91, 17.61,
& -5.55, -2.97, -.16, 1.95, 4.25, 6.84, 10.51, 14.18, 17.85,
& -5.52, -2.94, -.09, 2.09, 4.43, 7.18, 10.75, 14.32, 17.89,
& -5.50, -2.92, -.03, 2.25, 4.62, 7.50, 11.04, 14.58, 18.12,
& -5.46, -2.90, .02, 2.38, 4.80, 7.81, 11.26, 14.71, 18.16,
& -5.31, -2.74, .38, 3.09, 5.86, 9.25, 12.67, 16.09, 19.50,
& -5.15, -2.60, .54, 3.62, 6.92, 10.34, 13.76, 17.18, 20.60,
& -5.01, -2.46, .62, 4.24, 7.74, 11.04, 14.35, 17.65, 20.96/
DATA((ALP615(J,N),N=1,9),J=1,13)/
& -10.70, -7.86, -5.02, -2.18, .37, 2.78, 6.22, 10.31, 14.39,
& -10.67, -7.89, -5.11, -2.33, .23, 2.44, 5.36, 9.22, 13.22,
& -10.82, -8.00, -5.18, -2.37, .16, 2.27, 4.97, 8.15, 11.45,
& -11.48, -8.40, -5.32, -2.25, .06, 2.18, 4.81, 7.78, 10.74,

```

```

&-11.10, -8.09, -5.08, -2.08, .25, 2.48, 5.49, 8.74, 11.89,
& -9.74, -7.16, -4.58, -2.00, .63, 2.97, 6.41, 9.98, 13.55,
& -9.80, -6.88, -3.96, -1.12, 1.41, 3.97, 7.61, 10.89, 14.16,
& -8.95, -5.89, -2.84, -.09, 2.42, 5.98, 9.13, 12.28, 15.43,
& -6.27, -3.55, -1.10, 1.35, 4.04, 7.87, 11.61, 15.35, 19.08,
& -3.90, -1.42, .54, 3.05, 6.45, 10.02, 13.59, 17.16, 20.73,
& -1.58, .37, 2.53, 5.01, 8.93, 12.56, 16.20, 19.84, 23.47,
& .15, 2.01, 3.63, 7.58, 12.28, 16.99, 21.69, 26.40, 31.11,
& .67, 2.41, 3.98, 8.66, 13.36, 18.07, 22.78, 27.48, 32.19/

```

DATA((ALP615(J,N),N=1,9),J=14,26)/

```

& .14, 2.06, 3.64, 7.71, 12.59, 17.46, 22.34, 27.22, 32.10,
& -1.05, .78, 2.56, 4.36, 8.98, 13.98, 18.98, 23.98, 28.98,
& -2.39, -.45, 1.46, 3.14, 5.92, 10.56, 15.21, 19.86, 24.51,
& -3.57, -1.19, 1.10, 2.86, 5.26, 9.84, 14.49, 19.14, 23.79,
& -3.80, -1.30, 1.07, 2.88, 5.33, 10.12, 15.06, 20.00, 24.94,
& -3.85, -1.36, 1.07, 2.92, 5.48, 10.32, 15.26, 20.20, 25.14,
& -3.88, -1.38, 1.07, 2.95, 5.63, 10.49, 15.43, 20.37, 25.31,
& -3.93, -1.40, 1.06, 2.99, 5.79, 10.63, 15.51, 20.39, 25.27,
& -3.96, -1.42, 1.07, 3.04, 5.94, 10.80, 15.68, 20.56, 25.44,
& -4.00, -1.44, 1.07, 3.08, 6.12, 10.94, 15.76, 20.58, 25.40,
& -4.16, -1.63, 1.08, 3.42, 7.15, 12.02, 16.90, 21.78, 26.66,
& -4.34, -1.88, 1.02, 3.84, 8.15, 13.09, 18.02, 22.96, 27.90,
& -4.51, -2.12, .85, 4.55, 9.11, 14.05, 18.99, 23.93, 28.86/

```

DATA((CD604(I,J),J=1,26),I=1,5)/

```

1 .0224, .0253, .0268, .0275, .0282, .0286, .0289, .0293, .0297,
1 .0301, .0318, .0354, .0408, .0462, .0515, .0569, .0616, .0655,
1 .0675, .0687, .0694, .0700, .0705, .0628, .0458, .0344,
2 .0120, .0134, .0141, .0144, .0148, .0150, .0151, .0153, .0157,
2 .0162, .0185, .0220, .0274, .0328, .0382, .0435, .0487, .0518,
2 .0546, .0561, .0566, .0572, .0578, .0560, .0491, .0397,
3 .0063, .0062, .0062, .0062, .0062, .0062, .0062, .0063, .0065,
3 .0073, .0117, .0162, .0206, .0250, .0299, .0359, .0419, .0480,
3 .0523, .0543, .0564, .0584, .0595, .0646, .0691, .0731,
4 .0055, .0054, .0053, .0053, .0053, .0053, .0053, .0053, .0056,
4 .0064, .0098, .0134, .0169, .0227, .0310, .0393, .0478, .0550,
4 .0600, .0650, .0698, .0737, .0776, .0987, .1129, .1284,
5 .0070, .0067, .0065, .0066, .0066, .0066, .0066, .0068, .0070,
5 .0083, .0153, .0223, .0293, .0370, .0498, .0621, .0724, .0826,
5 .0921, .1016, .1094, .1163, .1232, .1587, .1786, .1906/

```

DATA((CD606(I,J),J=1,26),I=1,5)/

```

1 .0198, .0213, .0221, .0225, .0228, .0230, .0232, .0236, .0248,
1 .0264, .0296, .0334, .0382, .0441, .0500, .0559, .0617, .0667,
1 .0694, .0717, .0723, .0729, .0735, .0662, .0532, .0411,
2 .0116, .0116, .0115, .0115, .0115, .0117, .0121, .0129, .0140,
2 .0160, .0186, .0227, .0274, .0322, .0372, .0429, .0485, .0534,
2 .0569, .0605, .0640, .0676, .0688, .0672, .0579, .0484,
3 .0058, .0058, .0058, .0058, .0058, .0061, .0065, .0074, .0088,
3 .0121, .0153, .0186, .0219, .0271, .0353, .0435, .0517, .0574,
3 .0631, .0682, .0711, .0740, .0770, .0803, .0810, .0810,
4 .0058, .0059, .0059, .0059, .0059, .0059, .0059, .0064, .0075,
4 .0089, .0124, .0169, .0213, .0265, .0374, .0481, .0586, .0673,
4 .0737, .0796, .0843, .0889, .0936, .1144, .1293, .1430,
5 .0082, .0075, .0072, .0072, .0073, .0076, .0080, .0088, .0102,
5 .0144, .0245, .0346, .0448, .0549, .0651, .0858, .1041, .1178,
5 .1304, .1417, .1530, .1630, .1721, .2178, .2484, .2682/

```

DATA((CD609(I,J),J=1,26),I=1,5)/

1	.0179,	.0177,	.0176,	.0176,	.0175,	.0175,	.0175,	.0182,	.0201,
1	.0235,	.0291,	.0347,	.0439,	.0536,	.0629,	.0710,	.0786,	.0846,
1	.0905,	.0965,	.1016,	.1035,	.1053,	.1071,	.0972,	.0780,	
2	.0113,	.0112,	.0111,	.0111,	.0115,	.0120,	.0127,	.0139,	.0162,
2	.0206,	.0249,	.0293,	.0343,	.0418,	.0493,	.0568,	.0640,	.0707,
2	.0771,	.0811,	.0844,	.0863,	.0882,	.0854,	.0757,	.0655,	
3	.0066,	.0064,	.0062,	.0062,	.0064,	.0068,	.0076,	.0096,	.0121,
3	.0147,	.0189,	.0254,	.0320,	.0409,	.0525,	.0640,	.0716,	.0787,
3	.0858,	.0910,	.0942,	.0974,	.1002,	.1024,	.1015,	.0989,	
4	.0079,	.0078,	.0078,	.0078,	.0077,	.0078,	.0081,	.0087,	.0099,
4	.0147,	.0200,	.0264,	.0351,	.0454,	.0575,	.0699,	.0816,	.0907,
4	.0992,	.1058,	.1123,	.1179,	.1207,	.1356,	.1464,	.1536,	
5	.0100,	.0081,	.0073,	.0073,	.0080,	.0087,	.0103,	.0126,	.0165,
5	.0204,	.0279,	.0371,	.0463,	.0619,	.0779,	.0975,	.1169,	.1352,
5	.1478,	.1572,	.1642,	.1672,	.1691,	.1762,	.1809,	.1855/	

DATA((CD612(I,J),J=1,26),I=1,5)/

1	.0197,	.0206,	.0211,	.0217,	.0223,	.0227,	.0232,	.0259,	.0312,
1	.0381,	.0462,	.0550,	.0638,	.0725,	.0818,	.0930,	.1020,	.1104,
1	.1189,	.1256,	.1302,	.1348,	.1366,	.1294,	.1084,	.0833,	
2	.0127,	.0127,	.0128,	.0128,	.0133,	.0138,	.0163,	.0209,	.0270,
2	.0349,	.0430,	.0519,	.0617,	.0712,	.0806,	.0894,	.0976,	.1058,
2	.1140,	.1199,	.1257,	.1316,	.1363,	.1379,	.1187,	.0947,	
3	.0097,	.0097,	.0096,	.0096,	.0103,	.0115,	.0139,	.0178,	.0235,
3	.0313,	.0407,	.0512,	.0621,	.0725,	.0830,	.0942,	.1054,	.1136,
3	.1218,	.1300,	.1365,	.1426,	.1486,	.1538,	.1444,	.1284,	
4	.0078,	.0078,	.0078,	.0078,	.0078,	.0091,	.0111,	.0141,	.0208,
4	.0275,	.0343,	.0454,	.0578,	.0707,	.0839,	.0971,	.1100,	.1230,
4	.1343,	.1432,	.1521,	.1610,	.1678,	.1968,	.1952,	.1853,	
5	.0107,	.0107,	.0107,	.0107,	.0108,	.0123,	.0166,	.0219,	.0313,
5	.0471,	.0636,	.0798,	.0959,	.1103,	.1236,	.1374,	.1517,	.1661,
5	.1785,	.1897,	.2008,	.2120,	.2229,	.2798,	.3189,	.3488/	

DATA((CD615(I,J),J=1,26),I=1,5)/

1	.0160,	.0272,	.0328,	.0355,	.0386,	.0413,	.0450,	.0534,	.0628,
1	.0731,	.0834,	.0924,	.1011,	.1097,	.1182,	.1256,	.1324,	.1392,
1	.1453,	.1504,	.1553,	.1572,	.1591,	.1547,	.1349,	.1190,	
2	.0131,	.0130,	.0130,	.0137,	.0155,	.0186,	.0248,	.0326,	.0454,
2	.0598,	.0752,	.0895,	.1014,	.1132,	.1237,	.1317,	.1396,	.1454,
2	.1510,	.1559,	.1586,	.1612,	.1631,	.1594,	.1409,	.1243,	
3	.0106,	.0105,	.0105,	.0106,	.0120,	.0146,	.0225,	.0319,	.0413,
3	.0579,	.0740,	.0899,	.1063,	.1201,	.1294,	.1387,	.1469,	.1546,
3	.1623,	.1689,	.1722,	.1755,	.1788,	.1755,	.1678,	.1583,	
4	.0099,	.0098,	.0098,	.0098,	.0108,	.0132,	.0200,	.0302,	.0404,
4	.0506,	.0663,	.0833,	.1017,	.1200,	.1346,	.1490,	.1625,	.1722,
4	.1818,	.1908,	.1951,	.1993,	.2036,	.2162,	.2173,	.2155,	
5	.0119,	.0119,	.0119,	.0125,	.0147,	.0215,	.0314,	.0413,	.0610,
5	.0817,	.1049,	.1285,	.1509,	.1732,	.1923,	.2092,	.2262,	.2423,
5	.2559,	.2695,	.2796,	.2788,	.2780,	.2734,	.2688,	.2642/	

DATA(XMI(J),J=1,26)/.3,.5,.6,.65,.7,.725,.75,.775,
 & .8,.825,.85,.875,.9,.925,.95,.975,1.0,1.025,1.05,1.075,
 & 1.1,1.125,1.15,1.3,1.45,1.6/

DATA(CLI(J),J=1,9)/-.4,-.2,0.0,.2,.4,.6,.8,1.0,1.2/

DATA(ALPI(J),J=1,7)/-4.0,-2.0,0.0,2.0,4.0,6.0,8.0/

DATA(CLII(J),J=1,5)/0.0,.2,.4,.6,.8/

IORDER(1)=IORDER(2)=1


