DEPARTMENT OF ENERGY,MINES AND RESOURCES
MARINE SCIENCES BRANCH

MINISTÈRE DE L'ÉNERGIE DE MINES ET DES RESSOURCES
DIRECTION DES SCIENCES DE LA MER

ATLANTIC OCEANOGRAPHIC LABORATORY
BEDFORD INSTITUTE

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INSTITUT de BEDFORD

Dartmouth, Nova Scotia
Canada

BATHYSONDE CALIBRATION PROGRAMS

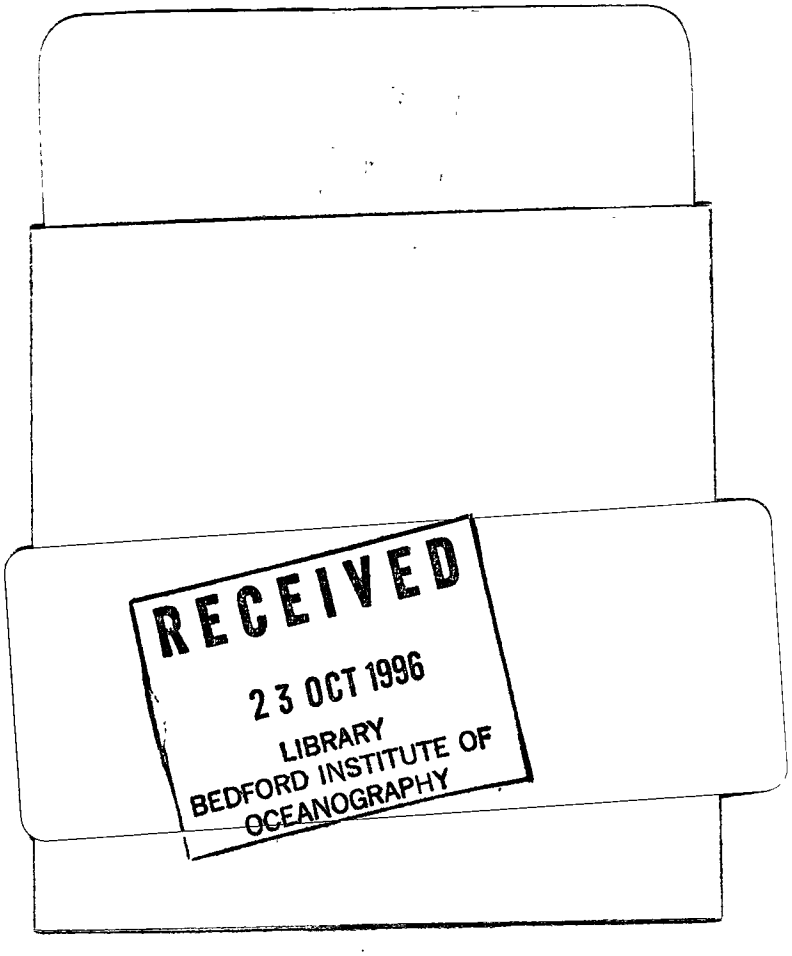
by

K.S. BUDLONG

B.I. COMPUTER NOTE 69-5-C

JULY 1969

PROGRAMMED BY
THE CANADIAN COMMITTEE OF OCEANOGRAPHY



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INTRODUCTION

This computer note describes the programs referred to by Mr. B.D. Carson in the calibration section of his internal note 1969-29-I "Electronic Salinity Temperature Depth Recording".

The three programs are basically similar, with variations to account for different data and output formats. All use the same modified Gauss elimination curve fitting subroutine.

INPUT

The input in each case consists of data points for ten ranges of the variable vs frequency.

(a) Temperature

10 sets of the following type:

1. A card read under I2 giving the number of data cards to be expected for the particular range.
2. As many data cards as predicted by 1, read under

F5.2, 1X, F4.0

(temp ^{o}C) (frequency cps)

(b) Conductance

1. As for temperature.
2. Data cards, read under

F8.1 F4.0

(resistance ohms) (frequency cps)

Note that the data cards have resistance-frequency pairs, not conductance-frequency pairs.

(c) Conductivity

exactly as for conductance with the addition of a form factor card, read under F5.3, preceding the first card of type 1.

OUTPUT

The printout consists of three parts.

(a) A listing of the data pairs, with corresponding conductance and conductivity where applicable.

(b) The coefficients of the fitted curves for the two cases of variable vs frequency and frequency vs variable for all ten ranges, with some measure of the goodness of fit.

(c) The tables of the variable vs frequency, as described in Mr. Carson's Note.

A sample output follows for each program.

OPERATING INSTRUCTIONS

These programs requires no sense switches.

Input is from cards.

Output is on the printer.

LISTINGS

```
      PROGRAM BATHTEMP
C     BATHYSONDE TEMPERATURE CALIBRATION  K.S.BUDLONG  MAY 1968
C     READ TEMPERATURE AND FREQUENCY
C     FIT POLYNOMIAL CURVES TO TEMPERATURE AND FREQUENCY DATA,
C     OBTAIN LIMITS OF TEMPERATURE FROM TEMPERATURE=F(FREQUENCY)
C     TABULATE FREQUENCIES FOR TEMPERATURES WITHIN LIMITS ABOVE
      DIMENSION LMHD(10)
      DIMENSION X(17),Y(17),A(16,16)
      COMMON    TT(10,17),FR(10,17),B(17),SUMR(17)
      COMMON AF(10,17),AT(10,17),FREQR(17)
      DIMENSION TL(10),TH(10),ITL(10),ITH(10)
      DIMENSION CLMHD(10),TTT(10),FF(10),N(10)
      NORD=3
      NORD1=NORD+1
      PRINT 10
   10 FORMAT (1H1,10X,14HTEMPERATURE,6X,9HFREQUENCY)
C  READ TEMPERATURE AND FREQUENCY
      DO 1 M=1,10
      PRINT 20, M
   20 FORMAT (1H , 6HRANGE , I2)
      READ 25,N(M)
   25 FORMAT(I2)
      NOFM=N(M)
      DO 2 J=1,NOFM
      READ 30, TEMP,FREQ
   30 FORMAT (F5.2,1X,F4.0)
      FR(M,J)=FREQ
      TT(M,J)=TEMP
    2 PRINT 50,TT(M,J),FR(M,J)
   50 FORMAT (1H ,13X,F5.2,12X,F5.0)
    1 CONTINUE
C  FIT CURVES TO TEMPERATURE AND FREQUENCY DATA
      DO 1800 IPASS=1,2
      IF (IPASS-1) 40,40,42
   40 PRINT 41
   41 FORMAT (1H1, 39H TEMPERATURE AS A FUNCTION OF FREQUENCY)
      GO TO 45
   42 PRINT 43
   43 FORMAT (1H1, 39H FREQUENCY AS A FUNCTION OF TEMPERATURE)
   45 DO 1800 MRANGE=1,10
      IF (IPASS-1) 46,46,48
   46 NOFMRNGE=N(MRANGE)
      DO 47 I=1,NOFMRNGE
      X(I) = FR(MRANGE,I)
   47 Y(I) = TT(MRANGE,I)
      GO TO 52
   48 NOFMRNGE=N(MRANGE)
      DO 49 I=1,NOFMRNGE
      X(I) = TT(MRANGE,I)
   49 Y(I) = FR(MRANGE,I)
   52 PRINT 53, MRANGE
   53 FORMAT (1H0,18HTEMPERATURE RANGE ,I2)
      NN=N(MRANGE)
      CALL POLYFIT (X,Y,NN,NORD,A)
      DO 180 I=1,NORD1
      J = I-1
      PRINT 175,J,A(I,NORD+2)
  175 FORMAT (1H , 5X,1HA,I1,2X,E14.7)
      IF (IPASS-1) 176,176,178
  176 AF(MRANGE,I) = A(I,NORD+2)
```

```
      GO TO 180
  178 AT(MRANGE,I)=A(I,NORD+2)
  180 CONTINUE
      PRINT 182
182   FORMAT(1H0,9X,6HDATA X,9X,6HDATA Y,7X,12HCALCULATED Y,4X,12HYCALC-
     1YDATA,3X,1HK)
      NOFMRNGE=N(MRANGE)
      DO 1800 K=1,NOFMRNGE
      SUMR(K)=0.
      IF(X(K))1818,1816,1818
1816  SUMR(K)=A(1,NORD+2)
      GO TO 1824
1818  DO 1820 I=1,NORD1
      J=I-1
      R(I)=A(I,NORD+2)*X(K)**J
 1820 SUMR(K)=SUMR(K)+R(I)
1824  DIFF=SUMR(K)-Y(K)
1800  PRINT 1830,X(K),Y(K),SUMR(K),DIFF,K
1830  FORMAT(1H ,2(5X,F10.2),2(5X,F11.3),5X,I2)
C  LIMITS OF TEMPERATURE FROM TEMPERATURE=F(FREQUENCY)
      PRINT 210
  210 FORMAT (1H1,10X,27HLOWER LIMIT OF TEMPERATURE ,3X,26HUPPER LIMIT O
     1F TEMPERATURE)
      FLOW=1690.
      FHIGH=3035.
      DO 240 MRANGE=1,10
      TL(MRANGE)=0.
      DO 220 I=1,NORD1
      J=I-1
      R(I)=AF(MRANGE,I)*FLOW**J
  220 TL(MRANGE)=TL(MRANGE)+R(I)
      TH(MRANGE)=0.
      DO 230 I=1,NORD1
      J=I-1
      R(I)=AF(MRANGE,I)*FHIGH**J
  230 TH(MRANGE)=TH(MRANGE)+R(I)
  240 PRINT 250,MRANGE,TL(MRANGE),TH(MRANGE)
  250 FORMAT (1H ,6HRANGE ,I2,12X,F7.2,20X,F7.2)
C  TABULATION OF FREQUENCIES FROM FREQUENCY=F(TEMPERATURE)
      DO 330 MRANGE=1,10
      ITL(MRANGE)=TL(MRANGE)
      ITH(MRANGE)=TH(MRANGE)
      IF (MRANGE-2) 252,252,254
  252 PRINT 265,MRANGE
  265 FORMAT (1H1,18HTEMPERATURE RANGE ,I2)
      GO TO 399
  254 IF (MRANGE-5) 258,252,256
  256 IF (MRANGE-8) 258,252,258
  258 PRINT 260
  260 FORMAT (1H0)
      PRINT 260
      PRINT 262,MRANGE
  262 FORMAT (1H0,18HTEMPERATURE RANGE ,I2)
  399 ITLO=ITL(MRANGE)
      ITHI=ITH(MRANGE)
      IF (MRANGE-2) 400,400,299
  400 DO 401 I=0,9
  401 LMHD(I+1)=I
      PRINT 402,(LMHD(I),I=1,10)
  402 FORMAT (1H0,19X,10(3X,1H-,1H.,I1,4X))
      PRINT 292
      DO 420 IT=ITLO,9
```

```
      DO 410 I=1,10
      IJ=I-1
      TTT(I)=IT-IJ/10.
      FF(I)=0.
      IF(TTT(I))406,404,406
404   FF(I)=AT(MRANGE,1)
      GO TO 410
406   DO 408 II=1,NORD1
      JJ=II-1
      B(II)=AT(MRANGE,II)*TTT(I)**JJ
      FF(I)=FF(I)+B(II)
  408 CONTINUE
  410 CONTINUE
      PRINT 310,IT,(FF(I),I=1,10)
  420 CONTINUE
      ITLO=0
  299 DO 270 I=0,9
  270 LMHD(I+1)=I
      PRINT 280,(LMHD(I),I=1,10)
  280 FORMAT (1H0,19X,10(4X,1H.,I1,4X))
      PRINT 282
  282 FORMAT (1H0)
      DO 320 IT=ITLO,ITHI
      DO 301 I=1,10
      IJ=I-1
      TTT(I)=IT+IJ/10.
      FF(I)=0.
      IF(TTT(I))296,294,296
294   FF(I)=AT(MRANGE,1)
      GO TO 301
296   DO 300 II=1,NORD1
      JJ=II-1
      B(II)=AT(MRANGE,II)*TTT(I)**JJ
      FF(I)=FF(I)+B(II)
  300 CONTINUE
  301 CONTINUE
      PRINT 310,IT,(FF(I),I=1,10)
  310 FORMAT (1H ,8X,I2,10X,9(3X,F5.0,2X),3X,F5.0,1X)
  320 CONTINUE
  330 CONTINUE
      END
```

PROGRAM VARIABLES

00363	A	01610	I	01433	ITL	01606	MRANGE	01601	TEMP
01457	CLMHD	01642	II	01632	ITLO	01553	N	01407	TH
01616	DIFF	01637	IJ	01600	J	01611	NN	01363	TL
01527	FF	01605	IPASS	01643	JJ	01576	NCFM	01503	TTT
01626	FHIGH	01636	IT	01613	K	01607	NOFMRNGE	00257	X
01622	FLOW	01445	ITH	00245	LMHD	01565	NORD	00321	Y
01603	FREQ	01633	ITHI	01573	M	01567	NORD1		

COMMON VARIABLES

01354	AF	01250	B	02624	FREQR	01312	SUMB	00000	TT
02100	AT	00524	FR						

STATEMENT NUMBERS

1	02072	46	02131	180	02257	258	02604	300	03131	406	02725
2	02051	47	02142	182	00100	260	00200	301	03141	408	02745
10	00000	48	02156	210	00134	262	00202	310	00233	410	02755
20	00012	49	02167	220	02451	265	00170	320	03173	420	03007
25	00017	50	00024	230	02505	270	03022	330	03202	1800	02352
30	00020	52	02202	240	02521	280	00222	399	02622	1816	02307
40	02111	53	00062	250	00157	282	00231	400	02634	1818	02314
41	00032	175	00072	252	02563	294	03104	401	02636	1820	02332
42	02116	176	02246	254	02572	296	03111	402	00212	1824	02346
43	00046	178	02253	256	02577	299	03020	404	02720	1830	00123
45	02122										

