A study of turbulent diffusion in the lower atmosphere using artificially produced electric space charge

Jones, C. D.

BIVANEPROG

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0001        1     FORMAT(I2,3F10.5)
0002        2     FORMAT(12I5)
0003        3     FORMAT(9F12.3)
0004        5     FORMAT('1 DATA ANALYSIS')
0005              WRITE(6,5)
0006        7     FORMAT(3F10.3)
0007        8     FORMAT('MEAN COMPONENTS WRT EXPT FRAME')
0008        9     FORMAT('DOWNWIND VECTOR')
0009        10    FORMAT('TAU,USTAR,UDSHBR,VDSHBR,WDSHBR')
0010        11    FORMAT('1AUTOCOV UDASH,VDASH,WDASH')
0011        12    FORMAT(I5,3E12.3)
0012        13    FORMAT('1AUTOCOR UDASH,VDASH,WDASH')
0013        14    FORMAT('1ELEV,AZI,WSPD,ML,ML,UDASH,VDASH,WDASH,IC/ML')
0014        15    FORMAT('1XCOR UV,UW,VW')
0015        16    FORMAT(I5,6E12.3)
0016        17    FORMAT(8A4)
0017        18    FORMAT(2F10.3)
0018        19    FORMAT('0DT')
0019        20    FORMAT(3F15.2)
0020        21    FORMAT(4F10.1)
0021        22    FORMAT(4F15.1)
0022        23    FORMAT('1 AUTOCOV FM+TFM')
0023        24    FORMAT('1 XCOR FM1/TFM1,FM2/TFM2')
0024        25    FORMAT(I5,4E15.3)
0025              DIMENSION X(100),Y(100),Z(100)
0026              DIMENSION XX1(1000),XX2(1000),XX3(1000),XX4(1000),XX5(1000)
0027              DIMENSION XX6(1000)
0028              DIMENSION DATIME(8)
0029              DIMENSION R1(100),R2(100),R3(100),R4(100),R5(100),R6(100)
0030              DIMENSION R7(100),R8(100),R9(100)
0031              DIMENSION VDASH(1000),UWDASH(1000),XXX(100),YYY(100),ZZZ(100)
0032              DIMENSION DOWNU(1000),CROSSU(1000),VERTU(1000),UDASH(1000)
0033              DIMENSION E(1000),A(1000),U(1000),FM1(1000),FM2(1000),DU(500)
0034              DIMENSION X1(100),X2(100),Y1(100),Y2(100)
0035              DIMENSION SINFI1(100),SINFI2(100),TFM1(1000),TFM2(1000)
0036              DIMENSION FFM1(1000),FFM2(1000),FTFM1(1000),FTFM2(1000)
0037              DIMENSION XP(100),YP(100),ZP(100)
0038              RHO=1.293
0039              PI=3.142
0040              S1=0.
0041              S2=0.
0042              S3=0.
0043              UW=0.
0044              UDSHBR=0.
0045              VDSHBR=0.
0046              CURR=3.0E-07
0047              EPSLON=8.854E-12
0048              READ(5,17) DATIME
0049              WRITE(6,17) DATIME
0050              WRITE(8,17) DATIME
0051              READ(5,18) RUNTIM,H
0052              WRITE(6,18) RUNTIM,H
0053              READ(5,21) RRR1,PRR2,ALFA1,ALFA2
0054              WRITE(6,21) RRR1,RRR2,ALFA1,ALFA2
0055              ALFA1=ALFA1*PI/180.
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0056              ALFA2=ALFA2*PI/180.