```

IPT (1) = -1
IF (IKEY .EQ. 2) GO TO 1000
IF (TR .LT. .04) GO TO 9
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 1
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 2
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 3
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 4
IF (TR .GE. .15) GO TO 5
9 CALL IBI (7,ALPI,26,XMI,7,CL604,IORDER,IPT,AA,XM,CLFT04,IERR)
CL=CLFT04
GO TO 400
1 CALL IBI (7,ALPI,26,XMI,7,CL604,IORDER,IPT,AA,XM,CLFT04,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL606,IORDER,IPT,AA,XM,CLFT06,IERR)
CL=CLFT04 + (CLFT06-CLFT04)*((TR-.04)/(.06-.04))
GO TO 400
2 CALL IBI (7,ALPI,26,XMI,7,CL606,IORDER,IPT,AA,XM,CLFT06,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL609,IORDER,IPT,AA,XM,CLFT09,IERR)
CL=CLFT06 + (CLFT09 - CLFT06)*((TR-.06)/(.09-.06))
GO TO 400
3 CALL IBI (7,ALPI,26,XMI,7,CL609,IORDER,IPT,AA,XM,CLFT09,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL612,IORDER,IPT,AA,XM,CLFT12,IERR)
CL=CLFT09+(CLFT12-CLFT09)*((TR-.09)/(.12-.09))
GO TO 400
4 CALL IBI (7,ALPI,26,XMI,7,CL612,IORDER,IPT,AA,XM,CLFT12,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL615,IORDER,IPT,AA,XM,CLFT15,IERR)
CL=CLFT12 + (CLFT15-CLFT12)*((TR-.12)/(.15-.12))
GO TO 400
5 CALL IBI (7,ALPI,26,XMI,7,CL615,IORDER,IPT,AA,XM,CLFT15,IERR)
CL=CLFT15
GO TO 400
1000 CONTINUE
IPT (1)=-1
IF (TR .LT. .04) GO TO 90
IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 10
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 20
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 30
IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 40
IF (TR .GE. .15) GO TO 50
90 CALL IBI (26,XMI,9,CLI,26,ALP604,IORDER,IPT,XM,CL,AA04,IERR)
AA=AA04
GO TO 400
10 CALL IBI (26,XMI,9,CLI,26,ALP604,IORDER,IPT,XM,CL,AA04,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP606,IORDER,IPT,XM,CL,AA06,IERR)
AA=AA04 + (AA06-AA04)*((TR-.04)/(.06-.04))
GO TO 400
20 CALL IBI (26,XMI,9,CLI,26,ALP606,IORDER,IPT,XM,CL,AA06,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP609,IORDER,IPT,XM,CL,AA09,IERR)
AA=AA06 + (AA09 - AA06)*((TR -.06)/(.09-.06))
GO TO 400