RATHTEMP P 03222 C 02666 D 00000

```
      SUBROUTINE POLYFIT (X, Y, N, NORD, A)
C     K.S. RUDLONG      JUNE 1967
C PURPOSE
C     POLYNOMIAL CURVE FITTING SUBROUTINE
C DESCRIPTION OF PARAMETERS
C     X(I) ITH VALUE OF INDEPENDENT VARIABLE
C     Y(I) ITH VALUE OF DEPENDENT VARIABLE
C     A(I,J) MATRIX OF COEFFICIENTS OF NORMAL EQUATIONS
C     N NUMBER OF DATA POINTS
C     NORD ORDER OF POLYNOMIAL DESIRED
C     SUMX(J) SUM (I=1,N) X(I)**(J-1)
C     SUMY(J) SUM (I=1,N) Y(I)*X(I)**(J-1)
C REMARKS
C     FOR A, ALLOW A 2 DIMENSIONAL ARRAY (NORD+2) BY (NORD+2)
C     TO PRINT POLYNOMIAL COEFFICIENTS, PRINT A(I,NORD+2) FORI=1,NORD+1
C     IF ORDER TO BE FITTED IS GREATER THAN 15, THE DIMENSION STATEMENT
C       WITHIN THE SUBROUTINE POLYFIT MUST BE MODIFIED TO
C       SUMX(2NORD+1), SUMY(NORD)
C METHOD
C     MODIFIED GAUSS ELIMINATION
      DIMENSION X(100),Y(100),A(16,16),SUMX(31),SUMY(15)
      L=NORD+1
      KK=L+1
      DO 101 I=1,L
      DO 100 J=1,L
      IK=J-1+I
      SUMX(IK)=0
      SUMY(I)=0
      DO 90 K=1,N
      IF(X(K))70,80,70
70    SUMX(IK)=SUMX(IK)+X(K)**(IK-1)
      SUMY(I)=SUMY(I)+Y(K)*X(K)**(I-1)
      GO TO 90
80    SUMX(IK)=SUMX(IK)
      SUMY(I)=SUMY(I)
90    CONTINUE
100   A(I,J)=SUMX(IK)
101   A(I,KK)=SUMY(I)
      DO 140 I=1,L
      A(KK,I)=-1
      KKK=I+1
      DO 110 J=KKK,KK
110   A(KK,J)=0
      C=1./A(I,I)
      DO 120 II=2,KK
      DO 120 J=KKK,KK
120   A(II,J)=A(II,J)-A(I,J)*A(II,I)*C
      DO 140 II=1,L
      DO 140 J=KKK,KK
140   A(II,J)=A(II+1,J)
      RETURN
      END
```

```
        PROGRAM VARIABLES

      00150     C              00141     IK             00143     K              00145     KKK            00000     SUMX
      00137     I              00140     J              00136     KK             00134     L              00076     SUMY
      00152     II

        STATEMENT NUMBERS

         70   00335          90   00370          101   00413          110   00441          120   00464          140   00516
         80   00362         100   00400
   POLYFIT     P   00630  C    00000 D     00000
LOAD,56
RUN
```

```
SURP
 60405  Q8QERROR     60717  FIXF         60766  FLOATF       61015  POWRF        61365  XTOI         61613  QIOADRI
 61774  CIO.MSIO     62463  FORMAT       63033  CONTROL      63670  Q8QOUTTB     63671  BCDOUT       65572  BCDINP
 66813  POLYFIT      67443  BATHTEMP

ENTR
 60717  IFIX         60717  XFIXF        60766  FLOAT        61015  QIQEXRR      61015  POWRF        60766  FLOATF
 61365  XTOI         60717  FIXF         61736  QIQSTRX      61713  QIQSTXR      61656  QIQSBXR      61631  QIQADXR
 61707  QIQSBRX      61667  QIQADRX      61661  QIQMUIR      61656  QIQSBIR      61631  QIQADIR      61652  QIQDVRI
 61646  QIQMURI      61642  QIQSBRI      62442  Q8QFOTAB     62231  Q8QEOFRC     62417  SSH.CIT      63152  Q8QARRAY
 63132  Q8QIOTAB     63062  Q8QEXITS     63033  Q8QENTRY     63670  Q8QOUTTB     63614  PWRTBL       63772  Q8QLGOTC
 62463  Q8QIFRMT     62514  QFQFORMT     63106  Q8QIOSET     63066  Q8QSENSF     63340  Q8QEDITS     60405  Q8QERROR
 61774  CIO.MSIO     63612  PWRTBLO      53210  Q8QIOERR     65671  Q8QLGINC     61713  QIQSTIR      61613  QIQADRI
 61664  QIQDVIR      61724  QIQSTRI      61365  CIQEXRI      64005  Q8QLGOTR     65703  Q8QLGINR     66263  Q8QENGIN
 65676  Q8QLGINI     65572  Q8QINGIN     63777  Q8QLGOTI     64452  Q8QENGOT     63671  Q8QINGOT     67107  POLYFIT
 71437  BATHTEMP     01267  SFL          06711  FDPBOXS      10241  UST          11271  START2       06637  SETCLOCK
 04234  RSTOREQ      04223  RSTORE       01477  RPT          10727  RIO          10346  RHT          10564  RDCKFI
 03075  MSIC.SU      03031  MSIO.SP      04263  MSIOFLG      02661  MSIO         07640  MIFORADD     07613  MIBUF
 07637  MIRKADD      10546  MEMORY       10426  LOC5         12361  LOADER       11004  LENGRDT      10306  EST
 06562  EINT.        06546  DINT.        10302  CST          10427  CIT.RTM      10461  CIT          05637  CIC3.01
 05766  CIC3.2       00016  CIO          10366  RRHT         10720  BNJ.         10533  BKRUNFLG     06710  BKEXIT
 10200  AET          10507  ACCOUNTS     06711  ABNORMAL

COMM
 11560   14445

DATA
    NONE

EXTA
    NONE

(MEMORY) =   14446     (MEMORYE) =   60404
```

	TEMPERATURE	FREQUENCY
RANGE 1		
	-2.00	1714
	0	1779
	5.00	1941
	10.00	2104
	15.00	2269
	20.00	2439
RANGE 2		
	-1.50	1739
	-1.00	1863
	-0.50	1989
	0	2117
	.50	2249
	1.00	2389
RANGE 3		
	2.50	1797
	3.00	1914
	3.50	2035
	4.00	2161
	4.50	2293
	5.00	2432
RANGE 4		
	6.00	1720
	6.50	1835
	7.00	1953
	7.50	2073
	8.00	2193
	8.50	2328
RANGE 5		
	10.00	1746
	10.50	1858
	11.00	1972
	11.50	2091
	12.00	2216
	12.50	2346
RANGE 6		
	14.00	1756
	14.50	1865
	15.00	1977
	15.50	2095
	16.00	2218
	16.50	2346
RANGE 7		
	18.00	1749
	18.50	1857
	19.00	1968
	19.50	2084
	20.00	2205
	20.50	2332
RANGE 8		
	22.00	1740
	22.50	1830
	23.00	1945
	23.50	2056
	24.00	2174
	24.50	2298
RANGE 9		
	26.00	1699
	26.50	1795
	27.00	1896
	27.50	2003

	28.00	2116
	28.50	2235
RANGE 10		
	30.50	1752
	31.00	1845
	31.50	1946
	32.00	2055
	32.50	2170
	33.00	2291

TEMPERATURE AS A FUNCTION OF FREQUENCY

TEMPERATURE RANGE 1

A0 -4.1223670E 01
A1 8.9868937E-03
A2 1.1656893E-05
A3 -2.0703218E-09

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1714.00	-2.00	-1.999	.001	1
1779.00	0	-0.000	-0.000	2
1841.00	5.00	4.997	-0.003	3
2104.00	10.00	10.005	.005	4
2269.00	15.00	14.997	-0.003	5
2439.00	20.00	20.001	.001	6

TEMPERATURE RANGE 2

A0 -5.7241623E 00
A1 -6.5360421E-04
A2 2.6316378E-06
A3 -4.9385624E-10

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1739.00	-1.50	-1.500	.000	1
1863.00	-1.00	-1.001	-0.001	2
1989.00	-0.50	-0.499	.001	3
2117.00	0	.001	.001	4
2249.00	.50	.499	-0.001	5
2389.00	1.00	1.000	.000	6

TEMPERATURE RANGE 3

A0 -6.6773969E 00
A1 5.5742393E-03
A2 -9.6650737E-08
A3 -9.0902011E-11

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1797.00	2.50	2.500	-0.000	1
1914.00	3.00	3.000	.000	2
2035.00	3.50	3.500	-0.000	3
2161.00	4.00	4.000	-0.000	4
2293.00	4.50	4.500	.000	5
2432.00	5.00	5.000	-0.000	6

TEMPERATURE RANGE 4

A0 5.0382529E 00
A1 -6.1807305E-03
A2 5.6675068E-06
A3 -1.0232094E-09

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1720.00	6.00	6.002	.002	1
1835.00	6.50	6.495	-0.005	2
1953.00	7.00	7.001	.001	3
2073.00	7.50	7.507	.007	4
2193.00	8.00	7.993	-0.007	5
2328.00	8.50	8.502	.002	6

TEMPERATURE RANGE 5

A0 1.2723827E 00
A1 4.9351869E-03
A2 3.2664300E-07

A3 -1.6681229E-10

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1746.00	10.00	9.999	-0.001	1
1858.00	10.50	10.502	.002	2
1972.00	11.00	10.999	-0.001	3
2091.00	11.50	11.499	-0.001	4
2216.00	12.00	12.002	.002	5
2346.00	12.50	12.499	-0.001	6

TEMPERATURE RANGE 6

A0 2.5818994E 00
A1 8.6771298E-03
A2 -1.4132207E-06
A3 1.0688855E-10

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1756.00	14.00	13.999	-0.001	1
1865.00	14.50	14.502	.002	2
1977.00	15.00	14.998	-0.002	3
2095.00	15.50	15.500	-0.000	4
2218.00	16.00	16.001	.001	5
2346.00	16.50	16.500	-0.000	6

TEMPERATURE RANGE 7

A0 8.2553946E 00
A1 6.1090134E-03
A2 -1.2536686E-07
A3 -1.0408391E-10

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1749.00	18.00	18.000	-0.000	1
1857.00	18.50	18.501	.001	2
1968.00	19.00	18.999	-0.001	3
2084.00	19.50	19.500	.000	4
2205.00	20.00	20.000	.000	5
2332.00	20.50	20.500	-0.000	6

TEMPERATURE RANGE 8

A0 -9.1709083E 00
A1 3.7457735E-02
A2 -1.5300305E-05
A3 2.3398291E-09

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1740.00	22.00	22.009	.009	1
1830.00	22.50	22.477	-0.023	2
1945.00	23.00	23.019	.019	3
2056.00	23.50	23.501	.001	4
2174.00	24.00	23.990	-0.010	5
2298.00	24.50	24.504	.004	6

TEMPERATURE RANGE 9

A0 1.0403518E 01
A1 1.4234006E-02
A2 -3.7005343E-06
A3 4.2710946E-10

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1699.00	26.00	26.000	-0.000	1
1795.00	26.50	26.501	.001	2
1896.00	27.00	27.000	-0.000	3

2003.00	27.50	27.500	-0.000	4
2116.00	28.00	28.000	.000	5
2235.00	28.50	28.500	-0.000	6

TEMPERATURE RANGE 10

A0	5.5729867E 00
A1	2.7122844E-02
A2	-9.7875435E-06
A3	1.3855322E-09

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
1752.00	30.50	30.500	.000	1
1845.00	31.00	30.999	-0.001	2
1946.00	31.50	31.500	-0.000	3
2055.00	32.00	32.001	.001	4
2170.00	32.50	32.499	-0.001	5
2291.00	33.00	33.000	.000	6

FREQUENCY AS A FUNCTION OF TEMPERATURE

TEMPERATURE RANGE 1

A0	1.7790513E 03
A1	3.2473183E 01
A2	-2.5426937E-02
A3	2.5778432E-03

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
-2.00	1714.00	1713.983	-0.017	1
0	1779.00	1779.051	.051	2
5.00	1941.00	1941.104	.104	3
10.00	2104.00	2103.818	-0.182	4
15.00	2269.00	2269.128	.128	5
20.00	2439.00	2438.967	-0.033	6

TEMPERATURE RANGE 2

A0	2.1164706E 03
A1	2.5992837E 02
A2	9.6974791E 00
A3	2.8235296E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
-1.50	1739.00	1738.874	-0.126	1
-1.00	1863.00	1863.420	.420	2
-0.50	1989.00	1988.580	-0.420	3
0	2117.00	2116.471	-0.529	4
.50	2249.00	2249.210	.210	5
1.00	2389.00	2388.916	-0.084	6

TEMPERATURE RANGE 3

A0	1.2369986E 03
A1	2.2566788E 02
A2	-4.0003124E 00
A3	1.3333628E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
2.50	1797.00	1797.000	-0.000	1
3.00	1914.00	1914.000	.000	2
3.50	2035.00	2035.000	.000	3
4.00	2161.00	2161.000	-0.000	4
4.50	2293.00	2293.000	-0.000	5
5.00	2432.00	2432.000	.000	6

TEMPERATURE RANGE 4

A0	-8.2512913E 02
A1	7.5586999E 02
A2	-7.9297421E 01
A3	4.0005377E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
6.00	1720.00	1719.500	-0.500	1
6.50	1835.00	1836.357	1.357	2
7.00	1953.00	1952.572	-0.428	3
7.50	2073.00	2071.143	-1.857	4
8.00	2193.00	2195.071	2.071	5
8.50	2328.00	2327.357	-0.643	6

TEMPERATURE RANGE 5

A0	-1.3355128E 03
A1	5.2963719E 02
A2	-3.5502359E 01

A3 1.3355188E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
10.00	1746.00	1746.142	.142	1
10.50	1858.00	1857.573	-0.427	2
11.00	1972.00	1972.286	.286	3
11.50	2091.00	2091.285	.285	4
12.00	2216.00	2215.570	-0.430	5
12.50	2346.00	2346.144	.144	6

TEMPERATURE RANGE 6

A0 -1.0985841E 03
A1 2.9763444E 02
A2 -1.4024712E 01
A3 5.2356798E-01

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
14.00	1756.00	1756.125	.125	1
14.50	1865.00	1864.582	-0.418	2
15.00	1977.00	1977.414	.414	3
15.50	2095.00	2095.014	.014	4
16.00	2218.00	2217.775	-0.225	5
16.50	2346.00	2346.089	.089	6

TEMPERATURE RANGE 7

A0 -7.2653937E 03
A1 1.1708045E 03
A2 -5.8444210E 01
A3 1.1789880E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
18.00	1749.00	1749.022	.022	1
18.50	1857.00	1856.869	-0.131	2
19.00	1968.00	1968.211	.211	3
19.50	2084.00	2083.932	-0.068	4
20.00	2205.00	2204.917	-0.083	5
20.50	2332.00	2332.049	.049	6

TEMPERATURE RANGE 8

A0 7.0664075E 04
A1 -9.0208023E 03
A2 3.8498810E 02
A3 -5.3328842E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
22.00	1740.00	1739.074	-0.926	1
22.50	1830.00	1833.643	3.643	2
23.00	1945.00	1940.712	-4.288	3
23.50	2056.00	2056.283	.283	4
24.00	2174.00	2176.356	2.356	5
24.50	2298.00	2296.932	-1.068	6

TEMPERATURE RANGE 9

A0 -9.3849926E 03
A1 1.1337719E 03
A2 -4.5416154E 01
A3 6.9794932E-01

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
26.00	1699.00	1698.915	-0.085	1
26.50	1795.00	1795.045	.045	2
27.00	1896.00	1896.210	.210	3

27.50	2003.00	2002.935	-0.065	4
28.00	2116.00	2115.781	-0.259	5
28.50	2235.00	2235.153	.153	6

TEMPERATURE RANGE 10

A0	3.3757792E 05
A1	-3.1720408E 04
A2	9.9228117E 02
A3	-1.0269907E 01

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
30.50	1752.00	1755.451	3.451	1
31.00	1845.00	1840.145	-4.855	2
31.50	1946.00	1943.410	-2.590	3
32.00	2055.00	2057.544	2.544	4
32.50	2170.00	2174.843	4.843	5
33.00	2291.00	2287.606	-3.394	6

	LOWER LIMIT OF TEMPERATURE	UPPER LIMIT OF TEMPERATURE
RANGE 1	-2.74	35.55
RANGE 2	-1.70	2.73
RANGE 3	2.03	6.81
RANGE 4	5.87	9.94
RANGE 5	3.74	14.61
RANGE 6	13.69	18.85
RANGE 7	17.72	22.73
RANGE 8	21.73	28.99
RANGE 9	25.95	31.46
RANGE 10	30.14	36.47

TEMPERATURE RANGE 1

	-.0	-.1	-.2	-.3	-.4	-.5	-.6	-.7	-.8	-.9
-2	1714	1711	1707	1704	1701	1698	1694	1691	1688	1685
-1	1747	1743	1740	1737	1734	1730	1727	1724	1721	1717
0	1779	1776	1773	1769	1766	1763	1760	1756	1753	1750
	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	1779	1782	1786	1789	1792	1795	1799	1802	1805	1808
1	1812	1815	1818	1821	1824	1828	1831	1834	1837	1841
2	1844	1847	1850	1854	1857	1860	1863	1867	1870	1873
3	1876	1880	1883	1886	1889	1893	1896	1899	1902	1905
4	1909	1912	1915	1918	1922	1925	1928	1931	1935	1938
5	1941	1944	1948	1951	1954	1957	1961	1964	1967	1970
6	1974	1977	1980	1983	1987	1990	1993	1996	2000	2003
7	2006	2009	2013	2016	2019	2022	2026	2029	2032	2035
8	2039	2042	2045	2048	2052	2055	2058	2061	2065	2068
9	2071	2074	2078	2081	2084	2087	2091	2094	2097	2101
10	2104	2107	2110	2114	2117	2120	2123	2127	2130	2133
11	2137	2140	2143	2146	2150	2153	2156	2160	2163	2166
12	2170	2173	2176	2179	2183	2186	2189	2193	2196	2199
13	2203	2206	2209	2213	2216	2219	2222	2226	2229	2232
14	2236	2239	2242	2246	2249	2252	2256	2259	2262	2266
15	2269	2272	2276	2279	2283	2286	2289	2293	2296	2299
16	2303	2306	2309	2313	2316	2320	2323	2326	2330	2333
17	2336	2340	2343	2347	2350	2353	2357	2360	2364	2367
18	2370	2374	2377	2381	2384	2387	2391	2394	2398	2401
19	2405	2408	2411	2415	2418	2422	2425	2429	2432	2436
20	2439	2442	2446	2449	2453	2456	2460	2463	2467	2470
21	2474	2477	2481	2484	2488	2491	2495	2498	2502	2505
22	2509	2512	2516	2519	2523	2526	2530	2533	2537	2540
23	2544	2547	2551	2554	2558	2562	2565	2569	2572	2576
24	2579	2583	2587	2590	2594	2597	2601	2604	2608	2612
25	2615	2619	2622	2626	2630	2633	2637	2641	2644	2648
26	2651	2655	2659	2662	2666	2670	2673	2677	2681	2684
27	2688	2692	2695	2699	2703	2706	2710	2714	2718	2721
28	2725	2729	2732	2736	2740	2744	2747	2751	2755	2759
29	2762	2766	2770	2774	2777	2781	2785	2789	2792	2796
30	2800	2804	2808	2811	2815	2819	2823	2827	2830	2834
31	2838	2842	2846	2850	2853	2857	2861	2865	2869	2873
32	2877	2881	2884	2888	2892	2896	2900	2904	2908	2912
33	2916	2920	2923	2927	2931	2935	2939	2943	2947	2951
34	2955	2959	2963	2967	2971	2975	2979	2983	2987	2991
35	2995	2999	3003	3007	3011	3015	3019	3023	3027	3031