0057              XM1=RRR1*COS(ALFA1)
0058              YM1=RRR1*SIN(ALFA1)
0059              XM2=RRR2*COS(ALFA2)
0060              YM2=RRR2*SIN(ALFA2)
0061              READ(5,1)I1,A1,B1,C1
0062              READ(5,1)I2,A2,B2,C2
0063              READ(5,1)I3,A3,B3,C3
0064              READ(5,1)I4,A4,B4,C4
0065              READ(5,1)I5,A5,B5,C5
0066              READ(5,1)I6,A6,B6,C6
0067              J=999
0068              K=500
0069              N=0
0070        130   READ(5,2)M,I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11
0071              IF(M-9999)131,132,131
0072        131   N=N+1
0073              COMP=703./FLOAT(M)
0074              I1=IFIX(FLOAT(I1)*COMP)
0075              I2=IFIX(FLOAT(I2)*COMP)
0076              I3=IFIX(FLOAT(I3)*COMP)
0077              I4=IFIX(FLOAT(I4)*COMP)
0078              I5=IFIX(FLOAT(I5)*COMP)
0079              I6=IFIX(FLOAT(I6)*COMP)
0080              I7=IFIX(FLOAT(I7)*COMP)
0081              I8=IFIX(FLOAT(I8)*COMP)
0082              I9=IFIX(FLOAT(I9)*COMP)
0083              I10=IFIX(FLOAT(I10)*COMP)
0084              I11=IFIX(FLOAT(I11)*COMP)
0085              E(J)=(A1*FLOAT(I5)+B1)*C1
0086              E(J+1)=(A1*FLOAT(I11)+B1)*C1
0087              A(J)=(A2*FLOAT(I4)+B2)*C2
0088              A(J+1)=(A2*FLOAT(I10)+B2)*C2
0089              FM1(J)=(A3*FLOAT(I3)+B3)*C3
0090              FM1(J+1)=(A3*FLOAT(I9)+B3)*C3
0091              FM2(J)=(A4*FLOAT(I2)+B4)*C4
0092              FM2(J+1)=(A4*FLOAT(I8)+B4)*C4
0093              U(J)=(A5*FLOAT(I1)+B5)*C5
0094              U(J+1)=(A5*FLOAT(I7)+B5)*C5
0095              DU(K)=(A6*FLOAT(I6)+B6)*C6
0096              J=J-2
0097              K=K-1
0098              GO TO 130
0099        132   J=J+2
0100              K=K+1
0101              DO 140 JN=1,NN
0102              E(JN)=E(J)
0103              A(JN)=A(J)
0104              FM1(JN)=FM1(J)
0105              FM2(JN)=FM2(J)
0106              U(JN)=U(J)
0107        140   J=J+1
0108              DO 141 KN=1,N
0109              DU(KN)=DU(K)
0110        141   K=K+1
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0111              L=NN/10
0112              FNN=FLOAT(NN)
0113              IMAX=NN
0114              DO 160 J=1,NN
0115              DOWNU(J)=U(J)*(COS(A(J)*PI/180.))
0116              CROSSU(J)=U(J)*(SIN(A(J)*PI/180.))
0117              VERTU(J)=U(J)*(SIN(E(J)*PI/180.))
0118              S1=S1+DOWNU(J)
0119              S2=S2+CROSSU(J)
0120        160   S3=S3+VERTU(J)
0121              S1=S1/FNN
0122              S2=S2/FNN
0123              S3=S3/FNN
0124              WRITE(6,8)
0125              WRITE(6,7) S1,S2,S3
0126              UBAR=SQRT(S1**2+S2**2)
0127              AVECT=(180./PI)*(ATAN(S2/S1))
0128              WRITE(6,9)
0129              WRITE(6,7) UBAR,AVECT
0130              DO 170 J=1,NN
0131              UDASH(J)=(U(J)*(COS((A(J)-AVECT)*(PI/180.))))-UBAR
0132              UDSHBR=UDSHBR+UDASH(J)
0133              VDASH(J)=(U(J)*(SIN((A(J)-AVECT)*(PI/180.))))
0134              VDSHBR=VDSHBR+VDASH(J)
0135              UWDASH(J)=UDASH(J)*VERTU(J)
0136        170   UW=UW+UWDASH(J)
0137              UWBAR=UW/FNN
0138              UDSHBR=UDSHBR/FNN
0139              VDSHBR=VDSHBR/FNN
0140              TAU=-RHO*UWBAR
0141              IF(UWBAR)200,200,201
0142        200   UWBAR=-UWBAR
0143        201   USTAR=SQRT(UWBAR)
0144              WRITE(6,10)
0145              WRITE(6,3) TAU,USTAR,UDSHBR,VDSHBR,S3
0146              WRITE(6,14)
0147              J=1
0148              K=1
0149        149   WRITE(6,3) E(J),A(J),U(J),FM1(J),FM2(J),UDASH(J),VDASH(J),VERTU(J)
                 1,DU(K)
0150              J=J+1
0151              WRITE(6,3) E(J),A(J),U(J),FM1(J),FM2(J),UDASH(J),VDASH(J),VERTU(J)
0152              J=J+1
0153              K=K+1
0154              IF(N-K)150,149,149
0155        150   CONTINUE
0156              CALL AUTO(UDASH,NN,L,R1)
0157              CALL AUTO(VERTU,NN,L,R2)
0158              CALL AUTO(VDASH,NN,L,R3)
0159              WRITE(6,11)
0160              WRITE(6,12)(J,R1(J),R3(J),R2(J),J=1,L)
0161              RR1=R1(1)
0162              RR2=R2(1)
0163              RR3=R3(1)
0164              DO 180 J=1,L
```

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0165              R1(J)=R1(J)/RR1
0166              R2(J)=R2(J)/RR2
0167        180   R3(J)=R3(J)/RR3
0168              WRITE(6,13)
0169              WRITE(6,12)(J,R1(J),R3(J),R2(J),J=1,L)
0170              CALL CROSS(UDASH,VDASH,NN,L,R4,R5)
0171              CALL CROSS(UDASH,VERTU,NN,L,R6,R7)
0172              CALL CROSS(VDASH,VERTU,NN,L,R8,R9)
0173              DO 300 J=1,L
0174              R4(J)=R4(J)/SQRT(RR1*RR3)
0175              R5(J)=R5(J)/SQRT(RR1*RR3)
0176              R6(J)=R6(J)/SQRT(RR1*RR2)
0177              R7(J)=R7(J)/SQRT(RR1*RR2)
0178              R8(J)=R8(J)/SQRT(RR2*RR3)
0179              R9(J)=R9(J)/SQRT(RR2*RR3)
0180        300   CONTINUE
0181              WRITE(6,15)
0182              WRITE(6,16)(J,R4(J),R5(J),R6(J),R7(J),R8(J),R9(J),J=1,L)
0183              DT=(RUNTIM*60.)/FNN
0184              WRITE(6,19)
0185              WRITE(6,7) DT
0186              WRITE(8,7) DT
0187              Q=CURR*DT
0188              I=1
0189        508   T=DT*(FLOAT(I))