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```

30 CALL IBI (26,XMI,9,CLI,26,ALP609,IORDER,IPT,XM,CL,AA09,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP612,IORDER,IPT,XM,CL,AA12,IERR)
   AA=AA09+(AA12-AA09)*((TR-.09)/(.12-.09))
   GO TO 400
40 CALL IBI (26,XMI,9,CLI,26,ALP612,IORDER,IPT,XM,CL,AA12,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP615,IORDER,IPT,XM,CL,AA15,IERR)
   AA=AA12+(AA15-AA12)*((TR-.12)/(.15-.12))
   GO TO 400
50 CALL IBI (26,XMI,9,CLI,26,ALP615,IORDER,IPT,XM,CL,AA15,IERR)
   AA=AA15
400 CONTINUE
   IPT (1)=-1
   IF (TR .LT. .04) GO TO 91
   IF (TR .GE. .04 .AND. TR .LT. .06) GO TO 11
   IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 21
   IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 31
   IF (TR .GE. .12 .AND. TR .LT. .15) GO TO 41
   IF (TR .GE. .15) GO TO 51
91 CALL IBI (5,CLII,26,XMI,5,CD604,IORDER,IPT,CL,XM,CDRG04,IERR)
   CD=CDRG04
   WRITE (6,201) TR
201 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
   &*/* THE VALUES FOR T/C=.04 HAVE BEEN RETURNED*)
   GO TO 250
11 CALL IBI (5,CLII,26,XMI,5,CD604,IORDER,IPT,CL,XM,CDRG04,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD606,IORDER,IPT,CL,XM,CDRG06,IERR)
   CD=CDRG04 + (CDRG06-CDRG04)*((TR-.04)/(.06-.04))
   GO TO 250
21 CALL IBI (5,CLII,26,XMI,5,CD606,IORDER,IPT,CL,XM,CDRG06,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD609,IORDER,IPT,CL,XM,CDRG09,IERR)
   CD=CDRG06 + (CDRG09 - CDRG06)*((TR-.06)/(.09-.06))
   GO TO 250
31 CALL IBI (5,CLII,26,XMI,5,CD609,IORDER,IPT,CL,XM,CDRG09,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD612,IORDER,IPT,CL,XM,CDRG12,IERR)
   CD=CDRG09+(CDRG12-CDRG09)*((TR-.09)/(.12-.09))
   GO TO 250
41 CALL IBI (5,CLII,26,XMI,5,CD612,IORDER,IPT,CL,XM,CDRG12,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD615,IORDER,IPT,CL,XM,CDRG15,IERR)
   CD=CDRG12 + (CDRG15-CDRG12)*((TR-.12)/(.15-.12))
   GO TO 250
51 CALL IBI (5,CLII,26,XMI,5,CD615,IORDER,IPT,CL,XM,CDRG15,IERR)
   CD=CDRG15
   IF (TR .GT. .15) WRITE (6,205) TR
205 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
   &*/* THE VALUES FOR T/C=.15 HAVE BEEN RETURNED.*)
250 IF (CL .GT. .8) GO TO 251
   RETURN
251 CALL COMPUT (D,XM,ALT,COR,TR,AA,CDT,CL,CD,CLDES)
   CD=CDT

```



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DATA((CL709(I,J),J=1,26),I=1,4)/
1 .158, .164, .168, .170, .174, .163, .140, .080, .011,
1 -.085, -.264, -.442, -.620, -.779, -.849, -.801, -.717, -.609,
1 -.500, -.392, -.321, -.312, -.319, -.352, -.369, -.387,
2 .359, .388, .407, .420, .433, .420, .402, .348, .285,
2 .180, .041, -.125, -.291, -.448, -.527, -.475, -.375, -.266,
2 -.158, -.115, -.120, -.125, -.132, -.181, -.210, -.210,
3 .550, .594, .624, .644, .664, .673, .640, .605, .519,
3 .429, .295, .153, .011, -.122, -.191, -.175, -.077, .043,
3 .102, .097, .086, .076, .066, .017, -.012, -.029,
4 .734, .783, .814, .837, .856, .844, .821, .771, .710,
4 .648, .527, .388, .248, .130, .088, .095, .178, .263,
4 .322, .313, .294, .277, .263, .179, .119, .076/
DATA((CL709(I,J),J=1,26),I=5,7)/
5 .852, .906, .958, .984, 1.016, .997, .970, .902, .828,
5 .754, .680, .597, .467, .337, .243, .256, .334, .467,
5 .512, .506, .489, .471, .452, .336, .253, .194,
6 .961, 1.023, 1.097, 1.137, 1.127, 1.107, 1.057, 1.007, .957,
6 .879, .798, .717, .620, .500, .435, .444, .529, .642,
6 .711, .702, .678, .654, .630, .502, .391, .297,
7 1.096, 1.173, 1.231, 1.264, 1.239, 1.193, 1.147, 1.101, 1.055,
7 .979, .897, .816, .734, .644, .586, .598, .689, .843,
7 .872, .849, .827, .803, .779, .634, .514, .414/
DATA((CL712(I,J),J=1,26),I=1,4)/
1 .122, .144, .154, .164, .141, .103, .051, -.044, -.167,
1 -.290, -.418, -.558, -.612, -.625, -.593, -.522, -.413, -.338,
1 -.322, -.324, -.326, -.328, -.331, -.343, -.351, -.357,
2 .320, .352, .368, .380, .364, .332, .264, .146, .016,
2 -.115, -.245, -.381, -.459, -.478, -.440, -.339, -.224, -.162,
2 -.159, -.162, -.166, -.170, -.175, -.195, -.193, -.195,
3 .495, .538, .559, .575, .568, .529, .442, .324, .191,
3 .054, -.083, -.219, -.318, -.351, -.309, -.167, -.031, .001,
3 .003, -.003, -.009, -.015, -.021, -.041, -.044, -.050,
4 .684, .720, .748, .758, .731, .671, .573, .451, .329,
4 .207, .084, -.038, -.119, -.145, -.101, .043, .164, .195,
4 .187, .179, .171, .162, .154, .110, .080, .059/
DATA((CL712(I,J),J=1,26),I=5,7)/
5 .819, .875, .903, .920, .873, .773, .673, .572, .472,
5 .372, .272, .172, .091, .064, .115, .255, .373, .400,
5 .394, .383, .370, .357, .344, .271, .216, .171,
6 .936, 1.006, 1.058, 1.079, 1.019, .950, .850, .751, .652,
6 .552, .453, .354, .281, .253, .310, .457, .583, .594,
6 .577, .560, .544, .527, .511, .417, .348, .283,
7 1.032, 1.099, 1.153, 1.182, 1.125, 1.061, .984, .886, .788,
7 .691, .593, .495, .402, .377, .419, .603, .727, .737,
7 .724, .707, .689, .672, .654, .548, .468, .395/
DATA((ALP706(J,N),N=1,9),J=1,13)/
& -8.49, -6.74, -4.98, -3.23, -1.33, .83, 3.24, 6.22, 8.86,
& -8.30, -6.64, -4.98, -3.32, -1.61, .31, 2.45, 5.35, 7.99,
& -8.17, -6.59, -5.01, -3.43, -1.83, .01, 1.98, 4.73, 7.35,
& -8.02, -6.51, -5.00, -3.49, -1.98, -.16, 1.78, 4.35, 6.95,
& -7.91, -6.46, -5.01, -3.57, -2.12, -.42, 1.56, 3.97, 6.45,
& -7.93, -6.49, -5.05, -3.61, -2.17, -.58, 1.39, 3.79, 6.22,
& -7.84, -6.45, -5.06, -3.67, -2.28, -.75, 1.17, 3.65, 6.22,
& -7.90, -6.50, -5.10, -3.70, -2.30, -.80, 1.18, 3.82, 6.44,

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&	-8.07,	-6.59,	-5.10,	-3.61,	-2.13,	-.58,	1.67,	4.45,	7.04,
&	-7.95,	-6.42,	-4.89,	-3.37,	-1.82,	-.15,	2.60,	5.31,	7.93,
&	-7.68,	-6.13,	-4.58,	-3.03,	-1.34,	.89,	3.81,	6.25,	8.78,
&	-7.19,	-5.63,	-4.08,	-2.52,	-.42,	2.11,	4.78,	7.15,	9.54,
&	-6.52,	-4.99,	-3.46,	-1.86,	.80,	3.27,	5.69,	7.94,	10.19/

DATA((ALP706(J,N),N=1,9),J=14,26)/

&	-5.92,	-4.33,	-2.75,	-.37,	1.81,	4.26,	6.52,	8.66,	10.80,
&	-5.34,	-3.61,	-1.80,	.77,	2.83,	5.16,	7.27,	9.29,	11.31,
&	-4.77,	-2.72,	-.35,	1.58,	3.55,	5.82,	7.82,	9.79,	11.76,
&	-4.52,	-2.49,	-.18,	1.60,	3.60,	5.77,	7.82,	9.85,	11.88,
&	-4.94,	-2.88,	-.80,	1.11,	3.02,	5.07,	7.14,	9.19,	11.24,
&	-6.54,	-4.14,	-1.76,	.41,	2.19,	4.18,	6.31,	8.24,	10.17,
&	-7.58,	-5.19,	-2.79,	-.31,	1.52,	3.45,	5.59,	7.61,	9.58,
&	-7.89,	-5.45,	-3.01,	-.58,	1.45,	3.40,	5.56,	7.63,	9.66,
&	-7.64,	-5.23,	-2.82,	-.32,	1.70,	3.72,	5.92,	8.10,	10.27,
&	-7.49,	-5.05,	-2.61,	-.03,	1.98,	4.07,	6.38,	8.65,	10.92,
&	-6.61,	-3.97,	-1.19,	1.61,	4.00,	6.89,	9.81,	12.73,	15.65,
&	-6.29,	-3.04,	.33,	3.26,	6.47,	9.83,	13.19,	16.55,	19.92,
&	-5.98,	-2.68,	.67,	4.25,	7.94,	11.72,	15.49,	19.26,	23.04/

DATA((ALP709(J,N),N=1,9),J=1,13)/

&	-9.55,	-7.56,	-5.57,	-3.58,	-1.57,	.54,	3.12,	6.58,	9.54,
&	-9.04,	-7.25,	-5.46,	-3.68,	-1.88,	.06,	2.28,	5.61,	8.36,
&	-8.75,	-7.08,	-5.41,	-3.73,	-2.06,	-.22,	1.85,	4.60,	7.54,
&	-8.56,	-6.96,	-5.36,	-3.76,	-2.16,	-.39,	1.62,	4.21,	6.99,
&	-8.43,	-6.89,	-5.34,	-3.80,	-2.25,	-.55,	1.42,	3.80,	7.30,
&	-8.38,	-6.82,	-5.27,	-3.71,	-2.16,	-.58,	1.49,	4.05,	8.16,
&	-8.12,	-6.60,	-5.07,	-3.54,	-2.02,	-.34,	1.77,	4.69,	9.18,
&	-7.58,	-6.09,	-4.60,	-3.10,	-1.60,	-.04,	2.44,	5.87,	10.11,
&	-7.00,	-5.54,	-4.08,	-2.62,	-1.02,	.85,	3.53,	6.88,	10.96,
&	-6.38,	-4.87,	-3.36,	-1.84,	-.23,	1.56,	4.74,	8.42,	12.42,
&	-4.89,	-3.58,	-2.27,	-.75,	.91,	2.95,	6.04,	10.08,	14.12,
&	-3.74,	-2.47,	-1.10,	.40,	2.11,	4.05,	7.68,	11.72,	15.76,
&	-2.66,	-1.40,	-.07,	1.59,	3.39,	5.74,	9.16,	12.67,	16.18/

DATA((ALP709(J,N),N=1,9),J=14,26)/

&	-1.71,	-.48,	.97,	2.68,	4.77,	7.39,	10.17,	12.94,	15.72,
&	-1.24,	-.05,	1.37,	3.45,	5.64,	8.19,	10.83,	13.48,	16.13,
&	-1.50,	-.17,	1.30,	3.30,	5.53,	8.03,	10.62,	13.22,	15.82,
&	-2.15,	-.83,	.60,	2.28,	4.68,	6.89,	9.39,	11.89,	14.39,
&	-2.78,	-1.57,	-.28,	1.43,	3.34,	5.52,	7.57,	9.56,	11.55,
&	-3.42,	-2.25,	-.78,	.89,	2.82,	4.88,	7.11,	9.59,	12.07,
&	-4.06,	-2.61,	-.92,	.95,	2.90,	4.96,	7.33,	10.05,	12.78,
&	-4.79,	-2.80,	-.83,	1.10,	3.09,	5.17,	7.64,	10.32,	13.01,
&	-4.94,	-2.80,	-.76,	1.23,	3.27,	5.41,	7.96,	10.64,	13.33,
&	-4.87,	-2.73,	-.67,	1.36,	3.45,	5.66,	8.28,	10.97,	13.65,
&	-4.56,	-2.22,	-.17,	2.27,	4.77,	7.48,	10.52,	13.55,	16.58,
&	-4.39,	-1.90,	.18,	3.21,	6.15,	9.40,	12.65,	15.90,	19.15,
&	-4.15,	-1.89,	.55,	4.12,	7.76,	11.18,	14.60,	18.02,	21.44/

DATA((ALP712(J,N),N=1,9),J=1,13)/

&	-9.27,	-7.25,	-5.23,	-3.21,	-1.09,	1.11,	3.72,	7.33,	11.50,
&	-9.23,	-7.31,	-5.38,	-3.46,	-1.48,	.68,	3.03,	5.91,	10.17,
&	-9.18,	-7.31,	-5.44,	-3.57,	-1.66,	.43,	2.67,	5.25,	8.99,
&	-9.22,	-7.37,	-5.52,	-3.67,	-1.79,	.27,	2.52,	5.01,	8.35,
&	-8.85,	-7.06,	-5.26,	-3.47,	-1.65,	.39,	2.97,	5.74,	9.42,
&	-8.39,	-6.65,	-4.90,	-3.15,	-1.31,	1.00,	4.31,	6.90,	10.50,
&	-8.23,	-6.36,	-4.48,	-2.60,	-.47,	2.54,	5.44,	8.24,	11.22,

&	-7.75	-5.64	-3.54	-1.39	1.20	4.31	6.73	9.69	12.65
&	-6.55	-4.36	-2.17	.13	2.99	5.42	8.18	11.12	14.06
&	-5.26	-2.97	-.64	1.91	4.31	6.69	9.57	12.45	15.32
&	-3.79	-1.44	.99	3.23	5.41	8.10	10.96	13.81	16.67
&	-2.21	.21	2.36	4.31	6.65	9.49	12.33	15.16	18.00
&	-1.16	1.19	3.13	5.15	7.97	11.27	14.58	17.88	21.19/

DATA((ALP712(J,N),N=1,9),J=14,26)/

&	-.77	1.47	3.39	5.44	8.37	11.60	14.82	18.05	21.27
&	-1.39	1.05	2.94	4.87	7.65	11.32	14.99	18.66	22.33
&	-2.67	-.38	1.59	3.48	5.44	7.96	10.70	13.44	16.18
&	-3.86	-1.75	.32	2.34	4.26	6.24	9.01	11.79	14.57
&	-4.70	-2.43	-.01	2.05	4.00	6.08	8.88	11.68	14.48
&	-4.96	-2.50	-.04	2.13	4.07	6.31	9.03	11.76	14.48
&	-4.94	-2.47	.03	2.21	4.19	6.54	9.27	11.99	14.71
&	-4.93	-2.43	.10	2.29	4.34	6.77	9.53	12.29	15.05
&	-4.91	-2.38	.17	2.39	4.51	7.01	9.77	12.52	15.28
&	-4.88	-2.32	.24	2.48	4.67	7.24	10.04	12.84	15.64
&	-4.77	-2.07	.54	3.12	5.77	8.79	11.85	14.90	17.95
&	-4.62	-2.09	.71	3.76	6.87	10.20	13.53	16.87	20.20
&	-4.53	-2.06	.92	4.52	8.09	11.66	15.23	18.80	22.38/

DATA((CD706(I,J),J=1,26),I=1,5)/

1	.0265	.0282	.0288	.0291	.0294	.0296	.0297	.0300	.0317
1	.0350	.0393	.0435	.0483	.0535	.0586	.0637	.0689	.0740
1	.0766	.0782	.0798	.0805	.0812	.0749	.0600	.0497	
2	.0177	.0183	.0185	.0186	.0187	.0185	.0189	.0199	.0221
2	.0259	.0308	.0356	.0402	.0447	.0493	.0540	.0588	.0633
2	.0671	.0709	.0747	.0774	.0797	.0778	.0684	.0582	
3	.0080	.0082	.0085	.0086	.0090	.0094	.0100	.0108	.0124
3	.0157	.0201	.0244	.0300	.0374	.0448	.0529	.0615	.0687
3	.0739	.0784	.0817	.0851	.0875	.0920	.0911	.0901	
4	.0067	.0068	.0069	.0069	.0069	.0070	.0073	.0081	.0092
4	.0112	.0136	.0195	.0267	.0349	.0466	.0588	.0691	.0769
4	.0847	.0901	.0953	.1006	.1047	.1223	.1371	.1512	
5	.0067	.0068	.0068	.0069	.0069	.0069	.0074	.0084	.0109
5	.0139	.0187	.0263	.0389	.0547	.0719	.0889	.1051	.1208
5	.1349	.1470	.1560	.1621	.1681	.1998	.2300	.2478/	

DATA((CD709(I,J),J=1,26),I=1,5)/

1	.0245	.0304	.0333	.0348	.0363	.0374	.0386	.0410	.0439
1	.0488	.0537	.0586	.0635	.0684	.0733	.0790	.0854	.0919
1	.0983	.1023	.1042	.1060	.1063	.1021	.0878	.0696	
2	.0140	.0170	.0189	.0200	.0211	.0217	.0225	.0261	.0308
2	.0355	.0402	.0450	.0502	.0553	.0604	.0655	.0705	.0755
2	.0805	.0855	.0898	.0908	.0918	.0907	.0853	.0730	
3	.0093	.0096	.0100	.0102	.0104	.0106	.0128	.0179	.0231
3	.0283	.0334	.0397	.0470	.0542	.0617	.0698	.0779	.0859
3	.0925	.0980	.1034	.1068	.1083	.1084	.1063	.1024	
4	.0076	.0078	.0078	.0078	.0081	.0083	.0105	.0132	.0180
4	.0241	.0301	.0362	.0423	.0528	.0665	.0802	.0936	.1042
4	.1148	.1233	.1285	.1336	.1388	.1492	.1529	.1551	
5	.0077	.0077	.0078	.0079	.0080	.0082	.0110	.0158	.0205
5	.0253	.0360	.0481	.0602	.0723	.0899	.1097	.1295	.1475
5	.1644	.1813	.1957	.2029	.2101	.2435	.2569	.2654/	

DATA((CD712(I,J),J=1,26),I=1,5)/

1	.0221	.0315	.0362	.0386	.0426	.0454	.0492	.0530	.0568
1	.0606	.0666	.0734	.0802	.0872	.0952	.1032	.1112	.1196

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1 .1283, .1371, .1441, .1457, .1473, .1408, .1201, .0934,
2 .0130, .0146, .0154, .0161, .0176, .0195, .0242, .0325, .0403,
2 .0470, .0544, .0620, .0709, .0807, .0905, .0998, .1091, .1184,
2 .1272, .1348, .1423, .1480, .1504, .1474, .1252, .0990,
3 .0110, .0113, .0118, .0120, .0128, .0150, .0201, .0265, .0330,
3 .0418, .0505, .0594, .0709, .0825, .0940, .1044, .1148, .1253,
3 .1350, .1447, .1541, .1589, .1637, .1600, .1469, .1324,
4 .0099, .0099, .0099, .0099, .0099, .0110, .0162, .0222, .0284,
4 .0378, .0476, .0574, .0701, .0849, .0997, .1147, .1297, .1434,
4 .1568, .1696, .1778, .1861, .1909, .1992, .1923, .1824,
5 .0099, .0099, .0099, .0099, .0103, .0126, .0182, .0239, .0367,
5 .0499, .0661, .0836, .1023, .1198, .1367, .1508, .1637, .1766,
5 .1891, .2012, .2134, .2245, .2346, .2764, .2948, .3025/
DATA(XMI(J),J=1,26)/.3,.5,.6,.65,.7,.725,.75,.775,
& .8,.825,.85,.875,.9,.925,.95,.975,1.0,1.025,1.05,1.075,
&1.1,1.125,1.15,1.3,1.45,1.6/
DATA(CLI(J),J=1,9)/-.4,-.2,0.0,.2,.4,.6,.8,1.0,1.2/
DATA(ALPI(J),J=1,7)/-4.0,-2.0,0.0,2.0,4.0,6.0,8.0/
DATA(CLII(J),J=1,5)/0.0,.2,.4,.6,.8/
IORDER(1)=IORDER(2)=1
IPT (1) = -1
IF (IKEY .EQ. 2) GO TO 1000
IF (TR .LT. .06) GO TO 1
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 2
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 3
IF (TR .GE. .12) GO TO 4
1 CALL IBI (7,ALPI,26,XMI,7,CL706,IORDER,IPT,AA,XM,CLFT06,IERR)
CL=CLFT06
GO TO 400
2 CALL IBI (7,ALPI,26,XMI,7,CL706,IORDER,IPT,AA,XM,CLFT06,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL709,IORDER,IPT,AA,XM,CLFT09,IERR)
CL=CLFT06 + (CLFT09 - CLFT06)*((TR-.06)/(.09-.06))
GO TO 400
3 CALL IBI (7,ALPI,26,XMI,7,CL709,IORDER,IPT,AA,XM,CLFT09,IERR)
IPT (1)=-1
CALL IBI (7,ALPI,26,XMI,7,CL712,IORDER,IPT,AA,XM,CLFT12,IERR)
CL=CLFT09+(CLFT12-CLFT09)*((TR-.09)/(.12-.09))
GO TO 400
4 CALL IBI (7,ALPI,26,XMI,7,CL712,IORDER,IPT,AA,XM,CLFT12,IERR)
CL=CLFT12
GO TO 400
1000 CONTINUE
IPT (1)=-1
IF (TR .LT. .06) GO TO 10
IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 20
IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 30
IF (TR .GE. .12) GO TO 40
10 CALL IBI (26,XMI,9,CLI,26,ALP706,IORDER,IPT,XM,CL,AA06,IERR)
AA=AA06
GO TO 400
20 CALL IBI (26,XMI,9,CLI,26,ALP706,IORDER,IPT,XM,CL,AA06,IERR)
IPT (1) = -1
CALL IBI (26,XMI,9,CLI,26,ALP709,IORDER,IPT,XM,CL,AA09,IERR)
AA=AA06 + (AA09 - AA06)*((TR -.06)/(.09-.06))

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GO TO 400
30 CALL IBI (26,XMI,9,CLI,26,ALP709,IORDER,IPT,XM,CL,AA09,IERR)
   IPT (1) = -1
   CALL IBI (26,XMI,9,CLI,26,ALP712,IORDER,IPT,XM,CL,AA12,IERR)
   AA=AA09+(AA12-AA09)*((TR-.09)/(.12-.09))
   GO TO 400
40 CALL IBI (26,XMI,9,CLI,26,ALP712,IORDER,IPT,XM,CL,AA12,IERR)
   AA=AA12
400 CONTINUE
   IPT (1)=-1
   IF (TR .LT. .06) GO TO 11
   IF (TR .GE. .06 .AND. TR .LT. .09) GO TO 21
   IF (TR .GE. .09 .AND. TR .LT. .12) GO TO 31
   IF (TR .GE. .12) GO TO 41
11 CALL IBI (5,CLII,26,XMI,5,CD706,IORDER,IPT,CL,XM,CDRG06,IERR)
   CD=CDRG06
   WRITE (6,206) TR
206 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
&*/* THE VALUES FOR T/C=.06 HAVE BEEN RETURNED.*)
   GO TO 250
21 CALL IBI (5,CLII,26,XMI,5,CD706,IORDER,IPT,CL,XM,CDRG06,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD709,IORDER,IPT,CL,XM,CDRG09,IERR)
   CD=CDRG06 + (CDRG09 - CDRG06)*((TR-.06)/(.09-.06))
   GO TO 250
31 CALL IBI (5,CLII,26,XMI,5,CD709,IORDER,IPT,CL,XM,CDRG09,IERR)
   IPT (1)=-1
   CALL IBI (5,CLII,26,XMI,5,CD712,IORDER,IPT,CL,XM,CDRG12,IERR)
   CD=CDRG09+(CDRG12-CDRG09)*((TR-.09)/(.12-.09))
   GO TO 250
41 CALL IBI (5,CLII,26,XMI,5,CD712,IORDER,IPT,CL,XM,CDRG12,IERR)
   CD=CDRG12
   IF (TR .GT. .12) WRITE (6,207) TR
207 FORMAT(*0THICKNESS RATIO=*,F5.3,* IS OUT OF RANGE.
&*/* THE VALUES FOR T/C=.12 HAVE BEEN RETURNED.*)
250 IF (CL .GT. .8) GO TO 251
   RETURN
251 CALL COMPUT (U, XM, ALT, COR, TR, AA, CDT, CL, CD, CLDES)
   CD=CDT
   RETURN
   END