TEMPERATURE RANGE 2

	-.0	-.1	-.2	-.3	-.4	-.5	-.6	-.7	-.8	-.9
-1	1863	1839	1814	1789	1764	1739	1714	1689	1664	1638
0	2116	2091	2065	2039	2014	1989	1963	1938	1913	1888

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	2116	2143	2169	2195	2222	2249	2277	2304	2332	2360
1	2389	2418	2447	2477	2507	2538	2569	2600	2632	2665
2	2698	2731	2765	2800	2835	2871	2907	2945	2982	3021

TEMPERATURE RANGE 3

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
2	1683	1706	1728	1751	1774	1797	1820	1843	1867	1890
3	1914	1938	1962	1986	2010	2035	2060	2085	2110	2135
4	2161	2187	2213	2239	2266	2293	2320	2348	2375	2404
5	2432	2461	2490	2519	2549	2579	2609	2640	2671	2703
6	2735	2767	2800	2833	2867	2901	2935	2970	3006	3042

TEMPERATURE RANGE 4

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
5	1472	1498	1524	1549	1574	1599	1624	1648	1672	1696
6	1719	1743	1767	1790	1813	1836	1860	1883	1906	1929
7	1953	1976	2000	2023	2047	2071	2095	2120	2145	2170
8	2195	2221	2247	2273	2300	2327	2355	2383	2412	2441
9	2471	2501	2532	2564	2596	2629	2663	2697	2732	2768

TEMPERATURE RANGE 5

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
9	1529	1551	1572	1594	1615	1637	1659	1680	1702	1724
10	1746	1768	1790	1813	1835	1858	1880	1903	1926	1949
11	1972	1996	2019	2043	2067	2091	2116	2140	2165	2190
12	2216	2241	2267	2293	2319	2346	2373	2400	2428	2456
13	2484	2513	2541	2571	2600	2630	2660	2691	2722	2754
14	2786	2818	2851	2884	2917	2951	2986	3021	3056	3092

TEMPERATURE RANGE 6

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
13	1551	1571	1591	1611	1631	1652	1672	1693	1714	1735
14	1756	1777	1799	1821	1843	1865	1887	1909	1932	1954
15	1977	2001	2024	2047	2071	2095	2119	2143	2168	2193
16	2218	2243	2268	2294	2320	2346	2372	2399	2426	2453
17	2480	2508	2536	2564	2592	2621	2650	2679	2709	2738
18	2768	2799	2829	2860	2891	2923	2955	2987	3019	3052

TEMPERATURE RANGE 7

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
17	1540	1561	1582	1602	1623	1644	1665	1686	1707	1728
18	1749	1770	1792	1813	1835	1857	1879	1901	1923	1946
19	1968	1991	2014	2037	2060	2084	2108	2132	2156	2180
20	2205	2230	2255	2280	2306	2332	2358	2385	2412	2439
21	2466	2494	2522	2550	2579	2608	2638	2668	2698	2728
22	2759	2790	2822	2854	2887	2920	2953	2987	3021	3056

TEMPERATURE RANGE 8

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
21	1603	1613	1624	1635	1648	1661	1675	1690	1706	1722
22	1739	1757	1775	1794	1814	1834	1854	1875	1897	1918
23	1941	1963	1986	2009	2033	2056	2080	2104	2128	2152
24	2176	2201	2225	2249	2273	2297	2321	2344	2368	2391
25	2414	2437	2459	2481	2502	2524	2544	2564	2584	2603
26	2622	2640	2657	2673	2689	2704	2719	2732	2745	2757
27	2767	2777	2786	2794	2801	2807	2812	2815	2818	2819
28	2819	2818	2815	2811	2806	2800	2792	2782	2771	2759

TEMPERATURE RANGE 9

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
25	1520	1537	1554	1572	1589	1607	1625	1643	1662	1680
26	1699	1718	1737	1756	1775	1795	1815	1835	1855	1876
27	1896	1917	1938	1960	1981	2003	2025	2047	2070	2093
28	2116	2139	2163	2187	2211	2235	2260	2285	2310	2336
29	2362	2388	2414	2441	2468	2496	2524	2552	2580	2609
30	2638	2668	2698	2728	2758	2789	2821	2852	2884	2917
31	2950	2983	3016	3050	3085	3120	3155	3191	3227	3263

TEMPERATURE RANGE 10

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
30	1697	1706	1717	1728	1741	1755	1771	1787	1804	1821
31	1840	1860	1880	1900	1922	1943	1966	1988	2011	2034
32	2058	2081	2105	2128	2151	2175	2198	2221	2244	2266
33	2288	2309	2330	2350	2369	2388	2406	2423	2439	2455
34	2469	2482	2494	2504	2514	2522	2528	2533	2537	2539
35	2539	2538	2535	2530	2523	2514	2503	2490	2475	2457
36	2438	2416	2391	2364	2335	2303	2268	2231	2191	2148

```
      PROGRAM CONCECAL
C     BATHYSONDE CONDUCTANCE PROGRAM
C     READ RESISTANCE AND FREQUENCY
C     OBTAIN CONDUCTANCE FROM RESISTANCE,
C     FIT POLYNOMIAL CURVES TO CONDUCTANCE AND FREQUENCY DATA,
C     OBTAIN LIMITS OF CONDUCTANCE FROM CONDUCTANCE=F(FREQUENCY)
C     TABULATE FREQUENCIES FOR CONDUCTANCES WITHIN LIMITS ABOVE
      DIMENSION LMHD(10)
      DIMENSION X(21),Y(21),A(16,16)
      DIMENSION CL(10),CH(10),ICL(10),ICH(10)
      DIMENSION CLMHD(10),CCC(10),FF(10),N(10)
      COMMON CC(10,21),FR(10,21),B(21),SUMB(21)
      COMMON AF(10,21),AC(10,21),FREQR(21)
      NORD=6
      NORD1=NORD+1
      PRINT 10
   10 FORMAT (1H1,10X,11H RESISTANCE,5X,11HCONDUCTANCE,6X,9HFREQUENCY)
      DO 1 M=1,10
      PRINT 20, M
   20 FORMAT (1H , 6HRANGE , I2)
C  READ RESISTANCE AND FREQUENCY
      READ 25,N(M)
25    FORMAT (I2)
      NOFM=N(M)
      DO 2 J=1,NOFM
      READ 30, RSISTNCE, FREQ
   30 FORMAT (F8.1,F4.0)
      FR(M,J)=FREQ
C  OBTAIN CONDUCTANCE FROM RESISTANCE
      CNDCTNCE=1000./RSISTNCE
      CC(M,J)=CNDCTNCE
    2 PRINT 50,RSISTNCE,CC(M,J),FR(M,J)
   50 FORMAT (1H ,13X,F5.1,10X,F7.2,9X,F5.0)
    1 CONTINUE
C  FIT CURVES TO CONDUCTANCE AND FREQUENCY DATA
      DO 1800 IPASS=1,2
      IF (IPASS-1) 40,40,42
   40 PRINT 41
   41 FORMAT (1H1, 39H CONDUCTANCE AS A FUNCTION OF FREQUENCY)
      GO TO 45
   42 PRINT 43
   43 FORMAT (1H1, 39H FREQUENCY AS A FUNCTION OF CONDUCTANCE)
   45 DO 1800 MRANGE=1,10
      IF (IPASS-1) 46,46,48
46    NOFMRNGE=N(MRANGE)
      DO 47 I=1,NOFMRNGE
      X(I) = FR(MRANGE,I)
   47 Y(I) = CC(MRANGE,I)
      GO TO 52
48    NOFMRNGE=N(MRANGE)
      DO 49 I=1,NOFMRNGE
      X(I) = CC(MRANGE,I)
   49 Y(I) = FR(MRANGE,I)
   52 PRINT 53, MRANGE
   53 FORMAT (1H0,18HCONDUCTANCE RANGE ,I2)
      NN=N(MRANGE)
      CALL POLYFIT (X,Y,NN,NORD,A)
      DO 180 I=1,NORD1
      J = I-1
      PRINT 175,J,A(I,NORD+2)
```

```
 175 FORMAT (1H ,5X,1HA,11, 5X,E14.7)
     IF (IPASS-1) 175,176,178
 176 AF(MRANGE,I) = A(I,NORD+2)
     GO TO 180
 178 AC(MRANGE,I)=A(I,NORD+2)
 180 CONTINUE
     PRINT 182
 182 FORMAT(1H0,9X,6HDATA X,9X,6HDATA Y,7X,12HCALCULATED Y,4X,12HYCALC-
    1YDATA,3X,1HK)
     NOFMRNGE=N(MRANGE)
     DO 1800 K=1,NOFMRNGE
     SUMR(K)=0.
     IF(X(K))1818,1818,1816
1816 SUMR(K)=A(1,NORD+2)
     GO TO 1824
1818 DO 1820 I=1,NORD1
     J=I-1
     R(I)=A(I,NORD+2)*X(K)**J
1820 SUMR(K)=SUMR(K)+R(I)
1824 DIFF=SUMR(K)-Y(K)
1800 PRINT 1830,X(K),Y(K),SUMR(K),DIFF,K
1830 FORMAT(1H ,2(5X,F10.2),2(5X,F11.3),5X,I2)
C  LIMITS OF CONDUCTANCE FROM CONDUCTANCE=F(FREQUENCY)
     PRINT 210
 210 FORMAT (1H1,10X,27HLOWER LIMIT OF CONDUCTANCE ,3X,26HUPPER LIMIT O
    1F CONDUCTANCE)
     FLOW=2560.
     FHIGH=4550.
     DO 240 MRANGE=1,10
     CL(MRANGE)=0.
     DO 220 I=1,NORD1
     J=I-1
     R(I)=AF(MRANGE,I)*FLOW**J
 220 CL(MRANGE)=CL(MRANGE)+R(I)
     CH(MRANGE)=0.
     DO 230 I=1,NORD1
     J=I-1
     R(I)=AF(MRANGE,I)*FHIGH**J
 230 CH(MRANGE)=CH(MRANGE)+R(I)
 240 PRINT 250,MRANGE,CL(MRANGE),CH(MRANGE)
 250 FORMAT (1H ,6HRANGE ,I2,12X,F7.2,20X,F7.2)
C  TABULATION OF FREQUENCIES FROM FREQUENCY=F(CONDUCTANCE)
     DO 330 MRANGE=1,10
     ICL(MRANGE)=CL(MRANGE)
     ICH(MRANGE)=CH(MRANGE)
     IF (MRANGE-2) 252,252,254
 252 PRINT 265,MRANGE
 265 FORMAT(1HI,18HCONDUCTANCE RANGE ,I2)
     GO TO 299
 254 IF (MRANGE-5) 258,252,256
 256 IF (MRANGE-8) 258,252,258
 258 PRINT 260
 260 FORMAT (1H0)
     PRINT 261
 261 FORMAT (1HC)
     PRINT 262,MRANGE
 262 FORMAT(1H0,18HCONDUCTANCE RANGE ,I2)
 299 ICL0=ICL(MRANGE)
     ICH1=ICH(MRANGE)
     DO 401 I=0,9
 401 LMHD(I+1)=I
     PRINT 402,(LMHD(I),I=1,10)
```

```
802 FORMAT(1H0,21X,10(4X,1H.,I1,4X))
    PRINT 282
282 FORMAT (1H0)
    DO 320 IC=ICLO,ICHI
    DO 301 I=1,10
    IJ=I-1
    CCC(I)=IC+IJ/10.
    FF(I)=0.
    DO 300 II=1,NORD1
    JJ=II-1
    B(II)=AC(MRANGE,II)*CCC(I)**JJ
    FF(I)=FF(I)+B(II)
300 CONTINUE
301 CONTINUE
    PRINT 310,IC,(FF(I),I=1,10)
310 FORMAT (1H ,10X,I2,8X,10(3X,F5.0,2X))
320 CONTINUE
330 CONTINUE
    END
```

PROGRAM VARIABLES

00401	A	01545	FF	01655	ICHI	01665	JJ	01614	NOFM
01521	CCC	01650	FHIGH	01451	ICL	01635	K	01631	NOFMRNGE
01425	CH	01644	FLOW	01654	ICLO	00243	LMHD	01603	NORD
01401	CL	01621	FREQ	01664	II	01611	M	01605	NORD1
01475	CLMHD	01632	I	01661	IJ	01630	MRANGE	01617	RSISTNCE
01525	CNDCTNCE	01660	IC	01627	IPASS	01571	N	00255	X
01640	DIFF	01463	ICH	01615	J	01633	NN	00327	Y

COMMON VARIABLES

02500	AC	01510	B	00644	FR	03344	FREQR	01562	SUMB
01634	AF	00000	CC						

STATEMENT NUMBERS

1	02121	43	00054	175	00100	250	00155	265	00176	401	02660		
2	02076	45	02151	176	02275	252	02612	282	00231	402	00222		
10	00000	46	02160	178	02302	254	02621	299	02651	1800	02401		
20	00017	47	02171	180	02306	256	02626	300	02756	1816	02336		
25	00024	48	02205	182	00106	258	02633	301	02766	1818	02343		
30	00025	49	02216	210	00142	260	00206	310	00233	1820	02361		
40	02140	50	00030	220	02500	261	00210	320	03020	1824	02375		
41	00040	52	02231	230	02534	262	00212	330	03027	1830	00131		
42	02145	53	00070	240	02550								