0190              FLDL1=0.
0191              FLDL2=0.
0192              II=1
0193        502   JJ=I-II+1
0194              IF(JJ)500,500,501
0195        501   X(II)=U(JJ)*FLOAT(II)*DT*COS(A(JJ)*PI/180.)
0196              Y(II)=X(II)*(TAN(A(JJ)*(PI/180.)))
0197              Z(II)=H+(X(II)*(TAN(E(JJ)*(PI/180.))))
0198              IF(Z(II)-0.2)510,510,511
0199        510   Z(II)=0.2
0200        511   IF(X(II)-50.)503,503,500
0201        503   II=II+1
0202              GO TO 502
0203        500   CONTINUE
0204              MM=II+1
0205              DO 600 J=2,MM
0206              XXX(J)=X(J-1)
0207              YYY(J)=Y(J-1)
0208        600   ZZZ(J)=Z(J-1)
0209              X(1)=0.
0210              Y(1)=0.
0211              Z(1)=H
0212              DO 602 J=2,MM
0213              X(J)=XXX(J)
0214              Y(J)=YYY(J)
0215        602   Z(J)=ZZZ(J)
0216              DO 2000 J=1,MM
0217              XP(J)=X(J)
0218              YP(J)=Y(J)
0219        2000  ZP(J)=Z(J)
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0220              DO 2010 J=1,MM
0221              IF(YP(J)-10.)2001,2001,2002
0222         2002 YP(J)=10.
0223         2001 IF(YP(J)+10.)2003,2003,2004
0224         2003 YP(J)=-10.
0225         2004 IF(ZP(J)-20.)2005,2005,2006
0226         2006 ZP(J)=20.
0227         2005 CONTINUE
0228         2010 CONTINUE
0229              WRITE(8) I,MM,(XP(J),YP(J),ZP(J),J=1,MM)
0230              DO 601 J=1,II
0231              X1(J)=X(J)+((X(J+1)-X(J))/2.)-XM1
0232              X2(J)=X1(J)+XM1-XM2
0233              Y1(J)=Y(J)+((Y(J+1)-Y(J))/2.)-YM1
0234              Y2(J)=Y1(J)+YM1-YM2
0235              R1(J)=SQRT(X1(J)**2+Y1(J)**2+Z(J)**2)
0236              R2(J)=SQRT(X2(J)**2+Y2(J)**2+Z(J)**2)
0237              SINFI1(J)=Z(J)/R1(J)
0238              SINFI2(J)=Z(J)/R2(J)
0239              R1(J)=R1(J)**2
0240              R2(J)=R2(J)**2
0241              IF(R1(J)-1.)1000,1000,1001
0242         1000 R1(J)=1.
0243         1001 IF(R2(J)-1.)1002,1002,1003
0244         1002 R2(J)=1.