```

```

SUBROUTINE IBI (NX,X,NY,Y,MAXF,F,IORDER,IPT,X0,Y0,Z,IERR)

```

```

C
C
C*****
C*
C* PURPOSE
C*
C* FIRST OR SECOND ORDER LAGRANGIAN INTEPOLATION FOR A BIVARIATE
C* FUNCTION Z = F(X0,Y0). THE ORDER OF INTERPOLATION IN THE X
C* DIRECTION MAY DIFFER FROM THE ORDER IN THE Y DIRECTION. VALUES
C* IN THE X AND Y ARRAYS NEED NOT BE EQUALLY SPACED, NOR DO THE X

```



```

C* AND Y ARRAYS REQUIRE THE SAME NUMBER OF ELEMENTS. THE X AND Y
C* ARRAYS EACH REQUIRE AT LEAST TWO ELEMENTS FOR FIRST ORDER INTERP-
C* OLATION AND AT LEAST THREE POINTS FOR SECOND ORDER INTERPOLATION.
C* F MUST BE KNOWN AT THE NODE POINTS (X(I),Y(J)).
C*
C* THE PROGRAM USES INTERNAL POINTERS IN THE X AND Y DIRECTIONS
C* TO BEGIN SEARCHES. THESE POINTERS CONTAIN THE INDICES OF THE X
C* AND Y MESH LINES NEAREST THE PREVIOUS (X0,Y0). THESE POINTERS
C* ARE USED TO MINIMIZE THE SEARCH TIMES BASED ON THE PREMISE THAT
C* IN SCIENTIFIC INTERPOLATION SUCCESSIVE POINTS TO BE INTERPOLATED
C* WILL BE FOUND IN THE SAME OR NEARBY GRID RECTANGLES.
C*
C* USE
C* CALL IBI(NX,X,NY,Y,MAXF,F,IORDER,IPT,X0,Y0,Z,IERR)
C*
C* PARAMETERS
C*
C* NX-----AN INPUT INTEGER SPECIFYING THE NUMBER OF DATA POINTS FOR
C* THE FIRST INDEPENDENT VARIABLE.
C*
C* X-----ONE INPUT INDEPENDENT VARIABLE ARRAY DIMENSIONED AT LEAST
C* NX IN THE CALLING PROGRAM. UPON ENTRY TO IBI, X(I) MUST
C* CONTAIN THE I-TH VALUE OF THE FIRST INDEPENDENT VARIABLE
C* AT WHICH THE FUNCTION IS KNOWN.
C* X MUST BE STRICTLY INCREASING, X(I+1)>X(I).
C*
C* NY-----AN INPUT INTEGER SPECIFYING THE NUMBER OF DATA POINTS FOR
C* THE SECOND INDEPENDENT VARIABLE.
C*
C* Y-----THE OTHER INPUT INDEPENDENT VARIABLE ARRAY DIMENSIONED AT
C* LEAST NY IN THE CALLING PROGRAM. UPON ENTRY TO IBI, Y(J)
C* MUST CONTAIN THE J-TH VALUE OF THE SECOND INDEPENDENT
C* VARIABLE AT WHICH THE FUNCTION IS KNOWN.
C* Y MUST BE STRICTLY INCREASING, Y(J+1)>Y(J).
C*
C* MAXF---AN INPUT INTEGER GIVING THE MAXIMUM ROW DIMENSION OF F IN
C* THE CALLING PROGRAM.
C*
C* F-----THE INPUT TABLE OF DEPENDENT VARIABLE (FUNCTIONAL) VALUES
C* DIMENSIONED F(MAXF,NY) IN THE CALLING PROGRAM. ACTUALLY
C* F MAY HAVE MORE THAN NY COLUMNS BUT NOT MORE THAN MAXF ROW
C* UPON ENTRY TO IBI, F(I,J) MUST CONTAIN THE FUNCTIONAL
C* VALUE AT (X(I),Y(J)).
C*
C* IORDER-AN INTEGER INPUT ARRAY OF INTERPOLATION ORDERS. DIMENSION
C* IORDER(2).
C*
C* IORDER(1)--ORDER OF INTERPOLATION FOR X.
C*
C* IORDER(2)--ORDER OF INTERPOLATION FOR Y.
C*
C* =1 FIRST ORDER INTERPOLATION.
C*
C* =2 SECOND ORDER INTERPOLATION.

```

```

C*
C* IPT----AN INPUT/OUTPUT INTEGER ARRAY WITH THE FOLLOWING FUNCTIONS:
C* DIMENSION IPT(2).
C*
C* INPUT--INITIALIZATION OF IBI AND CHECK ARRAYS X AND Y.
C*
C* = -1 WHENEVER A NEW X OR Y ARRAY IS INPUT, THIS
C* VALUE OF IPT(1) SHOULD BE SPECIFIED BY THE
C* USER TO INITIALIZE IBI AND CHECK THAT ARRAY
C* X IS STRICTLY INCREASING WITH AT LEAST NX
C* POINTS AND ARRAY Y IS STRICTLY INCREASING WITH
C* AT LEAST NY POINTS.
C*
C* OUTPUT-INDEX POINTER.
C*
C* IPT(1)-THE X INDEX POINTER.
C*
C* = K INDICATES THAT  $ABS(X0-X(K)) < ABS(X0-X(I))$ 
C*  $I=1, \dots, NX$  I"K, THAT IS, X(K) IS THE
C* NEAREST MESH LINE TO X0. IF
C* EXTRAPOLATION WAS USED (IERR=-3) IPT(1)
C* =0 ON RETURN IF  $X0 < X(1)$  AND  $IPT(1)=NX$  IF
C*  $X0 > X(NX)$ . ON THE NEXT CALL K IS USED AS
C* THE INDEX OF X WHERE THE SEARCH FOR X0
C* BEGINS.
C*
C* IPT(2)-THE Y INDEX POINTER.
C*
C* = J INDICATES THAT  $ABS(Y0-Y(J)) < ABS(Y0-Y(I))$ 
C*  $I=1, \dots, NY$  I"J, THAT IS, Y(J) IS THE
C* NEAREST MESH LINE TO Y0. IF
C* EXTRAPOLATION WAS USED (IERR=-3) IPT(2)
C* =0 ON RETURN IF  $Y0 < Y(1)$  AND  $IPT(2)=NY$  IF
C*  $Y0 > Y(NY)$ . ON THE NEXT CALL, J IS USED
C* AS THE INDEX OF Y WHERE THE SEARCH FOR
C* Y0 BEGINS.
C*
C* X0-----THE INPUT X POINT WHERE INTERPOLATION IS DESIRED.
C*
C* Y0-----THE INPUT Y POINT WHERE INTERPOLATION IS DESIRED.
C*
C* Z-----THE OUTPUT INTERPOLATED VALUE OF THE FUNCTION AT (X0,Y0),
C* Z=F(X0,Y0).
C*
C* IERR---INTEGER OUTPUT ERROR CODE GENERATED AND RETURNED BY IBI.
C*
C* = 0 NORMAL RETURN. NO PROBLEMS ENCOUNTERED.
C*
C* =-1 THE X OR Y ARRAY WAS NOT STRICTLY INCREASING.
C* NO INTERPOLATION PERFORMED.
C*
C* =-2 INSUFFICIENT VALUES IN X OR Y TO PERFORM THE ORDER OF
C* INTERPOLATION REQUESTED, POSSIBLY USER INPUT NX OR NY
C* INCORRECTLY. NO INTERPOLATION PERFORMED.
C*

```



```

IERR=0
C
C SEARCH FOR THE X AND Y MESH LINES NEAREST TO X0,Y0 AND RECORD
C THESE INDICES IN IPT(1) AND IPT(2).
C
CALL FINDER(X0,X,IPT(1),NX,M,IERR)
CALL FINDER(Y0,Y,IPT(2),NY,N,IERR)
C
C OBTAIN INDICES FOR Y DIRECTION INTERPOLATION TABLE LOOK UP.
C
CALL INDIXR(IPT(2),IORDER(2),Y0,KL,KR,Y,NY)
KM=KL+1
C
C DETERMINE THE LAGRANGIAN INTERPOLATING COEFFICIENTS FOR Y
C DIRECTION INTERPOLATION.
C
CALL LAGRAG(Y0,Y(KR),Y(KM),Y(KL),P,IORDER(2))
C
C OBTAIN INDICES FOR X DIRECTION INTERPOLATION TABLE LOOK UP.
C
CALL INDIXR(IPT(1),IORDER(1),X0,LL,LR,X,NX)
LM=LL+1
C
C DETERMINE THE LAGRANGIAN INTERPOLATING COEFFICIENTS FOR X
C DIRECTION INTERPOLATION.
C
CALL LAGRAG(X0,X(LR),X(LM),X(LL),S,IORDER(1))
C
C COMPLETE LAGRANGIAN INTERPOLATION BY COMPUTING THE DOUBLE SUM
C OF PRODUCTS.
C
Z=0.
LP1=0
DO 30 I=LL,LR
LP1=LP1+1
SUM=0.
KP1=0
DO 20 J=KL,KR
KP1=KP1+1
20 SUM=P(KP1)*F(I,J)+SUM
30 Z=SUM*S(LP1)+Z
IF(IERR.GE.0)RETURN
IPT(1)=M $ IPT(2)=N
RETURN
END