CONCECAL P 03047 C 03416 D 00000

```
      SUBROUTINE POLYFIT (X, Y, N, NORD, A)
C     K.S. RUDLONG      JUNE 1967
C PURPOSE
C     POLYNOMIAL CURVE FITTING SUBROUTINE
C DESCRIPTION OF PARAMETERS
C     X(I) ITH VALUE OF INDEPENDENT VARIABLE
C     Y(I) ITH VALUE OF DEPENDENT VARIABLE
C     A(I,J) MATRIX OF COEFFICIENTS OF NORMAL EQUATIONS
C     N NUMBER OF DATA POINTS
C     NORD ORDER OF POLYNOMIAL DESIRED
C     SUMX(J) SUM (I=1,N) X(I)**(J-1)
C     SUMY(J) SUM (I=1,N) Y(I)*X(I)**(J-1)
C REMARKS
C     FOR A, ALLOW A 2 DIMENSIONAL ARRAY (NORD+2) BY (NORD+2)
C     TO PRINT POLYNOMIAL COEFFICIENTS, PRINT A(I,NORD+2) FORI=1,NORD+1
C     IF ORDER TO BE FITTED IS GREATER THAN 15, THE DIMENSION STATEMENT
C       WITHIN THE SUBROUTINE POLYFIT MUST BE MODIFIED TO
C       SUMX(2NORD+1), SUMY(NORD)
C METHOD
C     MODIFIED GAUSS ELIMINATION
      DIMENSION X(100),Y(100),A(16,16),SUMX(31),SUMY(15)
      L=NORD+1
      KK=L+1
      DO 101 I=1,L
      DO 100 J=1,L
      IK=J-1+I
      SUMX(IK)=0
      SUMY(I)=0
      DO 90 K=1,N
      IF(X(K))70,80,70
70    SUMX(IK)=SUMX(IK)+X(K)**(IK-1)
      SUMY(I)=SUMY(I)+Y(K)*X(K)**(I-1)
      GO TO 90
80    SUMX(IK)=SUMX(IK)
      SUMY(I)=SUMY(I)
90    CONTINUE
100   A(I,J)=SUMX(IK)
101   A(I,KK)=SUMY(I)
      DO 140 I=1,L
      A(KK,I)=-1
      KKK=I+1
      DO 110 J=KKK,KK
110   A(KK,J)=0
      C=1./A(1,I)
      DO 120 II=2,KK
      DO 120 J=KKK,KK
120   A(II,J)=A(II,J)-A(1,J)*A(II,I)*C
      DO 140 II=1,L
      DO 140 J=KKK,KK
140   A(II,J)=A(II+1,J)
      RETURN
      END
```

```
        PROGRAM VARIABLES

      00150    C              00141    IK             00143    K              00145    KKK            00000    SUMX
      00137    I              00140    J              00136    KK             00134    L              00076    SUMY
      00152    II

        STATEMENT NUMBERS

         70   00335          90   00370         101   00413         110   00441         120   00464         140   00516
         80   00362         100   00400
   POLYFIT    P   00830  C    00000 D    00000
LOAD,56
RUN
```

```
SURP
 60560  Q8QERROR     61072  FIXF         61141  FLOATF       61170  POWRF        61540  XTOI         61766  QIQADRI
 62147  CIO.MSIO     62636  FORMAT       63206  CONTROL      64043  Q8QOUTTB     64044  BCDOUT       65745  BCDINP
 66766  POLYFIT      67618  CONCECAL

ENTR
 61072  IFIX         61072  XFIXF        61141  FLOAT        61170  QIQEXRR      61170  POWRF        61141  FLOATF
 61540  XTOI         61072  FIXF         62111  QIQSTRX      62066  QIQSTXR      62031  QIQSBXR      62004  QIQADXR
 62062  QIQSBRX      62042  QIQADRX      62034  QIQMUIR      62031  QIQSBIR      62004  QIQADIR      62025  QIQDVRI
 62021  QIQMURI      62015  QIQSBRI      62615  Q8QFOTAB     62404  Q8QEOFRC     62572  SSH.CIT      63325  Q8QARRAY
 63305  Q8QIOTAB     63235  Q8QEXITS     63206  Q8QENTRY     64043  Q8QOUTTB     63767  PWRTBL       64145  Q8QLGOTC
 62636  Q8QIFRMT     62667  Q8QFORMT     63261  Q8QIOSET     63241  Q8QSENSF     63513  Q8QEDITS     60560  Q8QERROR
 62147  CIO.MSIO     63765  PWRTBLO      63363  Q8QIOERR     66044  Q8QLGINC     62066  QIQSTIR      61766  QIQADRI
 62037  QIQDVIR      62077  QIQSTRI      61540  QIQEXRI      64160  Q8QLGOTR     66056  Q8QLGINR     66436  Q8QENGIN
 66051  Q8QLGINI     65745  Q8QINGIN     64152  Q8QLGOTI     64625  Q8QENGOT     64044  Q8QINGOT     67262  POLYFIT
 71634  CONCECAL     C1267  SEL          C6711  FDPBOXS      10241  UST          11271  START2       06637  SETCLOCK
 04234  RSTOREQ      C4223  RSTORE       01477  RPT          10727  RIO          10346  RHT          10564  RDCKFI
 03075  MSIO.SU      C3031  MSIO.SP      04263  MSIOFLG      02661  MSIO         07640  MIFORADD     07613  MIBUF
 07637  MIRKADD      10546  MEMORY       10426  LOC5         12361  LOADER       11004  LENGRDT      10306  EST
 06562  EINT.        06546  DINT.        10302  CST          10427  CIT.RTM      10461  CIT          05637  CIC3.01
 05766  CIC3.2       00016  CIO          10366  RRHT         10720  BNJ.         10533  BKRUNFLG     06710  BKEXIT
 10200  AET          10507  ACCOUNTS     06711  ABNORMAL

COMM
 11560   15175

DATA
    NONE

EXTA
    NONE

(MEMORY) =   15176     (MEMORYE) =   60557
```

	RESISTANCE	CONDUCTANCE	FREQUENCY
RANGE 1			
	107.1	9.34	2575
	90.3	11.07	2672
	78.3	12.77	2779
	69.3	14.43	2895
	62.3	16.05	3024
	57.3	17.45	3152
	52.3	19.12	3322
	48.3	20.70	3507
	44.3	22.57	3768
	41.3	24.21	4041
	37.3	26.81	4582
RANGE 2			
	126.7	7.89	2574
	124.5	8.03	2621
	122.4	8.17	2672
	120.5	8.30	2722
	118.8	8.42	2770
	117.0	8.55	2826
	115.3	8.67	2883
	113.6	8.80	2945
	111.9	8.94	3014
	110.4	9.06	3080
	109.1	9.17	3143
	107.6	9.29	3222
	106.0	9.43	3315
	104.6	9.56	3404
	103.1	9.70	3512
	101.8	9.82	3615
	100.3	9.97	3749
	98.8	10.12	3894
	97.4	10.27	4055
	96.0	10.42	4236
	94.4	10.59	4474
RANGE 3			
	98.1	10.19	2571
	96.7	10.34	2621
	95.5	10.47	2669
	94.4	10.59	2715
	93.2	10.73	2770
	92.1	10.86	2826
	91.0	10.99	2884
	90.0	11.11	2940
	89.0	11.24	3009
	88.0	11.36	3077
	87.0	11.49	3153
	86.0	11.63	3236
	85.1	11.75	3318
	84.2	11.88	3408
	83.3	12.00	3507
	82.4	12.14	3616
	81.4	12.29	3750
	80.4	12.44	3905
	79.4	12.59	4078
	78.5	12.74	4254
	77.5	12.90	4476
RANGE 4			
	80.7	12.39	2572
	79.9	12.52	2614
	79.0	12.66	2666
	78.2	12.79	2716

	77.4	12.92	2769
	76.6	13.05	2826
	75.9	13.18	2881
	75.2	13.30	2939
	74.4	13.44	3012
	73.7	13.57	3081
	73.1	13.68	3145
	72.3	13.83	3237
	71.7	13.95	3314
	71.1	14.06	3397
	70.4	14.20	3505
	69.8	14.33	3600
	69.0	14.49	3751
	68.4	14.62	3875
	67.7	14.77	4037
	66.9	14.95	4248
	66.1	15.13	4493
RANGE 5			
	68.2	14.66	2573
	67.6	14.79	2619
	67.0	14.93	2666
	66.4	15.06	2719
	65.9	15.17	2765
	65.3	15.31	2824
	64.7	15.46	2889
	64.2	15.58	2947
	63.7	15.70	3009
	63.2	15.82	3076
	62.7	15.95	3149
	62.2	16.08	3228
	61.7	16.21	3314
	61.2	16.34	3407
	60.7	16.47	3510
	60.2	16.61	3623
	59.8	16.72	3743
	59.3	16.86	3881
	58.8	17.01	4037
	58.3	17.15	4208
	57.6	17.36	4486
RANGE 6			
	59.3	16.86	2568
	58.3	17.15	2670
	57.4	17.42	2775
	56.6	17.67	2883
	55.8	17.92	3007
	55.0	18.18	3152
	54.1	18.48	3322
	53.5	18.69	3501
	52.7	18.98	3745
	51.9	19.27	4048
	51.0	19.61	4476
RANGE 7			
	52.4	19.08	2569
	51.6	19.38	2671
	50.9	19.65	2777
	50.3	19.88	2881
	49.6	20.16	3021
	49.0	20.41	3158
	48.4	20.66	3319
	47.8	20.92	3511
	47.2	21.19	3740
	46.5	21.51	4065

	45.8	21.83	4479
RANGE 8			
	46.9	21.32	2570
	46.3	21.60	2667
	43.7	22.88	3304
	44.2	22.62	3141
	45.7	21.88	2777
	45.2	22.12	2883
	44.7	22.37	3002
	43.2	23.15	3500
	42.7	23.42	3733
	42.1	23.75	4068
	41.5	24.10	4506
RANGE 9			
	42.5	23.53	2580
	42.1	23.75	2658
	41.6	24.04	2769
	41.1	24.33	2897
	40.7	24.57	3014
	40.3	24.81	3149
	39.9	25.06	3309
	39.5	25.32	3488
	39.0	25.64	3766
	38.6	25.91	4037
	38.1	26.25	4455
RANGE 10			
	38.8	25.77	2575
	38.4	26.04	2669
	38.0	26.32	2774
	37.6	26.60	2896
	37.3	26.81	3000
	36.9	27.10	3161
	36.6	27.32	3299
	36.2	27.62	3515
	35.9	27.86	3714
	35.5	28.17	4023
	35.1	28.49	4420

CONDUCTANCE AS A FUNCTION OF FREQUENCY

CONDUCTANCE RANGE 1

A0	-1.8441529E 02
A1	1.7305190E-01
A2	-5.7552974E-05
A3	8.9943470E-09
A4	-5.4137832E-13

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2575.00	9.38	9.388	.011	1
2672.00	11.07	11.064	-0.010	2
2778.00	12.77	12.769	-0.002	3
2895.00	14.43	14.420	-0.010	4
3024.00	16.05	16.047	-0.005	5
3152.00	17.45	17.474	.022	6
3322.00	19.12	19.132	.011	7
3507.00	20.70	20.689	-0.014	8
3768.00	22.57	22.561	-0.012	9
4041.00	24.21	24.224	.011	10
4582.00	26.81	26.808	-0.001	11

CONDUCTANCE RANGE 2

A0	-2.2331087E 01
A1	2.6972836E-02
A2	-8.9724288E-06
A3	1.4060167E-09
A4	-8.5033704E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2574.00	7.89	7.896	.003	1
2621.00	8.03	8.030	-0.002	2
2672.00	8.17	8.169	-0.001	3
2722.00	8.30	8.298	-0.001	4
2770.00	8.42	8.416	-0.001	5
2826.00	8.55	8.547	.000	6
2883.00	8.67	8.673	-0.000	7
2945.00	8.80	8.802	-0.001	8
3014.00	8.94	8.937	.000	9
3080.00	9.06	9.058	.000	10
3143.00	9.17	9.167	.001	11
3222.00	9.29	9.295	.001	12
3315.00	9.43	9.435	.001	13
3404.00	9.56	9.559	-0.001	14
3512.00	9.70	9.699	-0.000	15
3615.00	9.82	9.823	-0.001	16
3749.00	9.97	9.971	.001	17
3894.00	10.12	10.118	-0.003	18
4055.00	10.27	10.267	.000	19
4236.00	10.42	10.419	.003	20
4474.00	10.59	10.592	-0.001	21

CONDUCTANCE RANGE 3

A0	-2.0209927E 01
A1	2.7107328E-02
A2	-8.9930736E-06
A3	1.4031142E-09
A4	-8.4187762E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2571.00	10.19	10.196	.003	1
2621.00	10.34	10.340	-0.001	2

2669.00	10.47	10.472	.000	3
2715.00	10.59	10.592	-0.002	4
2770.00	10.73	10.728	-0.002	5
2826.00	10.86	10.859	.001	6
2884.00	10.99	10.987	-0.002	7
2940.00	11.11	11.105	-0.007	8
3009.00	11.24	11.240	.004	9
3077.00	11.36	11.366	.002	10
3153.00	11.49	11.496	.002	11
3236.00	11.63	11.629	.002	12
3319.00	11.75	11.752	.001	13
3408.00	11.88	11.877	.000	14
3507.00	12.00	12.004	-0.000	15
3616.00	12.14	12.134	-0.001	16
3750.00	12.29	12.282	-0.003	17
3905.00	12.44	12.438	-0.000	18
4078.00	12.59	12.596	.001	19
4254.00	12.74	12.741	.002	20
4476.00	12.90	12.902	-0.001	21

CONDUCTANCE RANGE 4

A0	-1.66294E5E 01
A1	2.5540137E-02
A2	-8.3464099E-06
A3	1.2875877E-09
A4	-7.6781954E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
2572.00	12.39	12.394	.002	1
2614.00	12.52	12.515	-0.001	2
2666.00	12.66	12.657	-0.001	3
2716.00	12.79	12.788	-0.000	4
2769.00	12.92	12.919	-0.001	5
2826.00	13.05	13.053	-0.002	6
2881.00	13.18	13.175	-0.000	7
2939.00	13.30	13.297	-0.001	8
3012.00	13.44	13.442	.001	9
3081.00	13.57	13.570	.001	10
3145.00	13.68	13.681	.001	11
3237.00	13.83	13.831	-0.000	12
3314.00	13.95	13.948	.001	13
3397.00	14.06	14.065	.000	14
3505.00	14.20	14.207	.002	15
3600.00	14.33	14.323	-0.004	16
3751.00	14.49	14.492	-0.001	17
3875.00	14.62	14.619	-0.001	18
4037.00	14.77	14.772	.000	19
4248.00	14.95	14.950	.002	20
4493.00	15.13	15.128	-0.001	21

CONDUCTANCE RANGE 5

A0	-1.0515276E 01
A1	2.0798618E-02
A2	-6.1797304E-06
A3	8.5326958E-10
A4	-4.4678638E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
2573.00	14.66	14.664	.001	1
2619.00	14.79	14.795	.002	2
2666.00	14.93	14.922	-0.003	3
2719.00	15.06	15.060	-0.001	4

2765.00	15.17	15.173	-0.001	5
2824.00	15.31	15.312	-0.002	6
2889.00	15.46	15.456	.000	7
2947.00	15.58	15.577	.001	8
3009.00	15.70	15.700	.001	9
3076.00	15.82	15.824	.001	10
3149.00	15.95	15.951	.002	11
3226.00	16.08	16.079	.002	12
3314.00	16.21	16.209	.001	13
3407.00	16.34	16.338	-0.002	14
3510.00	16.47	16.470	-0.005	15
3623.00	16.61	16.602	-0.009	16
3743.00	16.72	16.731	.009	17
3881.00	16.86	16.867	.003	18
4037.00	17.01	17.007	.000	19
4208.00	17.15	17.149	-0.003	20
4486.00	17.36	17.362	.001	21

CONDUCTANCE RANGE 6

A0	-6.7382577E 00
A1	1.8777287E-02
A2	-5.2366747E-06
A3	6.8482083E-10
A4	-3.0907058E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
2568.00	16.36	16.865	.001	1
2670.00	17.15	17.151	-0.002	2
2775.00	17.42	17.419	-0.003	3
2883.00	17.67	17.669	.001	4
3007.00	17.92	17.926	.005	5
3152.00	18.18	18.191	.009	6
3322.00	18.48	18.460	-0.024	7
3501.00	18.69	18.702	.011	8
3745.00	18.98	18.980	.004	9
4048.00	19.27	19.264	-0.004	10
4476.00	19.61	19.608	.001	11

CONDUCTANCE RANGE 7

A0	-1.1758774E 01
A1	2.7548641E-02
A2	-9.2417920E-06
A3	1.4539086E-09
A4	-8.8184624E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
2569.00	19.08	19.087	.003	1
2671.00	19.38	19.375	-0.005	2
2777.00	19.65	19.644	-0.002	3
2881.00	19.88	19.882	.001	4
3021.00	20.16	20.165	.004	5
3158.00	20.41	20.409	.001	6
3319.00	20.66	20.660	-0.001	7
3511.00	20.92	20.919	-0.001	8
3740.00	21.19	21.188	-0.000	9
4065.00	21.51	21.506	.001	10
4479.00	21.83	21.834	-0.000	11

CONDUCTANCE RANGE 8

A0	-1.0359479E 01
A1	2.8854207E-02
A2	-9.5222220E-06

A3 1.8857908E-09
A4 -9.0402687E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2570.00	21.32	21.321	-0.001	1
2667.00	21.60	21.599	.001	2
3304.00	22.88	22.881	-0.002	3
3141.00	22.62	22.623	-0.001	4
2777.00	21.88	21.882	-0.000	5
2883.00	22.12	22.126	.002	6
3002.00	22.37	22.371	-0.001	7
3500.00	23.15	23.149	.001	8
3733.00	23.42	23.421	.002	9
4068.00	23.75	23.751	-0.001	10
4506.00	24.10	24.097	.000	11

CONDUCTANCE RANGE 9
A0 -6.7350508E 00
A1 2.6868362E-02
A2 -8.8843856E-06
A3 1.3840027E-09
A4 -8.3166833E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2580.00	23.53	23.531	.001	1
2658.00	23.75	23.752	-0.001	2
2769.00	24.04	24.038	-0.000	3
2897.00	24.33	24.331	.000	4
3018.00	24.57	24.569	-0.001	5
3149.00	24.81	24.813	-0.001	6
3309.00	25.06	25.067	.004	7
3488.00	25.32	25.314	-0.002	8
3766.00	25.64	25.640	-0.001	9
4037.00	25.91	25.908	.001	10
4455.00	26.25	26.247	-0.000	11