0245         1003 FLDL1=FLDL1+(Q*SINFI1(J))/(2.*PI*EPSLON*R1(J))
0246              FLDL2=FLDL2+(Q*SINFI2(J))/(2.*PI*EPSLON*R2(J))
0247         601  CONTINUE
0248              TFM1(I)=FLDL1
0249              TFM2(I)=FLDL2
0250              I=I+1
0251              IF(I-IMAX)508,508,509
0252         509  CONTINUE
0253              NN1=NN-1
0254              DO 1100 J=2,NN1
0255              FFM1(J)=0.25*FM1(J-1)+0.5*FM1(J)+0.25*FM1(J+1)
0256              FFM2(J)=0.25*FM2(J-1)+0.5*FM2(J)+0.25*FM2(J+1)
0257              FTFM1(J)=0.25*TFM1(J-1)+0.5*TFM1(J)+0.25*TFM1(J+1)
0258              FTFM2(J)=0.25*TFM2(J-1)+0.5*TFM2(J)+0.25*TFM2(J+1)
0259         1100 CONTINUE
0260              DO 1101 J=2,NN1
0261              FM1(J)=FFM1(J)
0262              FM2(J)=FFM2(J)
0263              TFM1(J)=FTFM1(J)
0264              TFM2(J)=FTFM2(J)
0265         1101 CONTINUE
0266              CALL AUTO(FM1,NN,L,R1)
0267              CALL AUTO(TFM1,NN,L,R2)
0268              CALL AUTO(FM2,NN,L,R3)
0269              CALL AUTO(TFM2,NN,L,R4)
0270              WRITE(6,23)
0271              WRITE(6,25) (J,R1(J),R2(J),R3(J),R4(J),J=1,L)
0272              RR1=R1(1)
0273              RR2=R2(1)
0274              RR3=R3(1)
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0275              RR4=R4(1)
0276              CALL CROSS(FM1,TFM1,NN,L,R5,R6)
0277              CALL CROSS(FM2,TFM2,NN,L,R7,R8)
0278              DO 700 J=1,L
0279              R5(J)=R5(J)/SQRT(RR1*RR2)
0280              R6(J)=R6(J)/SQRT(RR1*RR2)
0281              R7(J)=R7(J)/SQRT(RR3*RR4)
0282              R8(J)=R8(J)/SQRT(RR3*RR4)
0283         700  CONTINUE
0284              WRITE(6,24)
0285              WRITE(6,25) (J,R5(J),R6(J),R7(J),R8(J),J=1,L)
0286              DO 710 L=1,NN
0287         710  XX1(L)=(FLOAT(L-1))*DT
0288              FMMX1=1.
0289              DO 711 I=1,NN
0290         802  IF(FM1(I)-FMMX1)800,800,801
0291         801  FMMX1=FMMX1*1.1
0292              GO TO 802
0293         800  CONTINUE
0294         805  IF(TFM1(I)-FMMX1)803,803,804
0295         804  FMMX1=FMMX1*1.1
0296              GO TO 805
0297         803  CONTINUE
0298         711  CONTINUE
0299              FMMX2=1.
0300              DO 712 I=1,NN
0301         902  IF(FM2(I)-FMMX2)90C,900,901
0302         901  FMMX2=FMMX2*1.1
0303              GO TO 902
0304         900  CONTINUE
0305         905  IF(TFM2(I)-FMMX2)903,903,904
0306         904  FMMX2=FMMX2*1.1
0307              GO TO 905
0308         903  CONTINUE
0309         712  CONTINUE
0310              DO 713 I=1,NN
0311              FM1(I)=FM1(I)/FMMX1
0312              TFM1(I)=TFM1(I)/FMMX1
0313              FM2(I)=FM2(I)/FMMX2
0314         713  TFM2(I)=TFM2(I)/FMMX2
0315              AXLTH=(FNN*DT)/10.0
0316              XPOS=0.5
0317              XPOS2=XPOS+AXLTH+2.0
0318              XPOS3=XPOS+0.5
0319              CALL PLTXMX(150.)
0320              CALL PAXIS(XPOS,0.5,'TIME (SEC)',-10,AXLTH,0.0,0.0,10.0,1.0)
0321              CALL PAXIS(XPOS,0.5,'ARB UNITS',9,10.0,90.C,0.0,0.1,1.0)
0322              CALL PSYMB(XPOS3,1.0,-0.1,DATIME,0.0,32)
0323              CALL PLTOFS(0.0,10.0,0.0,0.1,XPOS,0.5)
0324              CALL PLINE(XX1,FM1,NN,1,4,0,1.0)
0325              CALL PLINE(XX1,TFM1,NN,1,4,1,1.0)
0326              CALL PAXIS(XPOS2,0.5,'TIME (SEC)',-10,AXLTH,0.0,0.0,10.0,1.0)
0327              CALL PAXIS(XPOS2,0.5,'ARB UNITS',9,10.0,90.0,0.0,0.1,1.0)
0328              CALL PLTOFS(0.0,10.0,0.0,0.1,XPOS2,0.5)
0329              CALL PLINE(XX1,FM2,NN,1,4,2,1.0)
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 0330                CALL PLINE(XX1,TFM2,NN,1,4,3,1.0)
 0331                CALL PLTEND
 0332                STOP
 0333                END

   TOTAL MEMORY REQUIREMENTS 01BCD8 BYTES
EXECUTION TERMINATED
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DATA PROG

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0001              6 FORMAT(I5,3F15.5)