```

```

SUBROUTINE COMPUT (D,XM,ALT,COR,TR,ALPHA,CD,CL,CDINPUT,CLDES)
DIMENSION CDARRAY(11,1),CLARRAY(6,9),CLMXAR(10,12)
DIMENSION ALPHA0(11),RNI(3),CLDSIN(4),DELALR(10,3),ALCLMX(10,4)
DIMENSION IPT(2),IORDER(2)
DIMENSION TR0(10),RNO(12),CLMAX0(6),DELAL0(9)
DATA ((CDARRAY(I,J),I= 1,11),J=1,1)/ 0.00, 0.00, .07, .29,
1 .42, .53, .67, .81, .96, 1.15, 1.28/

```

```

DATA ((CLARAY(K,L),K=1,6),L=1,9) /
1 0.800, 0.980, 1.200, 1.400, 1.600, 1.800,
2 1.080, 1.290, 1.380, 1.540, 1.770, 1.985,
3 1.200, 1.345, 1.415, 1.565, 1.790, 2.010,
4 1.200, 1.330, 1.405, 1.550, 1.770, 1.990,
5 1.180, 1.305, 1.380, 1.520, 1.745, 1.960,
6 1.175, 1.290, 1.365, 1.505, 1.725, 1.940,
7 1.170, 1.280, 1.355, 1.495, 1.710, 1.925,
8 1.170, 1.270, 1.345, 1.490, 1.700, 1.915,
9 1.170, 1.260, 1.335, 1.480, 1.690, 1.905/
DATA ((CLMXAR(M,N),M=1,10),N=1,12) /
1 .750, .750, .750, .752, .760, .790, .820, .832, .840, .840,
2 .750, .750, .750, .760, .790, .835, .860, .870, .872, .870,
3 .750, .750, .760, .780, .840, .895, .920, .930, .930, .920,
4 .750, .750, .760, .790, .900, .965, .990, 1.000, 1.000, .990,
5 .750, .750, .760, .800, .960, 1.045, 1.075, 1.078, 1.063, 1.040,
6 .750, .750, .768, .825, 1.010, 1.110, 1.140, 1.140, 1.120, 1.080,
7 .750, .750, .770, .850, 1.080, 1.205, 1.240, 1.235, 1.200, 1.135,
8 .760, .760, .820, .870, 1.110, 1.245, 1.280, 1.270, 1.230, 1.160,
9 .770, .775, .795, .905, 1.145, 1.265, 1.300, 1.290, 1.255, 1.200,
* .800, .800, .825, .950, 1.175, 1.285, 1.320, 1.320, 1.300, 1.270,
1 .800, .800, .870, .995, 1.200, 1.300, 1.335, 1.340, 1.330, 1.315,
2 .815, .820, .945, 1.095, 1.245, 1.350, 1.380, 1.375, 1.360, 1.350/
DATA ((DELALR(I,J),I= 1,10),J= 1,3) /
1 -2.2, -1.5, -1.1, -1.2, -2.3, -4., -4., -4., -4., -4.,
2 0., 0., -.6, -1.2, -1.1, -.2, 0., -.2, -1.7, -4.,
3 0., 0., 0., .4, 1.05, .65, 0., -.2, -1.7, -4./
DATA ((ALCLMX(I,J),I=1,10),J=1,4) /
1 9., 9., 9.5, 10.9, 13., 15.3, 16.4, 19., 18.2, 20.0,
2 10., 10., 10.2, 11.5, 14.2, 16., 17., 17.7, 19., 10.8,
3 11., 11., 11., 12.3, 14.8, 16.6, 17.8, 18.7, 20., 21.8,
4 11.8, 11.6, 11.6, 13., 15.5, 17.3, 18.5, 19.5, 20.6, 22.4/
DATA RN1 /1., 3., 9./
DATA CLDSIN / 0., .2, .4, .6/
DATA TR0 / .04, .06, .08, .10, .12, .14, .16, .18,
1 .20, .22/
DATA RNO / 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.5, 3.0,
1 4.0, 5.0, 6.0, 9.0/
DATA CLMAX0 / .8, 1.0, 1.2, 1.4, 1.6, 1.8/
DATA DELALO / 0., 4.0, 8., 12., 16., 20., 24., 28.,
1 32./
DATA ALPHA0 /0., 5., 10., 15., 20., 25., 30., 35., 40.,
1 45., 50./
IORDER(1)= IORDER(2)= 1
CALL ATMOS (ALT,RHO,SOS,T)
V= XM*SOS
CHORD= COR*D/2.
C XMUU= MU, BUT MU SHOULD BE DIVIDED BY 1 MILLION
C ALSO REYNOLDS NUMBER WILL BE 1 MILLIONTH OF ITS ACTUAL VALUE
XMUU= (.1E-09)*.3170*T**1.5*734.7/(T +216.)
RN= (RHO*V*CHORD)/XMUU/(.1E 07)
IPT(1)= -1
CALL IBI (10,TR0,12,RNO,10,CLMXAR,IORDER,IPT,TR,RN,CLMAX,IERR)
IPT(1)= -1
CALL IBI (10,TR0,3,RN1,10,DELALR,IORDER,IPT,TR,RN,

```

```

1DALPRN,IERR)
  IPT(1)= -1
  CALL IBI (10,TR0,4,CLDSIN,10,ALCLMX,IORDER,IPT,
1TR,CLDES,APCLMX,IERR)
  ALPCLM= APCLMX +DALPRN
  DELALP= ALPHA -ALPCLM
  IPT(1)= -1
  IF (DELALP.LE.0.0) GO TO 48
  WRITE(6,400)ALPHA
400 FORMAT(*0*,F6.3,* IS AT OR BEYOND STALL.*/ )
  CALL IBI (6,CLMAX0,9,DELAL0,6,CLARAY,IORDER,IPT,CLMAX,
1DELALP,CL,IERR)
  IPT(1)= -1
48  CONTINUE
  IF (ALPHA.LT.8.0) GO TO 50
  CALL IUNI (11,11,ALPHA0,1,CDARAY,IORDER,ALPHA,DELCD,IPT,IERR)
  CD= CDINPUT +DELCD
  RETURN
50  CONTINUE
  CD= CDINPUT
  RETURN
  END

```

```

SUBROUTINE ATMOS(ALT,RHO,SOS,T0)
C INPUT:
C ALTITUDE IN FEET; GEOPOTENTIAL.
C OUTPUT:
C T0= AMBIENT STATIC TEMPERATURE, DEG.,R.
C P0= AMBIENT STATIC PRESSURE, PSF.
C RHO= AMBIENT STATIC DENSITY, SLUGS/CUBIC FOOT.
C SOS= SPEED OF SOUND IN FEET PER SECOND.
C

```

```

DELTT=0.0
XL=0.003567
T00=518.69+DELTT
T0=T00*(1.0-XL*ALT/T00)
IF(ALT.GT.80000.0) WRITE 300
300 FORMAT(1H0,50H BECAUSE THE ALTITUDE IS GREATER THAN 80 000 FEET,/
161H CALCULATIONS CANNOT BE CARRIED OUT WITH SUFFICIENT ACCURACY.)
IF(ALT.GT.36089.0)T0=T00*0.7518
P0=2116.2*(1.0-XL*ALT/T00)**5.259805
IF(ALT.GT.36089.0)P0=470.8563*(EXP((36089.0-ALT)/(53.3*T0)))
RHO=P0/(53.3*32.2*T0)
SOS=SQRT(1.4*53.3*32.2*T0)
RETURN
END

```

```

FUNCTION MONO(M,VAR,IPOS)
C FUNCTION MONO CHECKS TO INSURE THAT THE SEQUENCE VAR IS STRICTLY
C INCREASING. IF VAR IS A STRICTLY INCREASING SEQUENCE MONO RETURNS

```

C A POSITIVE VALUE. IF VAR IS NOT A STRICTLY INCREASING SEQUENCE,
C MONO RETURNS A NEGATIVE VALUE AND THE INDEX OF VAR WHERE VAR(N)
C WAS NOT STRICTLY INCREASING.

C
C M----THE NUMBER OF ELEMENTS IN VAR.
C
C VAR--THE X,Y, OR Z ARRAY PASSED FROM IBI OR ITRI.
C
C IPOS-IPT(1),IPT(2),OR IPT(3).
C
C DIMENSION VAR(M)

C
C MONO=1
C K=M-1
C DO 10 L=1,K
C N=L+1
C IF (VAR(N)-VAR(L).GT.0.)GOTO 10
C MONO=-1
C IPOS=N
10 CONTINUE
C RETURN
C END

SUBROUTINE FINDER(S,VAR,IPOS,NBND,IF,IERR)

C
C FINDER DETERMINES THE INDEX OF THE X,Y, OR Z ARRAY(VAR) NEAREST TO
C X0,Y0, OR Z0 (S). IF S<VAR(1) OR S>VAR(NBND) IERR=-3 ON RETURN
C AND IF CONTAINS A 0 OR NBND ACCORDING TO THE SITUATION, WHILE
C IPOS RETURNS A 1 OR NBND.

C
C S----X0,Y0, OR Z0.
C
C VAR--X,Y, OR Z.
C
C IPOS-IPT(1),IPT(2), OR IPT(3). THE INDEX OF VAR NEAREST TO S.
C
C NBND-THE NUMBER OF VALUES IN VAR.
C
C IF---IPOS IF VAR(1)@S@VAR(NBND).
C
C 0 IF VAR(1)>S.
C
C NBND IF VAR(NBND)<S.
C
C IERR=0 IF VAR(1)@S@VAR(NBND).
C
C -3 IF VAR(1)>S OR VAR(NBND)<S.
C
C DIMENSION VAR(1)

C
C LOGICAL ABOVE,BELOW
C ABOVE=BELOW=.FALSE.
C IF(IPOS.EQ.0)IPOS=1

```

10 IF(S-VAR(IPOS))20,50,30
20 ABOVE=.TRUE.
   IUP=IPOS
   IF(ABOVE.AND.BELOW)GOTO 40
   IPOS=IPOS-1
   IF(IPOS.GE.1)GOTO 10
   IERR=-3
   IPOS=1
   IF=0
   RETURN
30 BELOW=.TRUE.
   LOW=IPOS
   IF(ABOVE.AND.BELOW)GOTO 40
   IPOS=IPOS+1
   IF(IPOS.LE.NBND)GOTO 10
   IERR=-3
   IF=IPOS=NBND
   RETURN
40 IPOS=LOW
   IF(ABS(S-VAR(IUP)).LT.ABS(S-VAR(LOW)))IPOS=IUP
50 IF=IPOS
   RETURN
   END

```

```

SUBROUTINE LAGRAG(S,VAR1,VAR2,VAR3,Q,IORDER)

```

```

C
C LAGRAG CALCULATES THE LAGRANGIAN COEFFICIENTS FOR FIRST OR SECOND
C ORDER INTERPOLATION.
C
C IORDER-IORDER(1),IORDER(2), OR IORDER(3).
C
C S-----X0,Y0, OR Z0.
C
C Q-----THE LAGRANGIAN COEFFICIENTS.
C
C VAR1---THE VALUE OF X,Y, OR Z AT RIGHT END POINT OF INTERVAL.
C
C VAR2---THE VALUE OF X,Y, OR Z AT MID-POINT OF INTERVAL(2-ND ORDER)
C
C VAR3---THE VALUE OF X,Y, OR Z AT LEFT END POINT OF INTERVAL.
C
C DIMENSION Q(3)
C
C IF(IORDER.EQ.2)GOTO 10
C
C FIRST ORDER COEFFICIENTS.
C
C T1=VAR3-VAR1
C T2=S-VAR1
C T3=S-VAR3
C Q(1)=T2/T1
C Q(2)=-T3/T1
C RETURN

```



```

C
C SECOND ORDER COEFFICIENTS.
C
10 T1=S-VAR2
   T2=S-VAR1
   T3=S-VAR3
   Q(1)=T1*T2
   Q(2)=T3*T2
   Q(3)=T3*T1
   T1=VAR3-VAR2
   T2=VAR3-VAR1
   T3=VAR2-VAR1
   Q(1)=Q(1)/(T1*T2)
   Q(2)=Q(2)/(-T1*T3)
   Q(3)=Q(3)/(T2*T3)
   RETURN
   END