CONDUCTANCE RANGE 10
A0 -5.8620552E 00
A1 2.8444598E-02
A2 -9.5588982E-06
A3 1.5134000E-09
A4 -9.2514516E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2575.00	25.77	25.773	.000	1
2669.00	26.04	26.042	.001	2
2778.00	26.32	26.314	-0.002	3
2896.00	26.60	26.595	-0.001	4
3000.00	26.81	26.810	.000	5
3161.00	27.10	27.103	.003	6
3299.00	27.32	27.323	.000	7
3515.00	27.62	27.621	-0.004	8
3714.00	27.86	27.857	.002	9
4023.00	28.17	28.169	.000	10
4420.00	28.49	28.490	-0.000	11

FREQUENCY AS A FUNCTION OF CONDUCTANCE

CONDUCTANCE RANGE 1

A0	2.39835 11E 03
A1	-2.87820F1E 01
A2	7.8804879E 00
A3	-3.1276530E-01
A4	7.0374334E-03

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
9.34	2575.00	2575.359	.359	1
11.07	2672.00	2671.392	-0.608	2
12.77	2779.00	2778.324	-0.676	3
14.43	2895.00	2895.975	.975	4
16.05	3024.00	3025.387	1.387	5
17.65	3152.00	3150.914	-1.086	6
19.12	3322.00	3320.876	-1.124	7
20.70	3507.00	3507.601	.601	8
22.57	3768.00	3768.147	.147	9
24.21	4041.00	4041.118	.118	10
26.81	4582.00	4581.907	-0.093	11

CONDUCTANCE RANGE 2

A0	2.0207378E 04
A1	-1.0034214E 04
A2	2.0320855E 03
A3	-1.8079481E 02
A4	6.1497620E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
7.89	2574.00	2571.553	-2.447	1
8.03	2621.00	2621.391	.391	2
8.17	2672.00	2672.781	.781	3
8.30	2722.00	2723.008	1.008	4
8.42	2770.00	2771.427	1.427	5
8.55	2826.00	2826.844	.844	6
8.67	2883.00	2883.727	.727	7
8.80	2945.00	2945.758	.758	8
8.94	3014.00	3013.800	-0.200	9
9.06	3080.00	3079.649	-0.351	10
9.17	3143.00	3141.801	-1.199	11
9.29	3222.00	3220.247	-1.753	12
9.43	3315.00	3313.105	-1.895	13
9.56	3404.00	3403.370	-0.630	14
9.70	3512.00	3510.924	-1.076	15
9.82	3615.00	3614.579	-0.421	16
9.97	3749.00	3748.107	-0.893	17
10.12	3894.00	3898.907	4.907	18
10.27	4055.00	4057.755	2.755	19
10.42	4236.00	4236.856	.856	20
10.59	4474.00	4470.411	-3.589	21

CONDUCTANCE RANGE 3

A0	4.8379094E 04
A1	-1.9714608E 04
A2	3.1009193E 03
A3	-2.1556601E 02
A4	5.6744098E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
10.19	2571.00	2568.800	-2.200	1
10.34	2621.00	2621.226	.226	2

10.87	2669.00	2669.333	.333	3
10.59	2715.00	2716.418	1.418	4
10.73	2770.00	2771.565	1.565	5
10.86	2526.00	2826.143	.143	6
10.99	2884.00	2885.213	1.213	7
11.11	2940.00	2943.431	3.431	8
11.24	3009.00	3006.621	-2.379	9
11.38	3077.00	3075.538	-1.462	10
11.49	3153.00	3151.060	-1.940	11
11.63	3236.00	3234.201	-1.799	12
11.75	3318.00	3316.509	-1.491	13
11.88	3408.00	3406.918	-1.082	14
12.00	3507.00	3506.544	-0.456	15
12.14	3616.00	3616.658	.658	16
12.29	3750.00	3753.068	3.068	17
12.44	3905.00	3906.475	1.475	18
12.59	4078.00	4079.489	1.489	19
12.74	4254.00	4254.439	.439	20
12.90	4476.00	4473.353	-2.647	21

CONDUCTANCE RANGE 4

A0	-4.6358201E 04
A1	8.5435426E 03
A2	-2.4889824E 02
A3	-2.6360120E 01
A4	1.3331095E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
12.39	2572.00	2566.669	-5.331	1
12.52	2614.00	2613.687	-0.313	2
12.66	2666.00	2668.293	2.293	3
12.79	2716.00	2718.986	2.986	4
12.92	2769.00	2772.387	3.387	5
13.05	2826.00	2829.234	3.234	6
13.18	2881.00	2882.458	1.458	7
13.30	2939.00	2939.588	.588	8
13.44	3012.00	3010.558	-1.442	9
13.57	3081.00	3078.500	-2.500	10
13.68	3145.00	3141.764	-3.236	11
13.83	3237.00	3234.432	-2.568	12
13.95	3314.00	3311.035	-2.965	13
14.06	3397.00	3394.540	-2.460	14
14.20	3505.00	3501.766	-3.234	15
14.33	3600.00	3603.089	3.089	16
14.49	3751.00	3753.475	2.475	17
14.62	3875.00	3879.127	4.127	18
14.77	4037.00	4041.403	4.403	19
14.95	4248.00	4250.101	2.101	20
15.13	4493.00	4486.908	-6.092	21

CONDUCTANCE RANGE 5

A0	-8.2387628E 04
A1	1.2744802E 04
A2	-3.1479362E 02
A3	-2.8843351E 01
A4	1.2265541E 00

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
14.66	2573.00	2569.568	-3.432	1
14.79	2619.00	2618.551	-0.449	2
14.93	2666.00	2668.958	2.958	3
15.06	2719.00	2721.476	2.476	4

15.17	2765.00	2767.404	2.404	5
15.31	2824.00	2825.847	1.847	6
15.46	2889.00	2888.817	-0.183	7
15.58	2947.00	2945.503	-1.497	8
15.70	3009.00	3006.728	-2.272	9
15.82	3076.00	3073.226	-2.774	10
15.95	3149.00	3145.796	-3.204	11
16.08	3228.00	3225.315	-2.685	12
16.21	3314.00	3312.735	-1.265	13
16.34	3407.00	3409.099	2.099	14
16.47	3510.00	3515.545	5.545	15
16.61	3623.00	3633.310	10.310	16
16.72	3743.00	3736.576	-6.424	17
16.86	3881.00	3878.204	-2.796	18
17.01	4037.00	4035.248	-1.752	19
17.15	4208.00	4209.428	1.428	20
17.36	4486.00	4485.666	-0.334	21

CONDUCTANCE RANGE 6

A0	-1.3758052E 05
A1	1.9743868E 04
A2	-6.2684063E 02
A3	-1.8345630E 01
A4	9.0803606E-01

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
16.86	2568.00	2565.825	-2.175	1
17.15	2670.00	2673.271	3.271	2
17.42	2775.00	2777.864	2.864	3
17.67	2883.00	2882.124	-0.876	4
17.92	3007.00	3002.259	-4.741	5
18.18	3152.00	3144.248	-7.752	6
18.48	3322.00	3338.919	16.919	7
18.69	3501.00	3494.820	-6.180	8
18.98	3745.00	3743.288	-1.712	9
19.27	4048.00	4048.467	.467	10
19.61	4476.00	4475.912	-0.088	11

CONDUCTANCE RANGE 7

A0	-2.0585175E 05
A1	2.7737934E 04
A2	-9.8775861E 02
A3	-6.1595403E 00
A4	6.1381613E-01

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
19.08	2569.00	2564.249	-4.751	1
19.38	2671.00	2675.534	4.534	2
19.65	2777.00	2781.200	4.200	3
19.88	2881.00	2882.260	1.260	4
20.16	3021.00	3018.065	-2.935	5
20.41	3158.00	3155.174	-2.826	6
20.66	3319.00	3317.097	-1.903	7
20.92	3511.00	3510.050	-0.950	8
21.19	3740.00	3741.140	1.140	9
21.51	4065.00	4069.832	4.832	10
21.83	4479.00	4476.399	-2.601	11

CONDUCTANCE RANGE 8

A0	-2.0743064E 05
A1	2.1793619E 04
A2	-3.3230036E 02

A3 -2.6770656E 01
A4 7.5424457E-01

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
21.32	2570.00	2568.728	-1.272	1
21.60	2667.00	2668.930	1.930	2
22.88	3304.00	3303.314	-0.686	3
22.62	3141.00	3139.414	-1.586	4
21.88	2777.00	2778.827	1.827	5
22.12	2883.00	2882.258	-0.742	6
22.37	3002.00	3000.869	-1.131	7
23.15	3500.00	3498.741	-1.259	8
23.42	3733.00	3732.715	-0.285	9
23.75	4068.00	4075.671	7.671	10
24.10	4506.00	4501.533	-4.467	11

CONDUCTANCE RANGE 9
A0 -2.7331491E 05
A1 2.5124212E 04
A2 -2.5019936E 02
A3 -3.0520312E 01
A4 7.3321987E-01

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
23.53	2580.00	2577.508	-2.492	1
23.75	2658.00	2660.321	2.321	2
24.04	2769.00	2771.621	2.621	3
24.31	2897.00	2897.401	.401	4
24.57	3014.00	3013.266	-0.734	5
24.81	3149.00	3147.225	-1.775	6
25.06	3309.00	3304.031	-4.969	7
25.32	3488.00	3489.028	1.028	8
25.64	3766.00	3769.121	3.121	9
25.91	4037.00	4040.586	3.586	10
26.25	4455.00	4451.875	-3.125	11

CONDUCTANCE RANGE 10
A0 -3.4423909E 05
A1 2.7390340E 04
A2 -9.1726091E 01
A3 -3.6100033E 01
A4 7.2486737E-01

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA,	K
25.77	2575.00	2572.828	-2.172	1
26.04	2669.00	2671.217	2.217	2
26.32	2774.00	2777.289	3.289	3
26.60	2896.00	2896.549	.549	4
26.81	3000.00	2998.409	-1.591	5
27.10	3161.00	3156.454	-4.546	6
27.32	3299.00	3296.005	-2.995	7
27.62	3515.00	3517.232	2.232	8
27.86	3714.00	3714.965	.965	9
28.17	4023.00	4029.952	6.952	10
28.49	4420.00	4415.100	-4.900	11

	LOWER LIMIT OF CONDUCTANCE	UPPER LIMIT OF CONDUCTANCE
RANGE 1	3.07	26.68
RANGE 2	7.85	10.84
RANGE 3	10.16	12.95
RANGE 4	12.36	15.16
RANGE 5	14.63	17.41
RANGE 6	16.84	19.67
RANGE 7	19.06	21.88
RANGE 8	21.29	24.13
RANGE 9	23.47	26.31
RANGE 10	25.73	28.57

CONDUCTANGE RANGE 1

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
9	2558	2563	2568	2573	2579	2584	2589	2594	2600	2605
10	2610	2616	2621	2627	2632	2638	2644	2650	2655	2661
11	2667	2673	2679	2685	2691	2697	2703	2709	2716	2722
12	2728	2734	2741	2747	2754	2760	2767	2774	2780	2787
13	2794	2801	2807	2814	2821	2828	2835	2842	2850	2857
14	2864	2871	2879	2886	2894	2901	2909	2916	2924	2932
15	2940	2948	2956	2963	2972	2980	2988	2996	3004	3013
16	3021	3030	3038	3047	3055	3064	3073	3082	3091	3100
17	3109	3118	3127	3137	3146	3155	3165	3175	3184	3194
18	3204	3214	3224	3234	3244	3255	3265	3276	3286	3297
19	3308	3319	3330	3341	3352	3363	3375	3386	3398	3409
20	3421	3433	3445	3457	3470	3482	3494	3507	3520	3533
21	3546	3559	3572	3586	3599	3613	3626	3640	3654	3669
22	3683	3698	3712	3727	3742	3757	3772	3788	3803	3819
23	3835	3851	3867	3883	3900	3917	3934	3951	3968	3985
24	4003	4021	4039	4057	4075	4094	4113	4132	4151	4170
25	4190	4209	4229	4250	4270	4291	4311	4333	4354	4375
26	4397	4419	4441	4464	4486	4509	4533	4556	4580	4604

CONDUCTANGE RANGE 2

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
7	2293	2321	2350	2380	2410	2441	2473	2506	2540	2574
8	2610	2646	2684	2724	2764	2806	2850	2896	2944	2995
9	3048	3103	3162	3224	3290	3359	3433	3511	3595	3683
10	3777	3877	3983	4096	4216	4344	4480	4624	4778	4941

CONDUCTANGE RANGE 3

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
10	2503	2537	2571	2606	2643	2680	2719	2759	2801	2845
11	2890	2938	2988	3041	3096	3155	3216	3282	3351	3425
12	3503	3586	3674	3767	3867	3973	4086	4206	4333	4469

CONDUCTANGE RANGE 4

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
12	2416	2455	2494	2532	2570	2608	2646	2685	2724	2764
13	2806	2849	2894	2941	2990	3041	3096	3154	3215	3279
14	3348	3421	3498	3580	3668	3760	3859	3963	4074	4192
15	4316	4448	4587	4735	4890	5054	5227	5410	5602	5804

CONDUCTANGE RANGE 5

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
14	2308	2350	2391	2431	2470	2508	2546	2584	2621	2659
15	2698	2737	2778	2820	2864	2909	2957	3007	3061	3117
16	3177	3240	3308	3379	3456	3537	3623	3715	3813	3917
17	4027	4145	4269	4401	4541	4689	4845	5011	5185	5369

CONDUCTANGE RANGE 6

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
16	2216	2262	2306	2348	2389	2429	2467	2505	2542	2579
17	2616	2653	2691	2730	2769	2810	2852	2897	2943	2992
18	3043	3097	3155	3216	3281	3350	3423	3502	3585	3673
19	3767	3867	3973	4085	4205	4331	4465	4607	4756	4915

CONDUCTANGE RANGE 7

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
19	2533	2570	2608	2645	2683	2722	2762	2804	2846	2891
20	2938	2987	3038	3093	3150	3211	3276	3344	3417	3494
21	3575	3662	3754	3851	3955	4064	4179	4302	4431	4567

CONDUCTANGE RANGE 8

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
21	2454	2490	2525	2561	2597	2633	2670	2707	2746	2786
22	2828	2872	2917	2965	3016	3068	3125	3185	3248	3315
23	3386	3461	3541	3625	3715	3810	3910	4017	4129	4248
24	4374	4506	4646	4793	4948	5111	5283	5463	5652	5850

CONDUCTANGE RANGE 9

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
23	2381	2419	2457	2494	2530	2567	2603	2640	2678	2717
24	2756	2797	2839	2883	2930	2978	3029	3082	3139	3199
25	3262	3330	3401	3476	3556	3641	3731	3826	3927	4033
26	4146	4265	4391	4523	4663	4811	4966	5129	5301	5481

CONDUCTANGE RANGE 10

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
25	2279	2320	2360	2399	2437	2474	2510	2546	2583	2619
26	2656	2693	2731	2771	2812	2854	2898	2945	2994	3045
27	3099	3156	3217	3281	3349	3421	3498	3579	3665	3757
28	3853	3956	4064	4179	4300	4428	4563	4706	4856	5014