0002              7 FORMAT(12I5)
0003              9 FORMAT('0ACTUAL VALUES')
0004             10 FORMAT(I4,4F9.1,3F7.2,4F9.1)
0005             11 FORMAT('1 MEANS,STD.DEV.AND COEFF.VAR')
0006             12 FORMAT(F10.2,4F10.1,2F10.2,4F10.1)
0007             13 FORMAT('0RI')
0008             14 FORMAT(1F11.3)
0009             15 FORMAT('0ST')
0010             16 FORMAT('1AUTOCOV,FM1,FM2,FM3,FM4')
0011             17 FORMAT(I4,4E15.3)
0012             18 FORMAT('1AUTOCOV,U,DU,DT')
0013             20 FORMAT('1AUTO-DERIVED STD DEV')
0014             22 FORMAT('1XCOR,FM1/FM2,FM1/FM3,FM1/FM4')
0015             23 FORMAT(I4,6E15.3)
0016             24 FORMAT('1XCOR,FM2/FM3,FM2/FM4,FM3/FM4')
0017             26 FORMAT('1XCOR,FM1/U,FM1/DU,FM1/DT')
0018             27 FORMAT('1XCOR,FM2/U,FM2/DU,FM2/DT')
0019             28 FORMAT('1XCOR,FM3/U,FM3/DU,FM3/DT')
0020             29 FORMAT('1XCOR,FM4/U,FM4/DU,FM4/DT')
0021             30 FORMAT('1XCOR,U/DU,U/DT,DU/DT')
0022             32 FORMAT(I4,3E15.3)
0023             33 FORMAT('1AUTOLENGTH')
0024             34 FORMAT(7F10.2)
0025             40 FORMAT(11F10.3)
0026            49  FORMAT('RUNTIM')
0027            50  FORMAT(1F10.1)
0028             51 FORMAT(4A4)
0029             53 FORMAT(I1)
0030            60  FORMAT('1DATA ANALYSIS')
0031                DIMENSION DATIME(4)
0032                DIMENSION FM1(1000),FM2(1000),FM3(1000),FM4(1000)
0033                DIMENSION U(1000),DU(1000),DT(1000)
0034                DIMENSION R1(200),R2(200),R3(200),R4(200),R5(200),R6(200),R7(200)
0035                DIMENSION R101(200),R102(200),R103(200),R104(200),R105(200)
0036                DIMENSION R106(200),R107(200),R108(200),R109(200),R110(200)
0037                DIMENSION R111(200),R112(200)
0038                DIMENSION R200(200),R201(200),R202(200),R203(200),R204(200)
0039                DIMENSION R205(200)
0040                DIMENSION R210(200),R211(200),R212(200),R213(200),R214(200)
0041                DIMENSION R215(200)
0042                DIMENSION R220(200),R221(200),R222(200),R223(200),R224(200)
0043                DIMENSION R225(200)
0044                DIMENSION R230(200),R231(200),R232(200),R233(200),R234(200)
0045                DIMENSION R235(200)
0046                DIMENSION R300(200),R301(200),R302(200),R303(200),R304(200)
0047                DIMENSION R305(200)
0048                DIMENSION FMS1(1000),FMS2(1000),FMS3(1000),FMS4(1000)
0049                DIMENSION X1(200),X2(200)
0050                DIMENSION XX1(1000),XX2(1000),XX3(1000),XX4(1000)
0051                DIMENSION XX5(1000),XX6(1000),XX7(1000)
0052                DIMENSION R102R(200),R104R(200),R106R(200)
0053                DIMENSION R108R(200),R110R(200),R112R(200)
0054                WRITE(4,60)
0055                READ(5,51) DATIME
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0056                WRITE(4,51) DATIME
0057                READ(5,50) RUNTIM
0058                WRITE(4,49)
0059                WRITE(4,50) RUNTIM
0060                RUNTIM=60.0*RUNTIM
0061                READ(5,53) IDT
0062                WRITE(4,9)
0063                J=0
0064          100   READ(5,6)I,A,B,C
0065                J=J+1
0066                GO TO(101,102,103,104,105,106,107,108,109,110,111),I
0067          101   A1=A
0068                B1=B
0069                C1=C
0070                GO TO 100
0071          102   A2=A
0072                B2=B
0073                C2=C
0074                GO TO 100
0075          103   A3=A
0076                B3=B
0077                C3=C
0078                GO TO 100
0079          104   A4=A
0080                B4=B
0081                C4=C
0082                GO TO 100
0083          105   A5=A
0084                B5=B
0085                C5=C
0086                GO TO 100
0087          106   A6=A
0088                B6=B
0089                C6=C