```

```

SUBROUTINE INDIXR(IPT,IORDER,S,IL,IR,VAR,N)
C
C INDIXR DETERMINES THE INDICES OF THE X,Y, Z ARRAY PASSED TO ARRAY VAR
C TO BE USED IN TABLE LOOK UP.
C
C IPT----THE X,Y,Z POINTER.
C
C IORDER-THE ORDER OF INTERPOLATION IN X,Y, Z DIRECTION
C
C S-----X0,Y0,Z0.
C
C IL-----THE INDEX OF ARRAY X,Y, OR Z GIVING THE LEFT END POINT OF
C THE INTERVAL CONTAINING S.
C
C IR-----THE INDEX OF THE X,Y, OR Z ARRAY GIVING THE RIGHT END POINT
C OF THE INTERVAL CONTAINING S.
C
C VAR----THE X,Y, OR Z ARRAY.
C
C N-----NX,NY, OR NZ.
C
C DIMENSION VAR(1)
C
C IF(S.LE.VAR(2))GOTO 10
C IF(S.GE.VAR(N-1))GOTO 20
C IL=IPT
C IF(S.LE.VAR(IPT))IL=IL-1
C IF(IORDER.LT.2)GOTO 30
C IF(ABS(S-VAR(IL-1)).LT.ABS(S-VAR(IL+2)))IL=IL-1
C GOTO 30
10 IL=1
   GOTO 30
20 IL=N-IORDER
30 IR=IL+IORDER
   RETURN

```

END

```
      SUBROUTINE IUNI(NMAX,N,X,NTAB,Y,IORDER,X0,Y0,IPT,IERR)
C      E1.1
C*****
C*
C*   PURPOSE:
C*           SUBROUTINE IUNI USES FIRST OR SECOND ORDER
C*           LAGRANGIAN INTERPOLATION TO ESTIMATE THE VALUES
C*           OF A SET OF A SET OF FUNCTIONS AT A POINT X0. IUNI
C*           USES ONE INDEPENDENT VARIABLE TABLE AND A DEPENDENT
C*           VARIABLE TABLE FOR EACH FUNCTION TO BE EVALUATED.
C*           THE ROUTINE ACCEPTS THE INDEPENDENT VARIABLES SPACED
C*           AT EQUAL OR UNEQUAL INTERVALS. EACH DEPENDENT
C*           VARIABLE TABLE MUST CONTAIN FUNCTION VALUES CORRES-
C*           PONDING TO EACH X(I) IN THE INDEPENDENT VARIABLE
C*           TABLE. THE ESTIMATED VALUES ARE RETURNED IN THE Y0
C*           ARRAY WITH THE N-TH VALUE OF THE ARRAY HOLDING THE
C*           VALUE OF THE N-TH FUNCTION VALUE EVALUATED AT X0.
C*
C*   USE:
C*           CALL IUNI(NMAX,N,X,NTAB,Y,IORDER,X0,Y0,IPT,IERR)
C*
C*   PARAMETERS:
C*
C*           NMAX   THE MAXIMUM NUMBER OF POINTS IN THE INDEPENDENT
C*                 VARIABLE ARRAY.
C*
C*           N      THE ACTUAL NUMBER OF POINTS IN THE INDEPENDENT
C*                 ARRAY,WHERE N .LE. NMAX.
C*
C*           X      A ONE-DIMENSIONAL ARRAY, DIMENSIONED (NMAX) IN THE
C*                 CALLING PROGRAM, WHICH CONTAINS THE INDEPENDENT
C*                 VARIABLES. THESE VALUES MUST BE STRICTLY MONOTONIC.
C*
C*           NTAB   THE NUMBER OF DEPENDENT VARIABLE TABLES
C*
C*           Y      A TWO-DIMENSIONAL ARRAY DIMENSIONED (NMAX,NTAB) IN
C*                 THE CALLING PROGRAM. EACH COLUMN OF THE ARRAY
C*                 CONTAINS A DEPENDENT VARIABLE TABLE
C*
C*           IORDER INTERPOLATION PARAMETER SUPPLIED BY THE USER.
C*
C*           =0    ZERO ORDER INTERPOLATION: THE FIRST FUNCTION
C*                 VALUE IN EACH DEPENDENT VARIABLE TABLE IS
C*                 ASSIGNED TO THE CORRESPONDING MEMBER OF THE Y0
C*                 ARRAY. THE FUNCTIONAL VALUE IS ESTIMATED TO
C*                 REMAIN CONSTANT AND EQUAL TO THE NEAREST KNOWN
C*                 FUNCTION VALUE.
C*
C*           X0    THE INPUT POINT AT WHICH INTERPOLATION WILL BE
C*                 PERFORMED.
C*
C*
```

```

C*      Y0      A ONE-DIMENSIONAL ARRAY DIMENSIONED (NTAB) IN THE      *
C*      CALLING PROGRAM.  UPON RETURN THE ARRAY CONTAINS THE      *
C*      ESTIMATED VALUE OF EACH FUNCTION AT X0.                      *
C*
C*      IPT      ON THE FIRST CALL IPT MUST BE INITIALIZED TO -1 SO  *
C*      THAT MONOTONICITY WILL BE CHECKED.  UPON LEAVING THE      *
C*      ROUTINE IPT EQUALS THE VALUE OF THE INDEX OF THE X        *
C*      VALUE PRECEDING X0 UNLESS EXTRAPOLATION WAS              *
C*      PERFORMED.  IN THAT CASE THE VALUE OF IPT IS            *
C*      RETURNED AS:                                             *
C*      =0 DENOTES X0 .LT. X(1) IF THE X ARRAY IS IN             *
C*      INCREASING ORDER AND X(1) .GT. X0 IF THE X ARRAY        *
C*      IS IN DECREASING ORDER.                                  *
C*      =N DENOTES X0 .GT. X(N) IF THE X ARRAY IS IN            *
C*      INCREASING ORDER AND X0 .LT. X(N) IF THE X ARRAY        *
C*      IS IN DECREASING ORDER.                                  *
C*
C*      ON SUBSEQUENT CALLS, IPT IS USED AS A POINTER TO        *
C*      BEGIN THE SEARCH FOR X0.                                  *
C*
C*      IERR      ERROR PARAMETER GENERATED BY THE ROUTINE      *
C*      =0 NORMAL RETURN                                          *
C*      =J THE J-TH ELEMENT OF THE X ARRAY IS OUT OF ORDER      *
C*      =-1 ZERO ORDER INTERPOLATION PERFORMED BECAUSE          *
C*      IORDER =0.                                               *
C*      =-2 ZERO ORDER INTERPOLATION PERFORMED BECAUSE ONLY     *
C*      ONE POINT WAS IN X ARRAY.                                *
C*      =-3 NO INTERPOLATION WAS PERFORMED BECAUSE              *
C*      INSUFFICIENT POINTS WERE SUPPLIED FOR SECOND           *
C*      ORDER INTERPOLATION.                                     *
C*      =-4 EXTRAPOLATION WAS PERFORMED                          *
C*
C*      UPON RETURN THE PARAMETER IERR SHOULD BE TESTED IN     *
C*      THE CALLING PROGRAM.                                     *
C*
C*      REQUIRED ROUTINES      NONE                                *
C*
C*      SOURCE                  CMPB ROUTINE MTLUP MODIFIED      *
C*                              BY COMPUTER SCIENCES CORPORATION *
C*
C*      LANGUAGE                FORTRAN                          *
C*
C*      DATE RELEASED          AUGUST 1,1973                     *
C*
C*      LATEST REVISION        AUGUST 1,1973                     *
C*
C*****
C*      DIMENSION X(1),Y(NMAX,1),Y0(1)
C*      NM1=N-1
C*      IERR=0
C*      J=1
C*      DELX=X(2)-X(1)
C
C      TEST FOR ZERO ORDER INTERPOLATION

```

```

C
  IF (IORDER .EQ. 0) GO TO 10
  IF (N.LT. 2) GO TO 20
  GO TO 50
10  IERR=-1
    GO TO 30
20  IERR=-2
30  DO 40 NT=1,NTAB
      Y0(NT)=Y(1,NT)
40  CONTINUE
    RETURN
50  IF (IPT .GT. -1) GO TO 65

C
C      CHECK FOR TABLE OF NODE POINTS BEING STRICTLY MONOTONIC
C      THE SIGN OF DELX SIGNIFIES WHETHER TABLE IS IN
C      INCREASING OR DECREASING ORDER.
C

  IF (DELX .EQ. 0) GO TO 190
  IF (N .EQ. 2) GO TO 65

C
C      CHECK FOR SIGN CONSISTENCY IN THE DIFFERENCES OF
C      SUBSEQUENT PAIRS
C

  DO 60 J=2,NM1
    IF (DELX * (X(J+1)-X(J))) 190,190,60
60  CONTINUE

C
C      IPT IS INITIALIZED TO BE WITHIN THE INTERVAL
C

65  IF (IPT .LT. 1) IPT=1
    IF (IPT .GT. NM1) IPT=NM1
    IN= SIGN (1.0,DELX *( X0-X(IPT)))
70  P= X(IPT) - X0
    IF (P*(X(IPT+1)-X0)) 90,180,80
80  IPT =IPT +IN

C
C      TEST TO SEE IF IT IS NECCESARY TO EXTRAPOLATE
C

  IF (IPT.GT.0 .AND. IPT .LT. N) GO TO 70
  IERR=-4
  IPT=IPT- IN

C
C      TEST FOR ORDER OF INTERPOLATION
C
C
90  IF (IORDER .GT. 1) GO TO 120

C
C      FIRST ORDER INTERPOLATION
C

  DO 100 NT=1,NTAB
    Y0(NT)=Y(IPT,NT)+((Y(IPT+1,NT)- Y(IPT,NT))*(X0-X(IPT)))/
1    (X(IPT+1)-X(IPT))
100 CONTINUE
    IF (IERR .EQ. -4) IPT=IPT+IN
    RETURN

```

```

C
C           SECOND ORDER INTERPOLATION
C
120 IF (N .EQ. 2) GO TO 200
C
C           CHOOSING A THIRD POINT SO AS TO MINIMIZE THE DISTANCE
C           BETWEEN THE THREE POINTS USED TO INTERPOLATE
C
IF (IPT .EQ. NM1) GO TO 140
IF (IPT .EQ. 1) GO TO 130
IF (DELX *(X0-X(IPT-1)).LT.DELX* (X(IPT+2)-X0)) GO TO 140
130 L=IPT
GO TO 150
140 L=IPT -1
150 V1=X(L)-X0
V2=X(L+1)-X0
V3=X(L+2)-X0
DO 160 NT=1,NTAB
YY1=(Y(L,NT) * V2 - Y(L+1,NT) * V1)/(X(L+1) - X(L))
YY2=(Y(L+1,NT)*V3-Y(L+2,NT) *V2)/(X(L+2)-X(L+1))
160 Y0(NT)=(YY1*V3 -YY2*V1)/(X(L+2)-X(L))
IF (IERR .EQ. -4) IPT=IPT + IN
RETURN
180 IF (P .NE. 0) IPT=IPT +1
DO 185 NT=1,NTAB
Y0(NT)=Y(IPT,NT)
185 CONTINUE
RETURN
C
C           IERR IS SET TO THE SUBSCRIPT OF THE MEMBER OF THE TABLE
C           WHICH IS OUT OF ORDER
C
190 IERR=J +1
RETURN
200 IERR=-3
RETURN
END