SEQUENCE:001
SEQ ERR

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      PROGRAM CONDYCAL
C     BATHYSONDE CONDUCTIVITY CALIBRATION
C     READ RESISTANCE, FREQUENCY AND FORM FACTOR
C     OBTAIN CONDUCTANCE FROM RESISTANCE,
C     OBTAIN CONDUCTIVITY FROM CONDUCTANCE USING FORM FACTOR
C     FIT POLYNOMIAL CURVES TO CONDUCTIVITY AND FREQUENCY DATA
C     OBTAIN LIMITS OF CONDUCTIVITY FROM CONDUCTIVITY=F(FREQUENCY)
C     TABULATE FREQUENCIES FOR CONDUCTIVITIES WITHIN DEFINED LIMITS
      DIMENSION CC(10,21),FR(10,21),B(21),SUMB(21)
      DIMENSION X(21),Y(21),A(16,16),FREQR(21)
      DIMENSION CL(10),CH(10),ICL(10),ICH(10)
      DIMENSION CLMHD(10),CCC(10),FF(10)
      DIMENSION CY(10,21),ACY(10,21),AFY(10,21),N(10)
      DIMENSION LMHD(10)
      NORD=4
      NORD1=NORD+1
C  READ RESISTANCE, FREQUENCY AND FORM FACTOR
      READ 8, FMFR
    8 FORMAT (F5.3)
      PRINT 10
   10 FORMAT (1H1,10X,11H RESISTANCE,5X,11HCONDUCTANCE,6X,9HFREQUENCY,
     15X,12HCONDUCTIVITY)
      DO 1 M=1,10
      PRINT 20, M
   20 FORMAT (1H , 6HRANGE , I2)
C  READ RESISTANCE AND FREQUENCY
      READ 25,N(M)
   25 FORMAT(I2)
      NOFM=N(M)
      DO 2 J=1,NOFM
      READ 30, RSISTNCE, FREQ
   30 FORMAT (F8.1,F4.0)
      FR(M,J)=FREQ
C  OBTAIN CONDUCTANCE FROM RESISTANCE
      CNDCTNCE=1000./RSISTNCE
      CC(M,J)=CNDCTNCE
C  OBTAIN CONDUCTIVITY FROM CONDUCTANCE USING FORM FACTOR
      CY(M,J)=FMFR*CC(M,J)
    2 PRINT 50,RSISTNCE,CC(M,J),FR(M,J),CY(M,J)
   50 FORMAT (1H ,13X,F5.1,10X,F7.2,9X,F5.0,10X,F7.2)
    1 CONTINUE
      PRINT 3, FMFR
    3 FORMAT (1H0,14HFORM FACTOR = ,F5.3)
C  FIT CURVES TO CONDUCTIVITY AND FREQUENCY DATA
      DO 1800 IPASS=1,2
      IF (IPASS-1) 40,40,42
   40 PRINT 41
   41 FORMAT (1H1, 40H CONDUCTIVITY AS A FUNCTION OF FREQUENCY)
      GO TO 45
   42 PRINT 43
   43 FORMAT (1H1, 40H FREQUENCY AS A FUNCTION OF CONDUCTIVITY)
   45 DO 1800 MRANGE=1,10
      IF (IPASS-1) 46,46,48
46    NOFMRNGE=N(MRANGE)
      DO 47 I=1,NOFMRNGE
      X(I) = FR(MRANGE,I)
   47 Y(I) = CY(MRANGE,I)
      GO TO 52
48    NOFMRNGE=N(MRANGE)
      DO 49 I=1,NOFMRNGE
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      X(I) = CY(MRANGE,I)
   49 Y(I) = FR(MRANGE,I)
   52 PRINT 53, MPANGE
   53 FORMAT (1HO,19HCONDUCTIVITY RANGE ,I2)
      NN=N(MRANGE)
      CALL POLYFIT(X,Y,NN,NORD,A)
      DO 180 I=1,NORD1
      J = I-1
      PRINT 175,J,A(I,NORD+2)
  175 FORMAT (1H ,5X,1HA,I1, 5X,E14.7)
      IF (IPASS-1) 178,176,178
  176 AFY(MRANGE,I)=A(I,NORD+2)
      GO TO 180
  178 ACY(MRANGE,I)=A(I,NORD+2)
  180 CONTINUE
      PRINT 182
  182 FORMAT(1HO,9X,6HDATA X,9X,6HDATA Y,7X,12HCALCULATED Y,4X,12HYCALC-
     1YDATA ,3X,14K)
      NOFMRNGE=N(MRANGE)
      DO 1800 K=1,NOFMRNGE
      SUMR(K)=0.
      DO 1820 I=1,NORD1
      J=I-1
      R(I)=A(I,NORD+2)*X(K)**J
 1820 SUMR(K)=SUMR(K)+R(I)
      DIFF=SUMR(K)-Y(K)
 1800 PRINT 1830,X(K),Y(K),SUMR(K),DIFF,K
 1830 FORMAT(1H ,2(5X,F10.2),2(5X,F11.3),5X,I2)
C  LIMITS OF CONDUCTIVITY FROM CONDUCTIVITY=F(FREQUENCY)
      PRINT 210
  210 FORMAT (1H1,10X,27HLOWER LIMIT OF CONDUCTIVITY,3X,27HUPPER LIMIT O
     1F CONDUCTIVITY)
      FLOW=2560.
      FHIGH=4550.
      DO 240 MRANGE=1,10
      CL(MRANGE)=0.
      DO 220 I=1,NORD1
      J=I-1
      R(I)=AFY(MRANGE,I)*FLOW**J
  220 CL(MRANGE)=CL(MRANGE)+R(I)
      CH(MRANGE)=0.
      DO 230 I=1,NORD1
      J=I-1
      R(I)=AFY(MRANGE,I)*FHIGH**J
  230 CH(MRANGE)=CH(MRANGE)+R(I)
  240 PRINT 250,MRANGE,CL(MRANGE),CH(MRANGE)
  250 FORMAT (1H ,6HRANGE ,I2,12X,F7.2,20X,F7.2)
C  TABULATION OF FREQUENCIES FROM FREQUENCY=F(CONDUCTIVITY)
      DO 330 MRANGE=1,10
      ICL(MRANGE)=CL(MRANGE)
      ICH(MRANGE)=CH(MRANGE)
      IF (MRANGE-2) 252,252,254
  252 PRINT 265,MRANGE,FMFR
  265 FORMAT(1H1,19HCONDUCTIVITY RANGE ,I2,5X,13H FORM FACTOR=,F5.3)
      GO TO 299
  254 IF (MRANGE-5) 258,252,256
  256 IF (MRANGE-8) 258,252,258
  258 PRINT 260
  260 FORMAT (1HO)
      PRINT 261
  261 FORMAT (1HO)
      PRINT 262,MPANGE,FMFR
```

```
262 FORMAT(1H0,19HCONDUCTIVITY RANGE ,I2,5X,13H FORM FACTOR=,F5.3)
299 ICLO=ICL(MRANGE)
    ICHI=ICH(MRANGE)
    DO 401 I=0,9
401 LMHD(I+1)=I
    PRINT 402,(LMHD(I),I=1,10)
402 FORMAT(1H0,20X,10(4X,1H.,I1,4X))
    PRINT 282
282 FORMAT(1H0)
    DO 320 IC=ICLO,ICHI
    DO 301 I=1,10
    IJ=I-1
    CCC(I)=IC+IJ/10.
    FF(I)=0.
    DO 300 II=1,NORD
    JJ=II-1
    B(II)=ACY(MRANGE,II)*CCC(I)**JJ
    FF(I)=FF(I)+B(II)
300 CONTINUE
301 CONTINUE
    PRINT 310,IC,(FF(I),I=1,10)
310 FORMAT (1H , 9X,I2,8X,10(3X,F5.0,2X))
320 CONTINUE
330 CONTINUE
    END
```

PROGRAM VARIABLES

02260	A	06146	CNDCTNCE	03260	FREQR	06150	IPASS	06135	NOFM
04366	ACY	03522	CY	06153	I	06137	J	06152	NOFMRNGE
05232	AFY	06161	DIFF	06201	IC	06206	JJ	06122	NORD
02010	R	03476	FF	03414	ICH	06156	K	06124	NORD1
00300	CC	06171	FHIGH	06176	ICHI	06110	LMHD	06140	RSISTNCE
03452	CCC	06165	FLOW	03402	ICL	06133	M	02062	SUMB
03356	CH	06127	FMFR	06175	ICLO	06151	MRANGE	02134	X
03332	CL	01144	FR	06205	II	06076	N	02206	Y
03426	CLMHD	06142	FREQ	06202	IJ	06154	NN		

STATEMENT NUMBERS

1	06454	41	00057	52	06572	220	07030	260	00235	310	00270
2	06426	42	06506	53	00111	230	07064	261	00237	320	07354
3	00050	43	00074	175	00121	240	07100	262	00241	330	07363
4	00000	45	06512	176	06636	250	00206	265	00217	401	07214
10	00002	46	06521	178	06643	252	07142	282	00266	402	00257
20	00025	47	06532	180	06647	254	07153	299	07205	1800	06731
25	00032	48	06546	182	00127	256	07160	300	07312	1820	06711
30	00033	49	06557	210	00163	258	07165	301	07322	1830	00152
40	06501	50	00036								

CONDYCAL P 07403 C 00000 D 00000

```
      SUBROUTINE POLYFIT (X, Y, N, NORD, A)
C     K.S. RUDLONG      JUNE 1967
C PURPOSE
C     POLYNOMIAL CURVE FITTING SUBROUTINE
C DESCRIPTION OF PARAMETERS
C     X(I) ITH VALUE OF INDEPENDENT VARIABLE
C     Y(I) ITH VALUE OF DEPENDENT VARIABLE
C     A(I,J) MATRIX OF COEFFICIENTS OF NORMAL EQUATIONS
C     N NUMBER OF DATA POINTS
C     NORD ORDER OF POLYNOMIAL DESIRED
C     SUMX(J) SUM (I=1,N) X(I)**(J-1)
C     SUMY(J) SUM (I=1,N) Y(I)*X(I)**(J-1)
C REMARKS
C     FOR A, ALLOW A 2 DIMENSIONAL ARRAY (NORD+2) BY (NORD+2)
C     TO PRINT POLYNOMIAL COEFFICIENTS, PRINT A(I,NORD+2) FORI=1,NORD+1
C     IF ORDER TO BE FITTED IS GREATER THAN 15, THE DIMENSION STATEMENT
C       WITHIN THE SUBROUTINE POLYFIT MUST BE MODIFIED TO
C       SUMX(2NORD+1), SUMY(NORD)
C METHOD
C     MODIFIED GAUSS ELIMINATION
      DIMENSION X(100),Y(100),A(16,16),SUMX(31),SUMY(15)
      L=NORD+1
      KK=L+1
      DO 101 I=1,L
      DO 100 J=1,L
      IK=J-1+I
      SUMX(IK)=0
      SUMY(I)=0
      DO 90 K=1,N
      IF(X(K))70,80,70
70    SUMX(IK)=SUMX(IK)+X(K)**(IK-1)
      SUMY(I)=SUMY(I)+Y(K)*X(K)**(I-1)
      GO TO 90
80    SUMX(IK)=SUMX(IK)
      SUMY(I)=SUMY(I)
90    CONTINUE
100   A(I,J)=SUMX(IK)
101   A(I,KK)=SUMY(I)
      DO 140 I=1,L
      A(KK,I)=-1
      KKK=I+1
      DO 110 J=KKK,KK
110   A(KK,J)=0
      C=1./A(1,I)
      DO 120 II=2,KK
      DO 120 J=KKK,KK
120   A(II,J)=A(II,J)-A(1,J)*A(II,I)*C
      DO 140 II=1,L
      DO 140 J=KKK,KK
140   A(II,J)=A(II+1,J)
      RETURN
      END
```

```
        PROGRAM VARIABLES

      00150    C              00141    IK             00143    K              00145    KKK            00000    SUMX
      00137    I              00140    J              00136    KK             00134    L              00076    SUMY
      00152    II

        STATEMENT NUMBERS

         70   00335          90   00370          101   00413          110   00441          120   00464          140   00516
         80   00362         100   00400
   POLYFIT    P   00630  C    00000 D    00000
LOAD,56
RUN
```

```
SURP
 54224  Q8QERROR     54538  FIXF         54605  FLOATF       54634  POWRF        55204  XTOI         55432  QIQADRI
 55613  CIO.MSIO     56302  FORMAT       56652  CONTROL      57507  Q8QOUTTR     57510  BCDOUT       61411  BCDINP
 62432  POLYFIT      63262  CONDYCAL

ENTR
 54536  IFIX         54536  XFIXF        54605  FLOAT        54634  QIQEXRR      54634  POWRF        54605  FLOATF
 55204  XTOI         54536  FIXF         55555  QIQSTRX      55532  QIQSTXR      55475  QIQSBXR      55450  QIQADXP
 55526  QIQSBRX      55506  QIQADRX      55500  QIQMUIR      55475  QIQSBIR      55450  QIQADIR      55471  QIQDVRI
 55465  QIQMURI      55461  QIQSBRI      56261  Q8QFQTAB     56050  Q8QEQFRC     56236  SSH.CIT      56771  Q8QARRAY
 56751  Q8QIQTAB     56701  Q8QEXITS     56652  Q8QENTRY     57507  Q8QQUTTR     57433  PWRTBL       57611  Q8QLGOTC
 56302  Q8QIFRMT     56333  Q8QFORMT     56725  Q8QIOSET     56705  Q8QSENSE     57157  Q8QEDITS     54224  Q8QERROR
 55613  CIO.MSIO     57431  PWRTBLO      57027  Q8QIOERR     61510  Q8QLGINC     55532  QIQSTIR      55432  QIQADRI
 55503  QIQDVIR      55543  QIQSTRI      55204  QIQEXRI      57624  Q8QLGOTR     61515  Q8QLGINI     57616  Q8QLGOTI
 60271  Q8QENGOT     57513  Q8QINGOT     62102  Q8QENGIN     61522  Q8QLGINR     61411  Q8QINGIN     62726  POLYFIT
 71617  CONDYCAL     01267  SEL          06711  FDPBOXS      10241  UST          11271  START2       06637  SETCLOCK
 04234  RSTOREQ      04223  RSTORE       01477  RPT          10727  RIO          10346  RHT          10564  RDCKFI
 03075  MSIO.SU      03031  MSIO.SP      04263  MSIOFLG      02661  MSIO         07640  MIFORADD     07613  MIBUF
 07637  MIRKADD      10546  MEMORY       10426  LOCS         12361  LOADER       11004  LENGRDT      10306  EST
 06562  EINT.        06546  DINT.        10302  CST          10427  CIT.RTM      10461  CIT          05637  CIC3.01
 05766  CIC3.2       00015  CIO          10366  RRHT         10720  BNJ.         10533  BKRUNFLG     06710  BKEXIT
 10200  AET          10507  ACCOUNTS     06711  ABNORMAL