0090                GO TO 100
0091          107   A7=A
0092                B7=B
0093                C7=C
0094                GO TO 100
0095          108   A8=A
0096                B8=B
0097                C8=C
0098                GO TO 100
0099          109   A9=A
0100                B9=B
0101                C9=C
0102                GO TO 100
0103          110   A10=A
0104                B10=B
0105                C10=C
0106                GO TO 100
0107          111   A11=A
0108                B11=B
0109                C11=C
0110                IF(J-11)126,120,126
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```
0111        126   STOP
0112        120   CONTINUE
0113              J=999
0114              K=500
0115              NFND=0
0116        130   READ(5,7)M,I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11
0117              IF(M-9999)131,132,131
0118        131   NFND=NFND+1
0119              COMP=703.0/FLOAT(M)
0120              U(K)=(A1*FLOAT(I1)+B1)*C1
0121              U(K)=U(K)*COMP
0122              DU(K)=(A6*FLOAT(I6)+B6)*C6
0123              DU(K)=DU(K)*COMP
0124              IF(1-IDT)600,601,600
0125         601  DT(K)=(A7*FLOAT(I7)+B7)*C7
0126              GO TO 602
0127         600  DT(K)=-(A7*FLOAT(I7)+B7)*C7
0128         602  CONTINUE
0129              DT(K)=DT(K)*COMP
0130              FM1(J)=(A2*FLOAT(I11)+B2)*C2
0131              FM1(J)=FM1(J)*COMP
0132              FM1(J+1)=(A8*FLOAT(I5)+B8)*C8
0133              FM1(J+1)=FM1(J+1)*COMP
0134              FM2(J)=(A3*FLOAT(I10)+B3)*C3
0135              FM2(J)=FM2(J)*COMP
0136              FM2(J+1)=(A9*FLOAT(I4)+B9)*C9
0137              FM2(J+1)=FM2(J+1)*COMP
0138              FM3(J)=(A4*FLOAT(I9)+B4)*C4
0139              FM3(J)=FM3(J)*COMP
0140              FM3(J+1)=(A10*FLOAT(I3)+B10)*C10
0141              FM3(J+1)=FM3(J+1)*COMP
0142              FM4(J)=(A5*FLOAT(I8)+B5)*C5
0143              FM4(J)=FM4(J)*COMP
0144              FM4(J+1)=(A11*FLOAT(I2)+B11)*C11
0145              FM4(J+1)=FM4(J+1)*COMP
0146              J=J-2
0147              K=K-1
0148              GO TO 130
0149        132   J=J+2
0150              K=K+1
0151              NM=2*NFND
0152              L=NM/10
0153              LS=L/2
0154              DO 140 JN=1,NM
0155              FM1(JN)=FM1(J)
0156              FM2(JN)=FM2(J)
0157              FM3(JN)=FM3(J)
0158              FM4(JN)=FM4(J)
0159        140   J=J+1
0160              DO 141 KN=1,NFND
0161              U(KN)=U(K)
0162              DU(KN)=DU(K)
0163              DT(KN)=DT(K)
0164        141   K=K+1
0165              D1=8.0
```

```
0166                D1=D1/2.0
0167                D2=C1*200.0
0168                D2=D2/10.0
0169                D3=C2*200.0
0170                D3=D3/10.0
0171                D4=C3*200.0
0172                D4=D4/10.0
0173                D5=C4*200.0
0174                D5=D5/10.0
0175                D6=3.5
0176                D6=D6/2.0
0177                D7=3.5
0178                D7=D7/2.0
0179                NMA=NM-1
0180                NFNDA=NFND-1
0181                DO 700 I=2,NMA
0182                Q2=((FM1(I-1)+FM1(I+1))/2.0)-FM1(I)
0183                IF(D2-Q2)701,702,702
0184          701   FM1(I)=(FM1(I-1)+FM1(I+1))/2.0
0185          702   CONTINUE
0186                Q3=((FM2(I-1)+FM2(I+1))/2.0)-FM2(I)
0187                IF(D3-Q3)703,704,704
0188          703   FM2(I)=(FM2(I-1)+FM2(I+1))/2.0
0189          704   CONTINUE
0190                Q4=((FM3(I-1)+FM3(I+1))/2.0)-FM3(I)
0191                IF(D4-Q4)705,706,706
0192          705   FM3(I)=(FM3(I-1)+FM3(I+1))/2.0
0193          706   CONTINUE
0194                Q5=((FM4(I-1)+FM4(I+1))/2.0)-FM4(I)
0195                IF(D5-Q5)707,700,700
0196          707   FM4(I)=(FM4(I-1)+FM4(I+1))/2.0
0197          700   CONTINUE
0198                DO 800 I=2,NFNDA
0199                Q1=((U(I-1)+U(I+1))/2.0)-U(I)