```

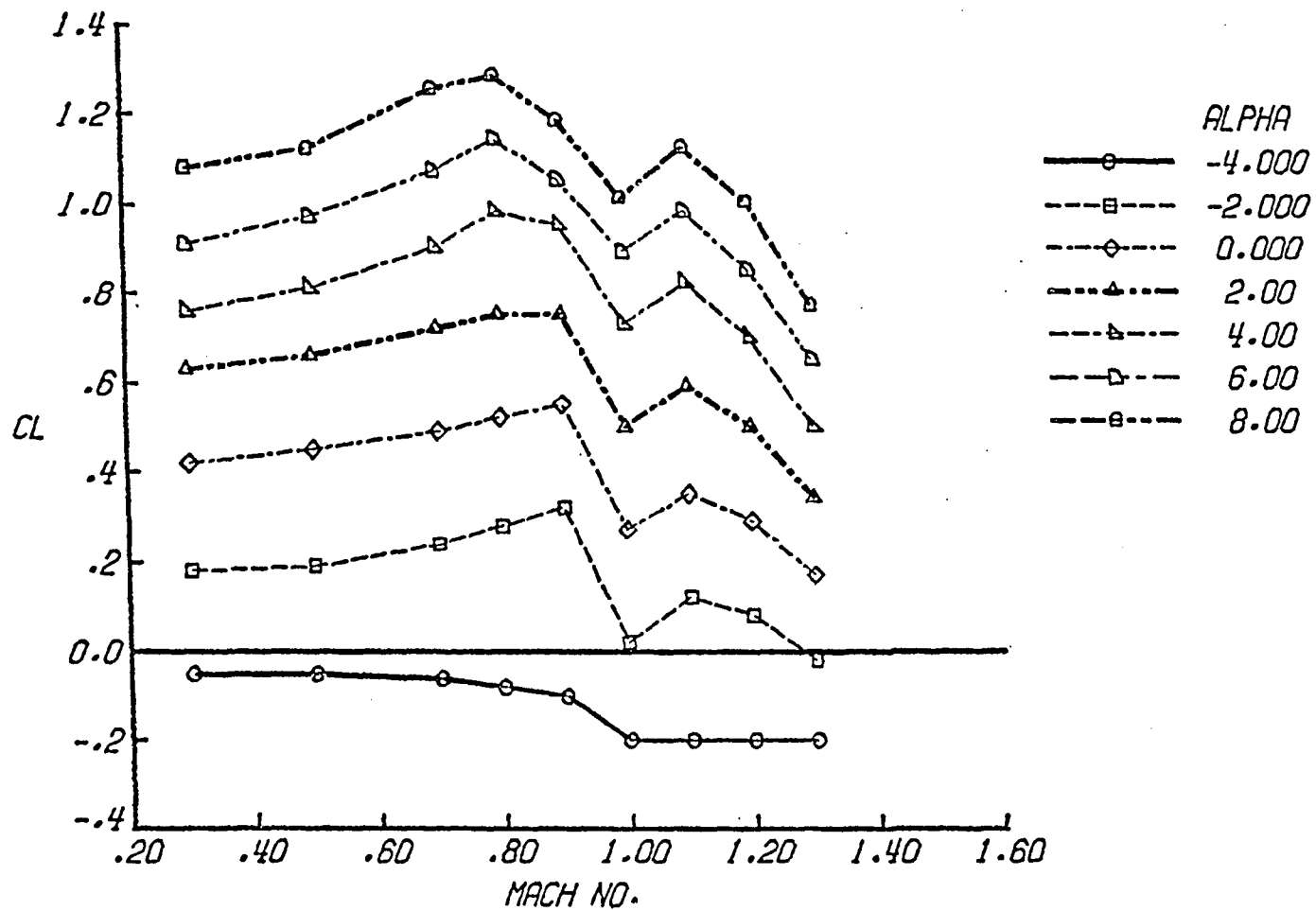


Figure 1.- Data points in lift coefficient table for 16-504, preliminary program.

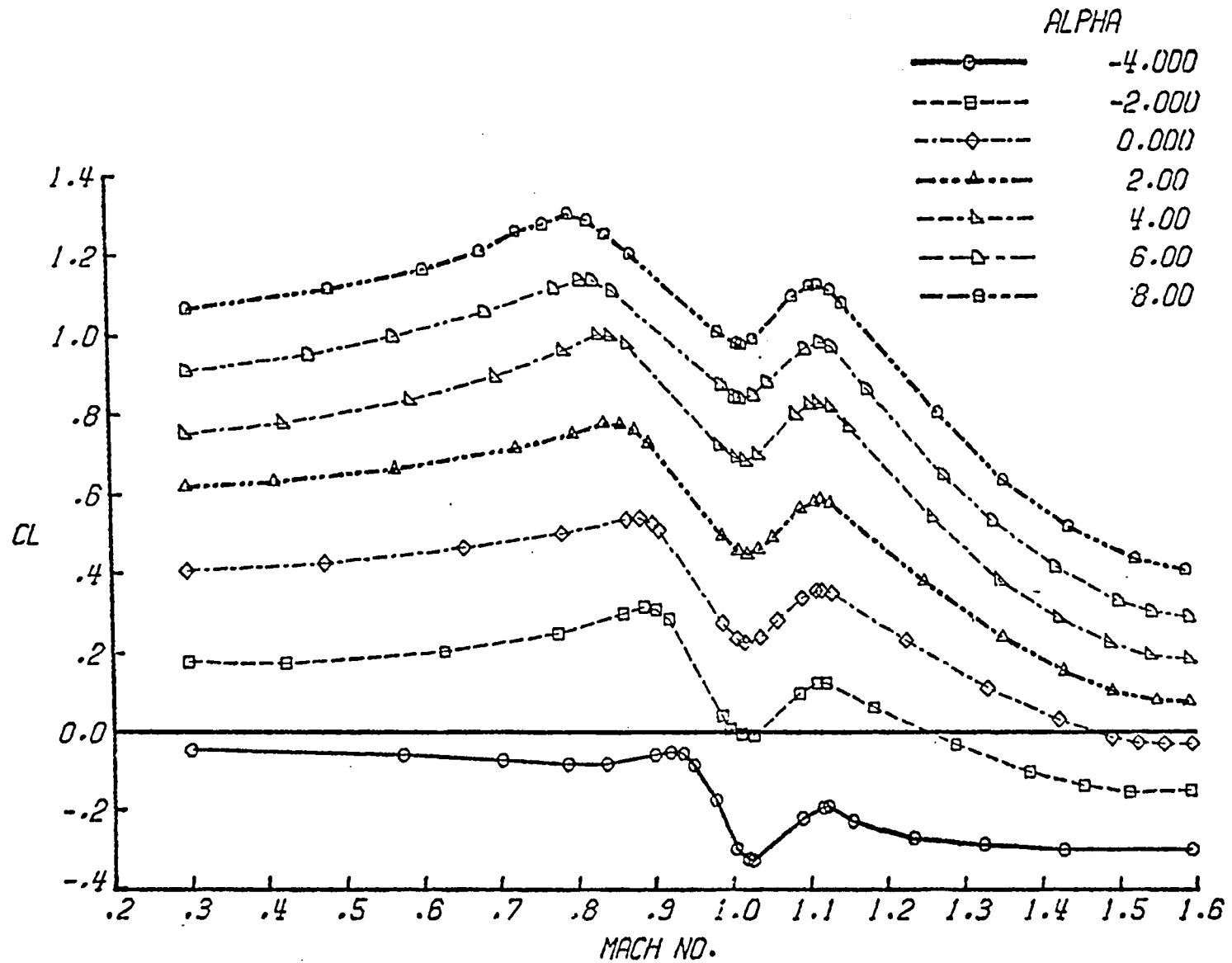


Figure 2.- Data points digitized from lift coefficient graph from reference 1 for 16-504.

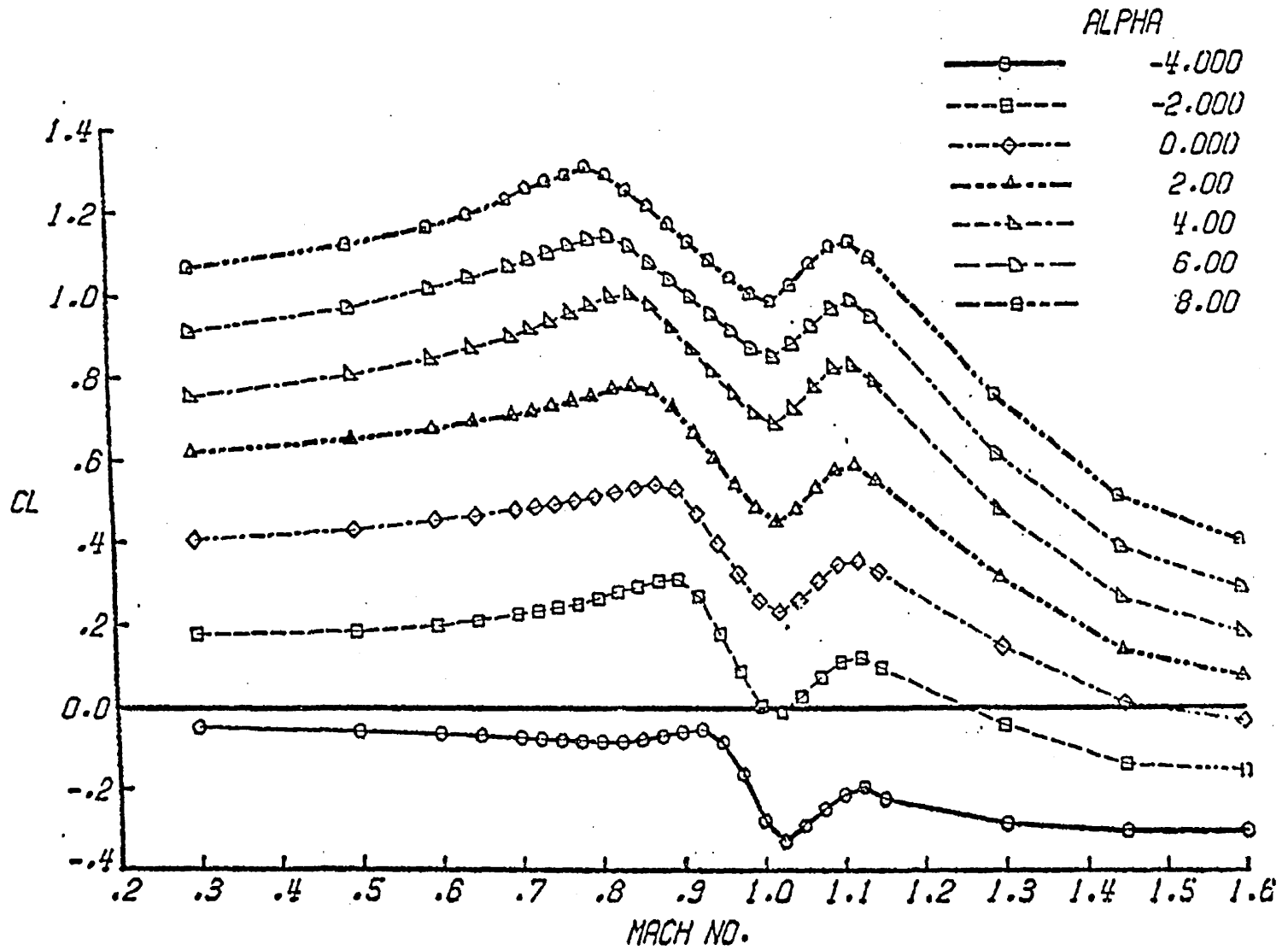


Figure 3.- Data points in lift coefficient table for 16-504, revised program.

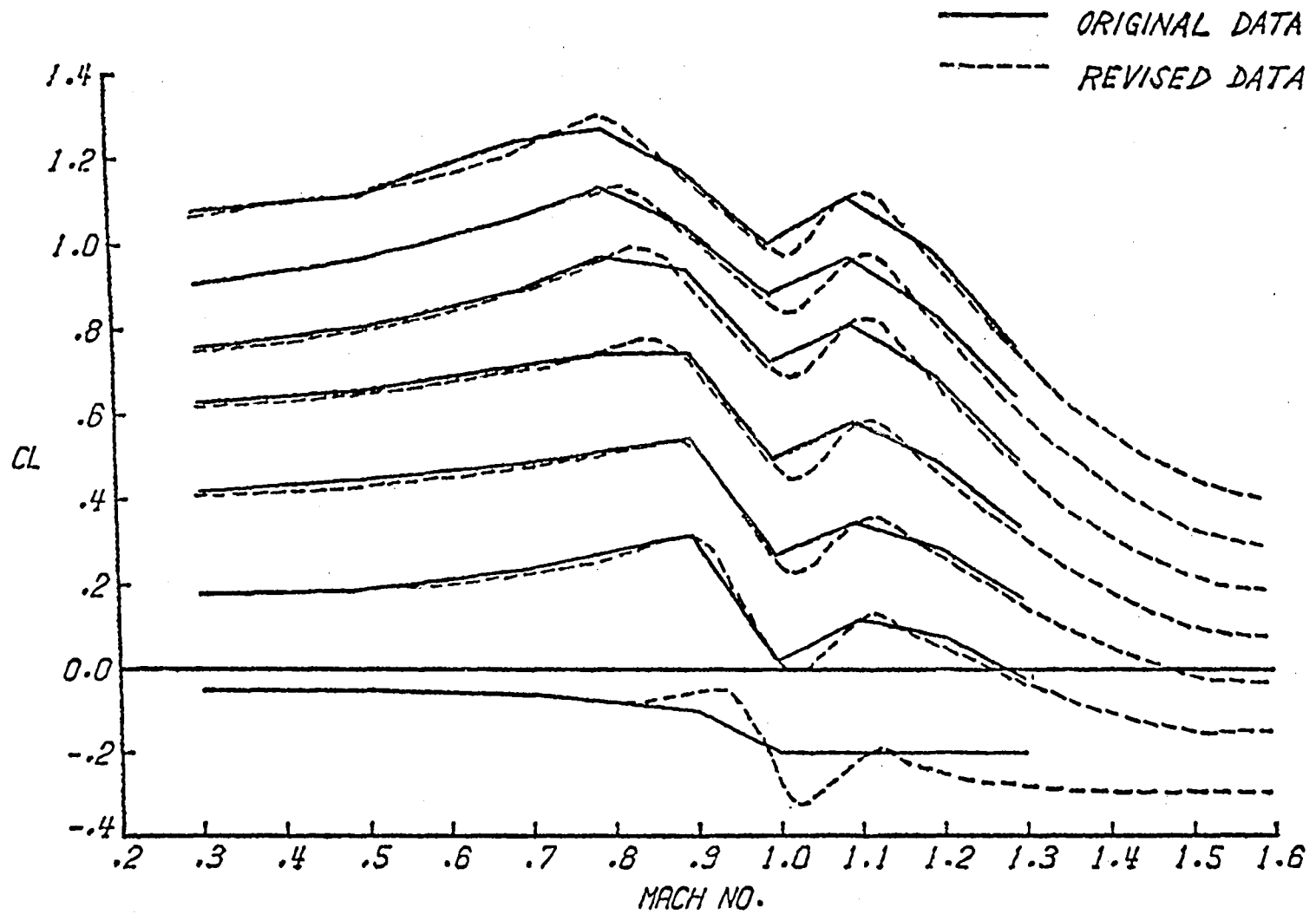


Figure 4.- Comparison of data declarations in original and revised programs.