COMM
    NONE

DATA
    NONE

EXTA
    NONE

(MEMORY) =   11560     (MEMORYE) =   54223
```

	RESISTANCE	CONDUCTANCE	FREQUENCY	CONDUCTIVITY
RANGE 1				
	107.1	9.34	2575	24.23
	90.3	11.07	2672	28.74
	78.3	12.77	2779	33.14
	69.3	14.43	2895	37.45
	62.3	16.05	3024	41.65
	57.3	17.45	3152	45.29
	52.3	19.12	3322	49.62
	48.3	20.70	3507	53.73
	44.3	22.57	3768	58.58
	41.3	24.21	4041	62.83
	37.3	26.81	4582	69.57
RANGE 2				
	126.7	7.89	2574	20.48
	124.5	8.03	2621	20.84
	122.4	8.17	2672	21.20
	120.5	8.30	2722	21.54
	118.8	8.42	2770	21.84
	117.0	8.55	2826	22.18
	115.3	8.67	2883	22.51
	113.6	8.80	2945	22.84
	111.9	8.94	3014	23.19
	110.4	9.06	3080	23.51
	109.1	9.17	3143	23.79
	107.6	9.29	3222	24.12
	106.0	9.43	3315	24.48
	104.6	9.56	3404	24.81
	103.1	9.70	3512	25.17
	101.8	9.82	3615	25.49
	100.3	9.97	3749	25.87
	98.8	10.12	3894	26.27
	97.4	10.27	4055	26.64
	96.0	10.42	4236	27.03
	94.6	10.59	4474	27.49
RANGE 3				
	98.1	10.19	2571	26.45
	96.7	10.34	2621	26.84
	95.5	10.47	2669	27.17
	94.4	10.59	2715	27.49
	93.2	10.73	2770	27.84
	92.1	10.86	2826	28.18
	91.0	10.99	2884	28.52
	90.0	11.11	2940	28.83
	89.0	11.24	3009	29.16
	88.0	11.36	3077	29.49
	87.0	11.49	3153	29.83
	86.0	11.63	3236	30.17
	85.1	11.75	3318	30.49
	84.2	11.88	3408	30.82
	83.3	12.00	3507	31.15
	82.4	12.14	3616	31.49
	81.4	12.29	3750	31.88
	80.4	12.44	3905	32.28
	79.4	12.59	4078	32.68
	78.5	12.74	4254	33.06
	77.5	12.90	4476	33.48
RANGE 4				
	80.7	12.39	2572	32.16
	79.9	12.52	2614	32.48
	79.0	12.66	2666	32.85
	78.2	12.79	2716	33.18

	77.4	12.92	2769	33.53
	76.6	13.05	2826	33.88
	75.9	13.18	2881	34.19
	75.2	13.30	2939	34.51
	74.4	13.44	3012	34.88
	73.7	13.57	3081	35.21
	73.1	13.68	3145	35.50
	72.3	13.83	3237	35.89
	71.7	13.95	3314	36.19
	71.1	14.06	3397	36.50
	70.4	14.20	3505	36.86
	69.8	14.33	3600	37.18
	69.0	14.49	3751	37.61
	68.4	14.62	3875	37.94
	67.7	14.77	4037	38.33
	66.9	14.95	4248	38.79
	66.1	15.13	4493	39.26
RANGE 5				
	68.2	14.66	2573	38.05
	67.6	14.79	2619	38.39
	67.0	14.93	2666	38.73
	66.4	15.06	2719	39.08
	65.9	15.17	2765	39.38
	65.3	15.31	2824	39.74
	64.7	15.46	2889	40.11
	64.2	15.58	2947	40.42
	63.7	15.70	3009	40.74
	63.2	15.82	3076	41.06
	62.7	15.95	3149	41.39
	62.2	16.08	3228	41.72
	61.7	16.21	3314	42.06
	61.2	16.34	3407	42.40
	60.7	16.47	3510	42.75
	60.2	16.61	3623	43.11
	59.8	16.72	3743	43.39
	59.3	16.86	3881	43.76
	58.8	17.01	4037	44.13
	58.3	17.15	4208	44.51
	57.6	17.36	4486	45.05
RANGE 6				
	59.3	16.86	2568	43.76
	58.3	17.15	2670	44.51
	57.4	17.42	2775	45.21
	56.6	17.67	2883	45.85
	55.8	17.92	3007	46.51
	55.0	18.18	3152	47.18
	54.1	18.48	3322	47.97
	53.5	18.69	3501	48.50
	52.7	18.98	3745	49.24
	51.9	19.27	4048	50.00
	51.0	19.61	4476	50.88
RANGE 7				
	52.4	19.08	2569	49.52
	51.6	19.38	2671	50.29
	50.9	19.65	2777	50.98
	50.3	19.88	2881	51.59
	49.6	20.16	3021	52.32
	49.0	20.41	3158	52.96
	48.4	20.66	3319	53.62
	47.8	20.92	3511	54.29
	47.2	21.19	3740	54.98
	46.5	21.51	4065	55.81

	45.8	21.83	4479	56.66
RANGE 8				
	46.9	21.32	2570	55.33
	46.3	21.60	2667	56.05
	43.7	22.88	3304	59.38
	44.2	22.62	3141	58.71
	45.7	21.88	2777	56.78
	45.2	22.12	2883	57.41
	44.7	22.37	3002	58.05
	43.2	23.15	3500	60.07
	42.7	23.42	3733	60.77
	42.1	23.75	4068	61.64
	41.5	24.10	4506	62.53
RANGE 9				
	42.5	23.53	2580	61.06
	42.1	23.75	2658	61.64
	41.6	24.04	2769	62.38
	41.1	24.33	2897	63.14
	40.7	24.57	3014	63.76
	40.3	24.81	3149	64.39
	39.9	25.06	3309	65.04
	39.5	25.32	3488	65.70
	39.0	25.64	3766	66.54
	38.6	25.91	4037	67.23
	38.1	26.25	4455	68.11
RANGE 10				
	38.8	25.77	2575	66.88
	38.4	26.04	2669	67.58
	38.0	26.32	2778	68.29
	37.6	26.60	2896	69.02
	37.3	26.81	3000	69.57
	36.9	27.10	3161	70.33
	36.6	27.32	3299	70.90
	36.2	27.62	3515	71.69
	35.9	27.86	3714	72.28
	35.5	28.17	4023	73.10
	35.1	28.49	4420	73.93

FORM FACTOR = 2.595

CONDUCTIVITY AS A FUNCTION OF FREQUENCY

CONDUCTIVITY RANGE 1

A0	-4.7855727E 02
A1	4.4906925E-01
A2	-1.4934980E-04
A3	2.3380302E-08
A4	-1.4048750E-12

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2575.00	24.23	24.257	.027	1
2672.00	28.74	28.711	-0.027	2
2779.00	33.14	33.136	-0.006	3
2895.00	37.45	37.420	-0.025	4
3024.00	41.65	41.641	-0.012	5
3152.00	45.29	45.345	.057	6
3322.00	49.62	49.647	.030	7
3507.00	53.73	53.689	-0.038	8
3768.00	58.58	58.547	-0.031	9
4041.00	62.83	62.861	.028	10
4582.00	69.57	69.568	-0.003	11

CONDUCTIVITY RANGE 2

A0	-5.7958003E 01
A1	7.0004983E-02
A2	-2.3288010E-05
A3	3.6894915E-09
A4	-2.2072502E-13

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2574.00	20.48	20.490	.008	1
2621.00	20.84	20.839	-0.005	2
2672.00	21.20	21.199	-0.002	3
2722.00	21.54	21.534	-0.001	4
2770.00	21.84	21.840	-0.003	5
2826.00	22.18	22.180	.000	6
2883.00	22.51	22.508	-0.000	7
2945.00	22.84	22.841	-0.002	8
3014.00	23.19	23.191	.001	9
3080.00	23.51	23.508	.000	10
3143.00	23.79	23.788	.003	11
3222.00	24.12	24.121	.004	12
3315.00	24.48	24.484	.003	13
3404.00	24.81	24.807	-0.002	14
3512.00	25.17	25.169	-0.000	15
3615.00	25.49	25.490	-0.001	16
3749.00	25.87	25.875	.002	17
3894.00	26.27	26.256	-0.009	18
4055.00	26.64	26.644	.001	19
4236.00	27.03	27.038	.007	20
4474.00	27.49	27.487	-0.002	21

CONDUCTIVITY RANGE 3

A0	-5.2442365E 01
A1	7.0340687E-02
A2	-2.3335702E-05
A3	3.6408447E-09
A4	-2.1896944E-13

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2571.00	26.45	26.460	.007	1
2621.00	26.84	26.833	-0.003	2

2669.00	27.17	27.174	.001	3
2715.00	27.49	27.485	-0.004	4
2770.00	27.84	27.839	-0.004	5
2826.00	28.18	28.179	.003	6
2884.00	28.52	28.512	-0.004	7
2940.00	28.83	28.816	-0.017	8
3009.00	29.16	29.168	.011	9
3077.00	29.49	29.494	.005	10
3153.00	29.83	29.833	.006	11
3236.00	30.17	30.179	.004	12
3318.00	30.49	30.496	.002	13
3408.00	30.82	30.820	.001	14
3507.00	31.15	31.151	-0.001	15
3616.00	31.49	31.489	-0.004	16
3750.00	31.88	31.871	-0.008	17
3905.00	32.28	32.275	-0.001	18
4078.00	32.68	32.686	.003	19
4258.00	33.06	33.063	.006	20
4476.00	33.48	33.481	-0.003	21

CONDUCTIVITY RANGE 4

A0	-4.3149925E 01
A1	6.6272524E-02
A2	-2.1657146E-05
A3	3.3409503E-09
A4	-1.9922526E-13

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2572.00	32.16	32.163	.006	1
2614.00	32.48	32.476	-0.002	2
2666.00	32.85	32.846	-0.002	3
2716.00	33.18	33.184	-0.000	4
2769.00	33.53	33.525	-0.002	5
2826.00	33.98	33.872	-0.005	6
2881.00	34.19	34.190	-0.000	7
2939.00	34.51	34.507	-0.001	8
3012.00	34.88	34.882	.003	9
3081.00	35.21	35.213	.003	10
3145.00	35.50	35.503	.004	11
3237.00	35.89	35.891	-0.001	12
3314.00	36.19	36.194	.001	13
3397.00	36.50	36.499	.001	14
3505.00	36.86	36.867	.006	15
3600.00	37.18	37.188	-0.010	16
3751.00	37.61	37.607	-0.002	17
3875.00	37.94	37.936	-0.002	18
4037.00	38.33	38.332	.001	19
4248.00	38.79	38.794	.005	20
4493.00	39.26	39.257	-0.002	21

CONDUCTIVITY RANGE 5

A0	-2.7270793E 01
A1	5.3953194E-02
A2	-1.6028037E-05
A3	2.2126361E-09
A4	-1.1582787E-13

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2573.00	38.05	38.054	.004	1
2619.00	38.39	38.392	.005	2
2666.00	38.73	38.724	-0.008	3
2719.00	39.08	39.080	-0.001	4

2765.00	39.38	39.375	-0.003	5
2828.00	39.74	39.735	-0.005	6
2889.00	40.11	40.108	.000	7
2947.00	40.42	40.423	.002	8
3009.00	40.74	40.741	.003	9
3076.00	41.06	41.064	.003	10
3149.00	41.39	41.393	.006	11
3228.00	41.72	41.726	.005	12
3314.00	42.06	42.062	.003	13
3407.00	42.40	42.397	-0.005	14
3510.00	42.75	42.739	-0.012	15
3623.00	43.11	43.083	-0.023	16
3743.00	43.39	43.417	.023	17
3881.00	43.76	43.769	.009	18
4037.00	44.13	44.134	.001	19
4208.00	44.51	44.502	-0.009	20
4486.00	45.05	45.054	.002	21

CONDUCTIVITY RANGE 6

A0	-1.7446313E 01
A1	4.8686519E-02
A2	-1.3571417E-05
A3	1.7217987E-09
A4	-7.9361092E-14

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2568.00	43.76	43.763	.003	1
2670.00	44.51	44.507	-0.004	2
2775.00	45.21	45.202	-0.007	3
2883.00	45.85	45.850	.002	4
3007.00	46.51	46.518	.012	5
3152.00	47.18	47.206	.025	6
3322.00	47.97	47.904	-0.062	7
3501.00	48.50	48.533	.028	8
3745.00	49.24	49.252	.011	9
4048.00	50.00	49.991	-0.009	10
4476.00	50.88	50.884	.001	11

CONDUCTIVITY RANGE 7

A0	-3.0526587E 01
A1	7.1763109E-02
A2	-2.3988976E-05
A3	3.7741379E-09
A4	-2.2887665E-13

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2569.00	49.52	49.532	.009	1
2671.00	50.29	50.279	-0.012	2
2777.00	50.98	50.977	-0.006	3
2881.00	51.59	51.593	.002	4
3021.00	52.32	52.329	.010	5
3158.00	52.96	52.961	.002	6
3319.00	53.62	53.612	-0.003	7
3511.00	54.29	54.286	-0.003	8
3740.00	54.98	54.978	-0.001	9
4065.00	55.81	55.809	.003	10
4479.00	56.66	56.659	-0.001	11

CONDUCTIVITY RANGE 8

A0	-2.6814222E 01
A1	7.3757551E-02
A2	-2.4674678E-05

A3 3.8747668E-09
A4 -2.3411125E-13

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2570.00	55.33	55.328	-0.002	1
2667.00	56.05	56.049	.002	2
3304.00	59.38	59.378	-0.005	3
3141.00	58.71	58.708	-0.003	4
2777.00	56.78	56.783	-0.000	5
2883.00	57.41	57.417	.005	6
3002.00	58.05	58.052	-0.002	7
3500.00	60.07	60.072	.002	8
3733.00	60.77	60.778	.006	9
4068.00	61.64	61.635	-0.004	10
4506.00	62.53	62.531	.001	11

CONDUCTIVITY RANGE D
A0 -1.7451109E 01
A1 6.9892265E-02
A2 -2.3041358E-05
A3 3.5888708E-09
A4 -2.1563182E-13

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2580.00	61.06	61.062	.003	1
2658.00	61.64	61.636	-0.003	2
2769.00	62.38	62.379	-0.001	3
2897.00	63.14	63.140	.001	4
3014.00	63.76	63.757	-0.002	5
3149.00	64.39	64.390	-0.002	6
3309.00	65.04	65.049	.011	7
3488.00	65.70	65.690	-0.006	8
3766.00	66.54	66.535	-0.003	9
4037.00	67.23	67.231	.003	10
4455.00	68.11	68.110	-0.000	11

CONDUCTIVITY RANGE E
A0 -1.5172791E 01
A1 7.3767008E-02
A2 -2.4784729E-05
A3 3.9232808E-09
A4 -2.3978869E-13

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
2575.00	66.88	66.882	.001	1
2669.00	67.58	67.580	.002	2
2774.00	68.29	68.285	-0.005	3
2896.00	69.02	69.015	-0.001	4
3000.00	69.57	69.571	.000	5
3161.00	70.33	70.332	.007	6
3299.00	70.90	70.903	.001	7
3515.00	71.69	71.676	-0.009	8
3714.00	72.28	72.288	.004	9
4023.00	73.10	73.099	.000	10
4420.00	73.93	73.931	-0.000	11

FREQUENCY AS A FUNCTION OF CONDUCTIVITY

CONDUCTIVITY RANGE 1

A0	2.3962487E 03
A1	-1.1073735E 01
A2	1.1045869E 00
A3	-1.7893048E-02
A4	1.5516373E-04

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
24.23	2575.00	2575.358	.358	1
28.78	2672.00	2671.392	-0.608	2
33.18	2779.00	2778.325	-0.675	3
37.45	2895.00	2895.976	.976	4
41.65	3024.00	3025.387	1.387	5
45.29	3152.00	3150.913	-1.087	6
49.62	3322.00	3320.876	-1.124	7
53.73	3507.00	3507.601	.601	8
58.58	3768.00	3768.147	.147	9
62.83	4041.00	4041.119	.119	10
69.57	4582.00	4581.906	-0.094	11

CONDUCTIVITY RANGE 2

A0	3.09092C0E 04
A1	-5.6677346E 03
A2	4.1503940E 02
A3	-1.3501979E 01
A4	1.6847961E-01

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
20.48	2574.00	2572.456	-1.544	1
20.84	2621.00	2621.415	.415	2
21.20	2672.00	2672.351	.351	3
21.58	2722.00	2722.428	.428	4
21.84	2770.00	2770.876	.876	5
22.18	2826.00	2826.442	.442	6
22.51	2883.00	2883.533	.533	7
22.84	2945.00	2945.794	.794	8
23.19	3014.00	3014.048	.048	9
23.51	3080.00	3080.041	.041	10
23.79	3143.00	3142.267	-0.733	11
24.12	3222.00	3220.728	-1.272	12
24.48	3315.00	3313.508	-1.492	13
24.81	3404.00	3403.629	-0.371	14
25.17	3512.00	3510.965	-1.035	15
25.49	3615.00	3614.401	-0.599	16
25.87	3749.00	3747.690	-1.310	17
26.27	3894.00	3898.340	4.340	18
26.64	4055.00	4057.228	2.228	19
27.01	4236.00	4236.669	.669	20
27.49	4474.00	4471.191	-2.809	21

CONDUCTIVITY RANGE 3

A0	-9.9755124E 03
A1	2.4125721E 02
A2	6.6502041E 01
A3	-3.5534105E 00
A4	5.1874784E-02

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
26.45	2571.00	2566.841	-4.159	1
26.84	2621.00	2621.275	.275	2

27.17	2669.00	2670.293	1.293	3
27.49	2715.00	2717.689	2.689	4
27.84	2770.00	2772.746	2.746	5
28.18	2826.00	2826.973	.973	6
28.52	2884.00	2885.550	1.550	7
28.83	2940.00	2943.287	3.287	8
29.16	3009.00	3006.041	-2.959	9
29.49	3077.00	3074.630	-2.370	10
29.83	3153.00	3149.982	-3.018	11
30.17	3236.00	3233.146	-2.854	12
30.49	3318.00	3315.648	-2.352	13
30.82	3408.00	3406.405	-1.595	14
31.15	3507.00	3506.500	-0.500	15
31.49	3616.00	3617.142	1.142	16
31.88	3750.00	3754.094	4.094	17