0200                IF(D1-Q1)801,802,802
0201          801   U(I)=(U(I-1)+U(I+1))/2.0
0202          802   CONTINUE
0203                Q6=((DU(I-1)+DU(I+1))/2.0)-DU(I)
0204                IF(D6-Q6)803,804,804
0205          803   DU(I)=(DU(I-1)+DU(I+1))/2.0
0206          804   CONTINUE
0207                Q7=((DT(I-1)+DT(I+1))/2.0)-DT(I)
0208                IF(D7-Q7)805,800,800
0209          805   DT(I)=(DT(I-1)+DT(I+1))/2.0
0210          800   CONTINUE
0211                FNM=FLOAT(NM)
0212                FNFND=FLOAT(NFND)
0213                J=1
0214                K=1
0215          149   WRITE(4,10) K,FM1(J),FM2(J),FM3(J),FM4(J),U(K),DU(K),DT(K),FM1(J+1
                    1),FM2(J+1),FM3(J+1),FM4(J+1)
0216                IF(K-NFND)150,151,151
0217          150   J=J+2
0218                K=K+1
0219                GO TO 149
```

```
0220        151   SM1=0.0
0221              SM2=0.0
0222              SM3=0.0
0223              SM4=0.0
0224              SM5=0.0
0225              SM6=0.0
0226              SM7=0.0
0227              SM8=0.0
0228              SM9=0.0
0229              SM10=0.0
0230              SM11=0.0
0231              DO 160 J=1,NM
0232              SM2=SM2+FM1(J)
0233              SM3=SM3+FM2(J)
0234              SM4=SM4+FM3(J)
0235        160   SM5=SM5+FM4(J)
0236              DO 161 K=1,NFND
0237              SM1=SM1+U(K)
0238              SM6=SM6+DU(K)
0239        161   SM7=SM7+DT(K)
0240              SM1=SM1/FNFND
0241              SM2=SM2/FNM
0242              SM3=SM3/FNM
0243              SM4=SM4/FNM
0244              SM5=SM5/FNM
0245              SM6=SM6/FNFND
0246              SM7=SM7/FNFND
0247              WRITE(4,11)
0248              WRITE(4,12) SM1,SM2,SM3,SM4,SM5,SM6,SM7,SM8,SM9,SM10,SM11
0249              VAR1=0.0
0250              VAR2=0.0
0251              VAR3=0.0
0252              VAR4=0.0
0253              VAR5=0.0
0254              VAR6=0.0
0255              VAR7=0.0
0256              VAR8=0.0
0257              VAR9=0.0
0258              VAR10=0.0
0259              VAR11=0.0
0260              DO 170 J=1,NM
0261              VAR2=VAR2+(FM1(J)-SM2)**2
0262              VAR3=VAR3+(FM2(J)-SM3)**2
0263              VAR4=VAR4+(FM3(J)-SM4)**2
0264        170   VAR5=VAR5+(FM4(J)-SM5)**2
0265              DO 171 K=1,NFND
0266              VAR1=VAR1+(U(K)-SM1)**2
0267              VAR6=VAR6+(DU(K)-SM6)**2
0268        171   VAR7=VAR7+(DT(K)-SM7)**2
0269              SD1=SQRT(VAR1/FNFND)
0270              SD2=SQRT(VAR2/FNM)
0271              SD3=SQRT(VAR3/FNM)
0272              SD4=SQRT(VAR4/FNM)
0273              SD5=SQRT(VAR5/FNM)
0274              SD6=SQRT(VAR6/FNFND)
```

```
0275                SD7=SQRT(VAR7/FNFND)
0276                WRITE(4,12) SD1,SD2,SD3,SD4,SD5,SD6,SD7
0277                CV1=SD1/SM1
0278                CV2=SD2/SM2
0279                CV3=SD3/SM3
0280                CV4=SD4/SM4
0281                CV5=SD5/SM5
0282                CV6=SD6/SM6
0283                CV7=SD7/SM7
0284                WRITE(4,40) CV1,CV2,CV3,CV4,CV5,CV6,CV7
0285                G=9.81
0286                T=285.0
0287                DELZ=7.0
0288                GAMMA=0.01
0289                DELU=SM6/DELZ
0290                DELU=DELU**2
0291                DELT=-SM7/DELZ
0292                RI=(G*(DELT+GAMMA))/(T*DELU)
0293                WRITE(4,13)
0294                WRITE(4,14) RI
0295                ST=RUNTIM/FNFND
0296                ST=ST/2.0
0297                WRITE(4,15)
0298                WRITE(4,14) ST
0299                CALL AUTO(FM1,NM,L,R2)
0300                CALL AUTO(FM2,NM,L,R3)
0301                CALL AUTO(FM3,NM,L,R4)
0302                CALL AUTO(FM4,NM,L,R5)
0303                CALL AUTO(U,NFND,LS,R1)
0304                CALL AUTO(DU,NFND,LS,R6)
0305                CALL AUTO(DT,NFND,LS,R7)
0306                SMA1=SQRT(R1(1))
0307                SMA2=SQRT(R2(1))
0308                SMA3=SQRT(R3(1))