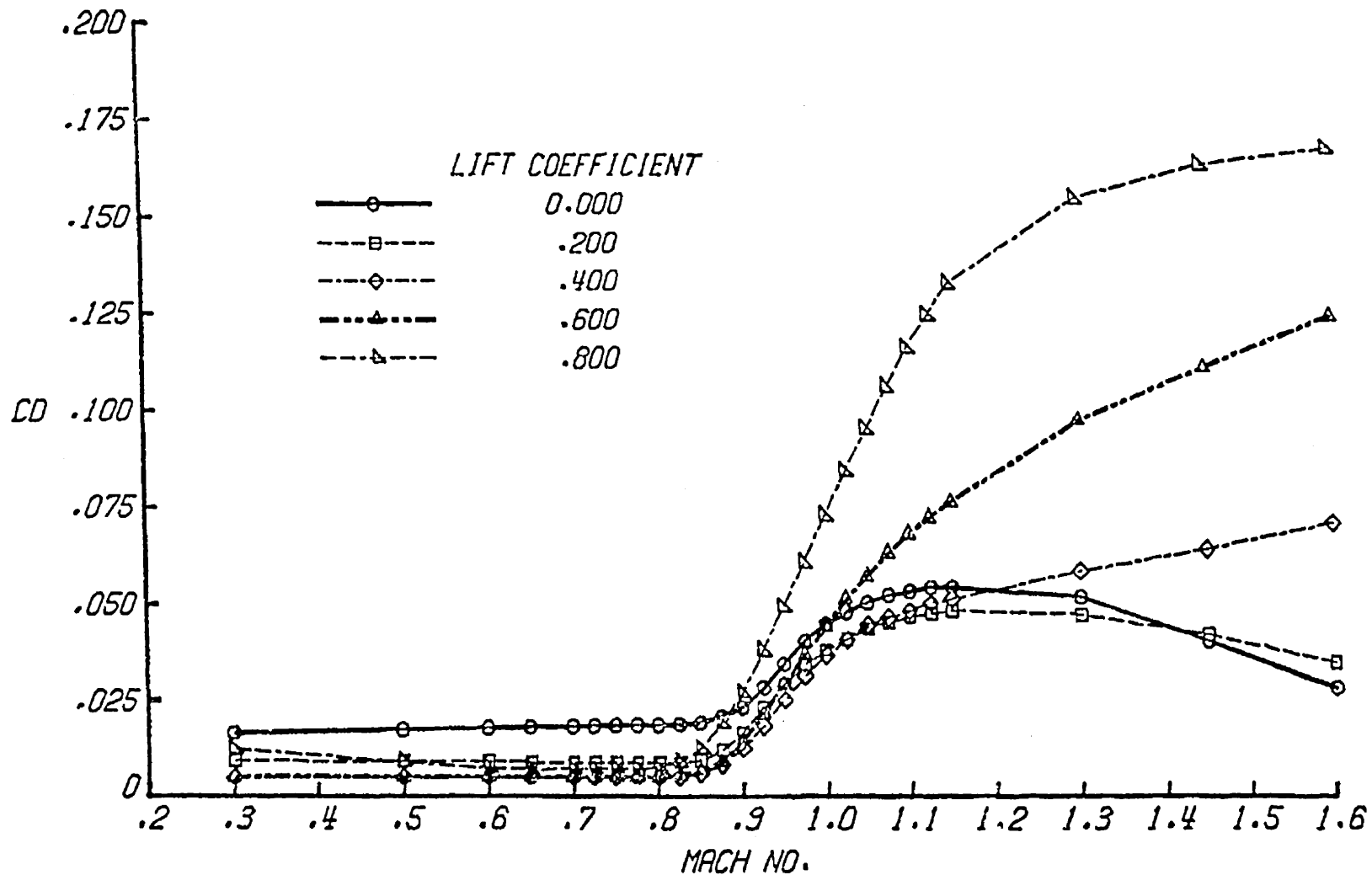


Figure 5.- Data points in drag coefficient table for 16-504, revised program.

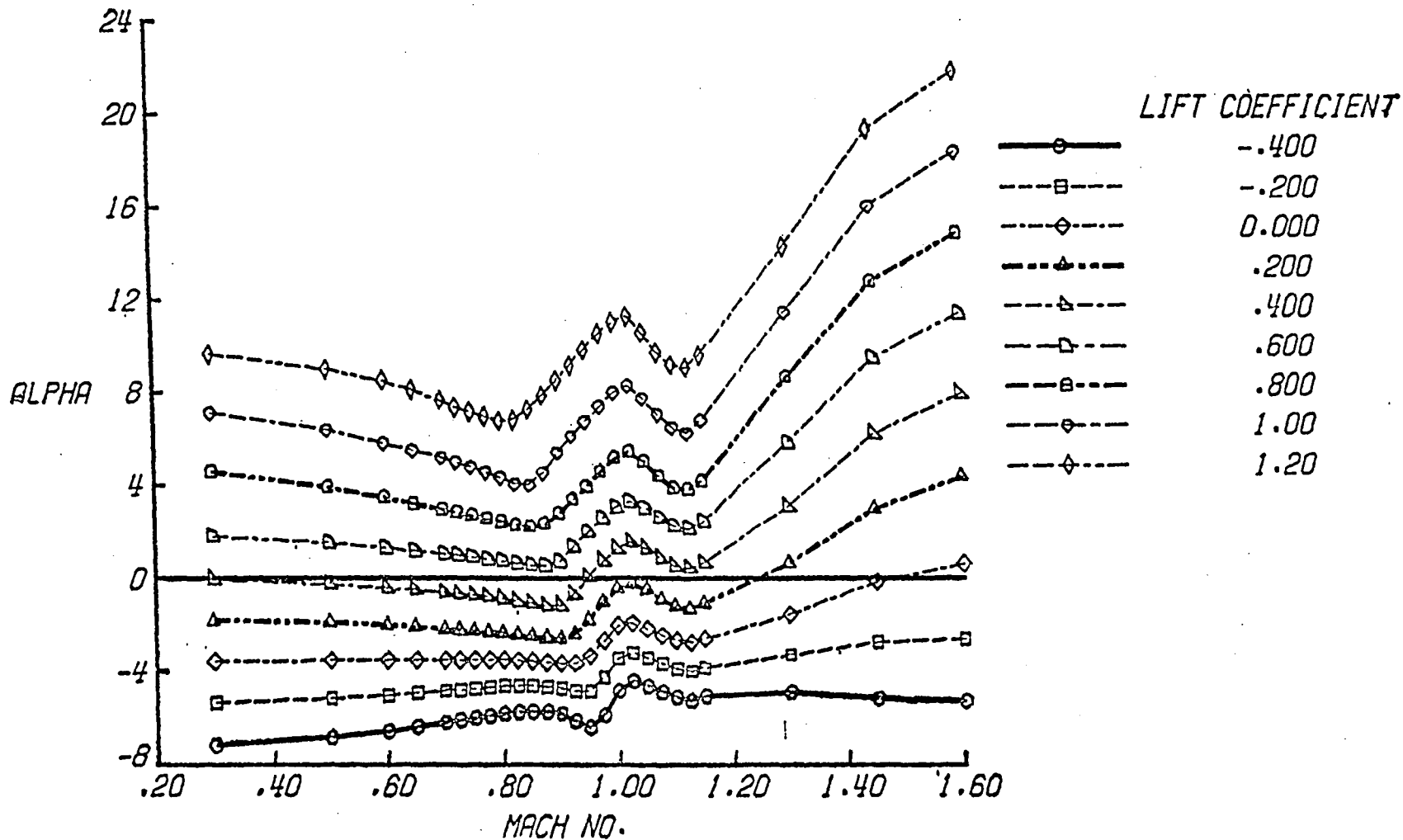


Figure 6.- Data points in angle of attack table for 16-504, revised program.

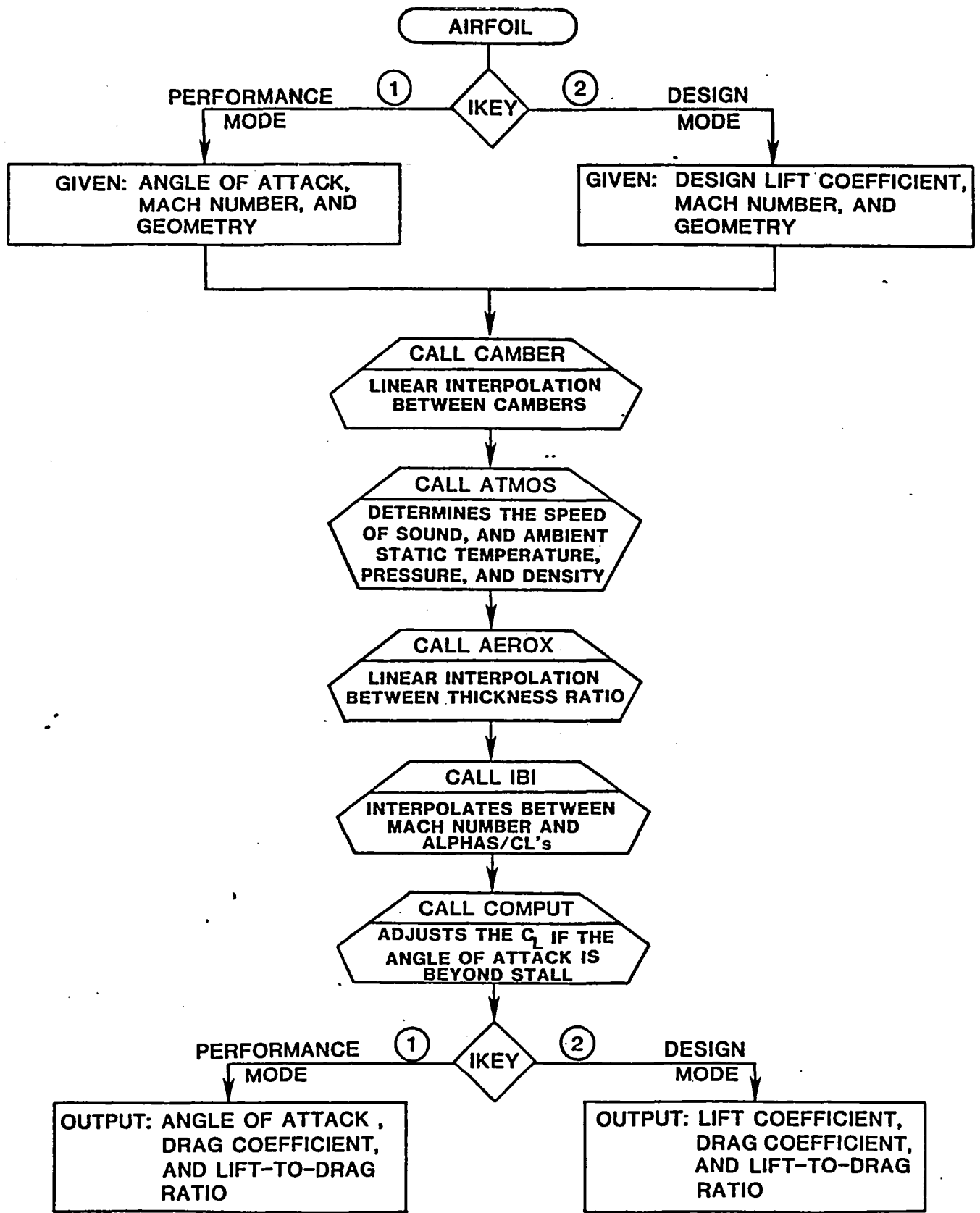


Figure 7. - Program Flowchart

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