32.28	3905.00	3907.816	2.816	18
32.68	4078.00	4080.658	2.658	19
33.06	4254.00	4254.753	.753	20
33.48	4476.00	4471.531	-4.469	21

CONDUCTIVITY RANGE 4

A0	4.4590464E 04
A1	-6.9430375E 03
A2	3.9432602E 02
A3	-9.5729491E 00
A4	8.5858940E-02

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
32.16	2572.00	2568.180	-3.820	1
32.48	2614.00	2613.806	-0.194	2
32.85	2666.00	2667.539	1.539	3
33.18	2716.00	2717.946	1.946	4
33.53	2769.00	2771.403	2.403	5
33.88	2826.00	2828.538	2.538	6
34.19	2881.00	2882.122	1.122	7
34.51	2939.00	2939.641	.641	8
34.88	3012.00	3011.019	-0.981	9
35.21	3081.00	3079.227	-1.773	10
35.50	3145.00	3142.621	-2.379	11
35.89	3237.00	3235.292	-1.708	12
36.19	3314.00	3311.763	-2.237	13
36.50	3397.00	3395.026	-1.974	14
36.86	3505.00	3501.858	-3.142	15
37.18	3600.00	3602.790	2.790	16
37.61	3751.00	3752.681	1.681	17
37.94	3875.00	3878.085	3.085	18
38.33	4037.00	4040.366	3.366	19
38.79	4248.00	4249.739	1.739	20
39.26	4493.00	4488.357	-4.643	21

CONDUCTIVITY RANGE 5

A0	-4.8504843E 04
A1	1.6535419E 03
A2	7.0567992E 01
A3	-3.5261451E 00
A4	3.8280249E-02

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
38.05	2573.00	2569.979	-3.021	1
38.39	2619.00	2618.614	-0.386	2
38.73	2666.00	2668.815	2.815	3
39.08	2719.00	2721.239	2.239	4

39.38	2765.00	2767.155	2.155	5
39.74	2824.00	2825.683	1.643	6
40.11	2889.00	2888.695	-0.305	7
40.42	2947.00	2945.462	-1.538	8
40.74	3009.00	3006.767	-2.233	9
41.06	3076.00	3073.333	-2.667	10
41.39	3149.00	3145.952	-3.048	11
41.72	3228.00	3225.493	-2.507	12
42.06	3314.00	3312.907	-1.093	13
42.40	3407.00	3409.236	2.236	14
42.75	3510.00	3515.620	5.620	15
43.11	3623.00	3633.308	10.308	16
43.39	3743.00	3736.511	-6.489	17
43.76	3881.00	3878.071	-2.929	18
44.13	4037.00	4035.086	-1.914	19
44.51	4208.00	4209.308	1.308	20
45.05	4486.00	4485.809	-0.191	21

CONDUCTIVITY RANGE 6

A0	-1.1655481E 05
A1	5.7459766E 03
A2	-3.1195354E 01
A3	-1.0555233E 00
A4	2.4997272E-02

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
43.76	2568.00	2565.414	-2.586	1
44.51	2670.00	2673.267	3.267	2
45.21	2775.00	2778.110	3.110	3
45.85	2883.00	2882.465	-0.535	4
46.51	3007.00	3002.563	-4.437	5
47.18	3152.00	3144.395	-7.605	6
47.97	3322.00	3338.799	16.799	7
48.50	3501.00	3494.521	-6.479	8
49.24	3745.00	3742.851	-2.149	9
50.00	4048.00	4048.176	.176	10
50.88	4476.00	4476.439	.439	11

CONDUCTIVITY RANGE 7

A0	-7.1576731E 04
A1	9.2772395E 02
A2	1.1925128E 02
A3	-3.5654189E 00
A4	2.8059844E-02

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
49.52	2569.00	2566.318	-2.682	1
50.29	2671.00	2674.878	3.878	2
50.98	2777.00	2779.722	2.722	3
51.59	2881.00	2880.888	-0.112	4
52.32	3021.00	3017.385	-3.615	5
52.96	3158.00	3155.272	-2.728	6
53.62	3319.00	3317.890	-1.110	7
54.29	3511.00	3511.241	.241	8
54.98	3740.00	3742.259	2.259	9
55.81	4065.00	4070.126	5.126	10
56.66	4479.00	4475.022	-3.978	11

CONDUCTIVITY RANGE 8

A0	-2.0709166E 05
A1	8.1013983E 03
A2	-3.4800836E 01

A3 -1.7755376E 00
A4 1.8000292E-02

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
55.33	2570.00	2567.644	-2.356	1
56.05	2667.00	2669.074	2.074	2
59.38	3304.00	3303.004	-0.996	3
58.71	3141.00	3139.588	-1.412	4
56.78	2777.00	2779.557	2.557	5
57.41	2883.00	2883.060	.060	6
58.05	3002.00	3001.453	-0.547	7
60.07	3500.00	3498.020	-1.980	8
60.77	3733.00	3731.829	-1.171	9
61.64	4068.00	4075.204	7.204	10
62.53	4506.00	4502.567	-3.433	11

CONDUCTIVITY RANGE B
A0 -2.2481894E 05
A1 7.1389368E 03
A2 1.0854626E 01
A3 -2.1448294E 00
A4 1.7200840E-02

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
61.06	2580.00	2578.939	-1.061	1
61.64	2658.00	2660.222	2.222	2
62.38	2769.00	2770.578	1.578	3
63.14	2897.00	2896.271	-0.729	4
63.76	3014.00	3012.505	-1.495	5
64.39	3149.00	3147.056	-1.944	6
65.04	3309.00	3304.510	-4.490	7
65.70	3488.00	3490.022	2.022	8
66.54	3766.00	3770.258	4.258	9
67.23	4037.00	4041.160	4.160	10
68.11	4455.00	4450.482	-4.518	11

CONDUCTIVITY RANGE IC
A0 -4.3540967E 05
A1 1.3740809E 04
A2 -3.8891500E 01
A3 -2.2302633E 00
A4 1.8000931E-02

DATA X	DATA Y	CALCULATED Y	YCALC-YDATA	K
66.88	2575.00	2567.620	-7.380	1
67.58	2669.00	2672.055	3.055	2
68.29	2774.00	2780.937	6.937	3
69.02	2896.00	2900.415	4.415	4
69.57	3000.00	3001.187	1.187	5
70.33	3161.00	3156.805	-4.195	6
70.90	3299.00	3294.342	-4.658	7
71.69	3515.00	3513.523	-1.477	8
72.28	3714.00	3710.895	-3.105	9
73.10	4023.00	4028.118	5.118	10
73.93	4420.00	4420.105	.105	11

	LOWER LIMIT OF CONDUCTIVITY	UPPER LIMIT OF CONDUCTIVITY
RANGE 1	23.53	69.25
RANGE 2	20.38	27.61
RANGE 3	26.37	33.60
RANGE 4	32.07	39.35
RANGE 5	37.96	45.18
RANGE 6	43.70	51.03
RANGE 7	49.46	56.78
RANGE 8	55.25	62.61
RANGE 9	60.91	68.28
RANGE 10	66.76	74.15

CONDUCTIVITY RANGE 1 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
23	2552	2553	2555	2557	2559	2561	2563	2565	2567	2569
24	2571	2573	2575	2577	2579	2581	2583	2585	2587	2589
25	2591	2593	2595	2597	2599	2601	2603	2605	2607	2609
26	2611	2614	2616	2618	2620	2622	2624	2626	2628	2631
27	2633	2635	2637	2639	2641	2644	2646	2648	2650	2653
28	2655	2657	2659	2661	2664	2666	2668	2671	2673	2675
29	2677	2680	2682	2684	2687	2689	2691	2694	2696	2698
30	2701	2703	2705	2708	2710	2713	2715	2717	2720	2722
31	2725	2727	2730	2732	2734	2737	2739	2742	2744	2747
32	2749	2752	2754	2757	2759	2762	2764	2767	2770	2772
33	2775	2777	2780	2782	2785	2788	2790	2793	2795	2798
34	2801	2803	2806	2809	2811	2814	2817	2819	2822	2825
35	2827	2830	2833	2836	2838	2841	2844	2847	2849	2852
36	2855	2858	2860	2863	2866	2869	2972	2875	2877	2880
37	2883	2886	2889	2892	2895	2898	2900	2903	2906	2909
38	2912	2915	2918	2921	2924	2927	2930	2933	2936	2939
39	2942	2945	2948	2951	2954	2957	2960	2963	2966	2970
40	2973	2976	2979	2982	2985	2988	2992	2995	2998	3001
41	3004	3007	3011	3014	3017	3020	3024	3027	3030	3033
42	3037	3040	3043	3047	3050	3053	3057	3060	3063	3067
43	3070	3074	3077	3081	3084	3087	3091	3094	3098	3101
44	3105	3108	3112	3115	3119	3122	3126	3130	3133	3137
45	3140	3144	3148	3151	3155	3159	3162	3166	3170	3173
46	3177	3181	3185	3188	3192	3196	3200	3204	3208	3211
47	3215	3219	3223	3227	3231	3235	3239	3243	3247	3250
48	3254	3258	3262	3267	3271	3275	3279	3283	3287	3291
49	3295	3299	3303	3308	3312	3316	3320	3324	3329	3333
50	3337	3341	3346	3350	3354	3359	3363	3367	3372	3376
51	3381	3385	3390	3394	3398	3403	3408	3412	3417	3421
52	3426	3430	3435	3440	3444	3449	3454	3458	3463	3468
53	3473	3477	3482	3487	3492	3497	3501	3506	3511	3516
54	3521	3526	3531	3536	3541	3546	3551	3556	3561	3566
55	3571	3577	3582	3587	3592	3597	3603	3608	3613	3618
56	3624	3629	3634	3640	3645	3651	3656	3662	3667	3672
57	3678	3684	3689	3695	3700	3706	3712	3717	3723	3729
58	3734	3740	3746	3752	3758	3764	3769	3775	3781	3787
59	3793	3799	3805	3811	3817	3823	3830	3836	3842	3848
60	3854	3861	3867	3873	3879	3886	3892	3899	3905	3911
61	3918	3924	3931	3937	3944	3951	3957	3964	3971	3977
62	3984	3991	3998	4004	4011	4018	4025	4032	4039	4046
63	4053	4060	4067	4074	4081	4088	4095	4103	4110	4117
64	4124	4132	4139	4147	4154	4161	4169	4176	4184	4192
65	4199	4207	4214	4222	4230	4238	4245	4253	4261	4269
66	4277	4285	4293	4301	4309	4317	4325	4333	4341	4350
67	4358	4366	4374	4383	4391	4400	4408	4417	4425	4434
68	4442	4451	4460	4468	4477	4486	4495	4503	4512	4521
69	4530	4539	4548	4557	4566	4575	4585	4594	4603	4612

CONDUCTIVITY RANGE 2 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
20	2511	2524	2536	2549	2562	2575	2588	2602	2615	2629
21	2643	2658	2672	2687	2702	2717	2732	2748	2764	2780
22	2796	2813	2830	2847	2865	2882	2900	2919	2938	2957
23	2976	2996	3016	3037	3058	3079	3101	3123	3145	3169
24	3192	3217	3241	3266	3292	3319	3345	3373	3401	3430
25	3459	3490	3520	3552	3584	3617	3651	3686	3721	3758
26	3795	3833	3872	3912	3953	3995	4039	4083	4128	4174
27	4222	4270	4320	4371	4423	4477	4532	4588	4646	4705

CONDUCTIVITY RANGE 3 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
26	2503	2517	2531	2545	2559	2574	2588	2602	2616	2631
27	2645	2660	2674	2689	2704	2719	2735	2750	2766	2782
28	2798	2814	2831	2848	2865	2883	2900	2919	2937	2956
29	2975	2995	3015	3035	3056	3077	3099	3121	3144	3167
30	3191	3215	3240	3265	3291	3317	3345	3372	3401	3430
31	3460	3490	3521	3553	3586	3620	3654	3689	3725	3762
32	3799	3838	3877	3918	3959	4001	4044	4088	4134	4180
33	4227	4276	4325	4376	4427	4480	4534	4589	4646	4704

CONDUCTIVITY RANGE 4 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
32	2546	2560	2574	2588	2603	2617	2631	2646	2660	2675
33	2690	2705	2720	2736	2751	2767	2783	2799	2816	2832
34	2849	2866	2884	2902	2920	2938	2957	2976	2995	3015
35	3035	3056	3077	3098	3120	3143	3166	3189	3213	3237
36	3262	3288	3314	3340	3368	3396	3424	3453	3483	3514
37	3545	3577	3610	3644	3678	3713	3750	3786	3824	3863
38	3903	3943	3985	4027	4071	4115	4161	4207	4255	4304
39	4354	4405	4457	4511	4565	4621	4679	4737	4797	4858

CONDUCTIVITY RANGE 5 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
37	2417	2432	2447	2462	2476	2491	2505	2520	2534	2548
38	2563	2577	2592	2606	2620	2635	2650	2664	2679	2694
39	2709	2724	2739	2755	2771	2787	2803	2819	2836	2853
40	2870	2887	2905	2923	2942	2960	2980	2999	3019	3040
41	3061	3082	3104	3126	3149	3172	3196	3220	3245	3271
42	3297	3324	3352	3380	3409	3438	3468	3499	3531	3564
43	3597	3631	3666	3702	3738	3776	3814	3854	3894	3935
44	3978	4021	4065	4110	4157	4204	4252	4302	4353	4405
45	4458	4512	4567	4624	4682	4741	4802	4864	4927	4991

CONDUCTIVITY RANGE 6 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
43	2455	2470	2485	2499	2514	2528	2542	2557	2571	2585
44	2600	2614	2628	2643	2657	2672	2686	2701	2716	2731
45	2746	2761	2777	2792	2808	2824	2841	2857	2874	2891
46	2909	2927	2945	2963	2982	3002	3021	3041	3062	3083
47	3104	3126	3149	3171	3195	3219	3244	3269	3294	3321
48	3348	3376	3404	3433	3463	3493	3524	3556	3589	3622
49	3657	3692	3728	3765	3802	3841	3881	3921	3962	4005
50	4048	4093	4138	4184	4232	4280	4330	4381	4433	4486
51	4540	4596	4652	4710	4769	4830	4891	4954	5019	5084

CONDUCTIVITY RANGE 7 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
49	2494	2508	2522	2536	2549	2563	2577	2591	2505	2619
50	2633	2647	2662	2676	2691	2706	2721	2736	2751	2767
51	2783	2799	2815	2831	2849	2865	2883	2900	2918	2937
52	2955	2974	2994	3014	3034	3055	3076	3097	3119	3142
53	3165	3188	3212	3237	3262	3287	3314	3341	3368	3396
54	3425	3454	3484	3515	3546	3578	3611	3645	3579	3714
55	3750	3787	3824	3862	3902	3942	3983	4025	4067	4111
56	4156	4201	4248	4295	4344	4394	4444	4496	4549	4603

CONDUCTIVITY RANGE 8 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
55	2522	2536	2549	2563	2577	2591	2605	2619	2634	2648
56	2662	2677	2691	2706	2721	2736	2751	2767	2782	2798
57	2814	2830	2847	2864	2881	2899	2916	2934	2953	2972
58	2991	3011	3031	3051	3072	3093	3115	3137	3160	3183
59	3207	3231	3256	3282	3308	3334	3362	3389	3418	3447
60	3477	3507	3539	3571	3603	3637	3671	3706	3742	3778
61	3816	3854	3893	3933	3974	4016	4058	4102	4147	4192
62	4239	4286	4335	4384	4435	4487	4540	4593	4649	4705

CONDUCTIVITY RANGE 9 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
60	2434	2448	2461	2475	2489	2502	2518	2530	2543	2557
61	2571	2585	2598	2612	2626	2640	2655	2669	2683	2698
62	2713	2728	2743	2758	2774	2789	2805	2822	2838	2855
63	2872	2889	2907	2925	2944	2962	2981	3001	3021	3041
64	3062	3083	3104	3126	3149	3172	3195	3219	3244	3269
65	3295	3321	3348	3375	3403	3432	3461	3491	3522	3553
66	3585	3618	3651	3686	3721	3756	3793	3830	3868	3907
67	3947	3988	4029	4072	4115	4159	4205	4251	4298	4346
68	4395	4445	4496	4549	4602	4656	4712	4768	4826	4884

CONDUCTIVITY RANGE 10 FORM FACTOR=2.595

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
66	2430	2446	2462	2478	2494	2509	2525	2540	2555	2570
67	2585	2600	2615	2630	2645	2660	2675	2690	2706	2721
68	2736	2751	2767	2783	2798	2814	2831	2847	2864	2881
69	2898	2915	2933	2951	2969	2988	3007	3026	3046	3066
70	3087	3108	3129	3151	3174	3197	3220	3244	3269	3294
71	3320	3346	3373	3401	3429	3458	3488	3518	3549	3581
72	3614	3647	3681	3717	3752	3789	3827	3865	3905	3945
73	3986	4029	4072	4116	4162	4208	4255	4304	4353	4404
74	4456	4509	4563	4618	4674	4732	4791	4851	4913	4976