0309                SMA4=SQRT(R4(1))
0310                SMA5=SQRT(R5(1))
0311                SMA6=SQRT(R6(1))
0312                SMA7=SQRT(R7(1))
0313                WRITE(4,16)
0314                WRITE(4,17)(I,R2(I),R3(I),R4(I),R5(I),I=1,L)
0315                WRITE(4,18)
0316                WRITE(4,32)(I,R1(I),R6(I),R7(I),I=1,LS)
0317                WRITE(4,20)
0318                WRITE(4,12) SMA2,SMA3,SMA4,SMA5,SMA1,SMA6,SMA7
0319                RR1=R1(1)
0320                RR2=R2(1)
0321                RR3=R3(1)
0322                RR4=R4(1)
0323                RR5=R5(1)
0324                RR6=R6(1)
0325                RR7=R7(1)
0326                DO 180 I=1,L
0327                R2(I)=R2(I)/RR2
0328                R3(I)=R3(I)/RR3
0329                R4(I)=R4(I)/RR4
```

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0330        180   R5(I)=R5(I)/RR5
0331              DO 181 I=1,LS
0332              R1(I)=R1(I)/RR1
0333              R6(I)=R6(I)/RR6
0334        181   R7(I)=R7(I)/RR7
0335              CALL CROSS(FM1,FM2,NM,L,R101,R102)
0336              CALL CROSS(FM1,FM3,NM,L,R103,R104)
0337              CALL CROSS(FM1,FM4,NM,L,R105,R106)
0338              CALL CROSS(FM2,FM3,NM,L,R107,R108)
0339              CALL CROSS(FM2,FM4,NM,L,R109,R110)
0340              CALL CROSS(FM3,FM4,NM,L,R111,R112)
0341              DO 190 I=1,L
0342              R101(I)=R101(I)/(SMA2*SMA3)
0343              R102(I)=R102(I)/(SMA2*SMA3)
0344              R103(I)=R103(I)/(SMA2*SMA4)
0345              R104(I)=R104(I)/(SMA2*SMA4)
0346              R105(I)=R105(I)/(SMA2*SMA5)
0347              R106(I)=R106(I)/(SMA2*SMA5)
0348              R107(I)=R107(I)/(SMA3*SMA4)
0349              R108(I)=R108(I)/(SMA3*SMA4)
0350              R109(I)=R109(I)/(SMA3*SMA5)
0351              R110(I)=R110(I)/(SMA3*SMA5)
0352              R111(I)=R111(I)/(SMA4*SMA5)
0353        190   R112(I)=R112(I)/(SMA4*SMA5)
0354              WRITE(4,22)
0355              WRITE(4,23)(I,R101(I),R102(I),R103(I),R104(I),R105(I),R106(I),I=1,
                 1L)
0356              WRITE(4,24)
0357              WRITE(4,23)(I,R107(I),R108(I),R109(I),R110(I),R111(I),R112(I),I=1,
                 1L)
0358              J=1
0359              MNM=NM-1
0360              DO 200 JN=1,MNM,2
0361              FMS1(J)=(FM1(JN)+FM1(JN+1))/2.0
0362              FMS2(J)=(FM2(JN)+FM2(JN+1))/2.0
0363              FMS3(J)=(FM3(JN)+FM3(JN+1))/2.0
0364              FMS4(J)=(FM4(JN)+FM4(JN+1))/2.0
0365        200   J=J+1
0366              CALL CROSS(FMS1,U,NFND,LS,R200,R201)
0367              CALL CROSS(FMS1,DU,NFND,LS,R202,R203)
0368              CALL CROSS(FMS1,DT,NFND,LS,R204,R205)
0369              CALL CROSS(FMS2,U,NFND,LS,R210,R211)
0370              CALL CROSS(FMS2,DU,NFND,LS,R212,R213)
0371              CALL CROSS(FMS2,DT,NFND,LS,R214,R215)
0372              CALL CROSS(FMS3,U,NFND,LS,R220,R221)
0373              CALL CROSS(FMS3,DU,NFND,LS,R222,R223)
0374              CALL CROSS(FMS3,DT,NFND,LS,R224,R225)
0375              CALL CROSS(FMS4,U,NFND,LS,R230,R231)
0376              CALL CROSS(FMS4,DU,NFND,LS,R232,R233)
0377              CALL CROSS(FMS4,DT,NFND,LS,R234,R235)
0378              CALL CROSS(U,DU,NFND,LS,R300,R301)
0379              CALL CROSS(U,DT,NFND,LS,R302,R303)
0380              CALL CROSS(DU,DT,NFND,LS,R304,R305)
0381              DO 210 J=1,LS
0382              R200(J)=R200(J)/(SMA2*SMA1)
```

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0383                R201(J)=R201(J)/(SMA2*SMA1)
0384                R202(J)=R202(J)/(SMA2*SMA6)
0385                R203(J)=R203(J)/(SMA2*SMA6)
0386                R204(J)=R204(J)/(SMA2*SMA7)
0387                R205(J)=R205(J)/(SMA2*SMA7)
0388                R210(J)=R210(J)/(SMA3*SMA1)
0389                R211(J)=R211(J)/(SMA3*SMA1)
0390                R212(J)=R212(J)/(SMA3*SMA6)
0391                R213(J)=R213(J)/(SMA3*SMA6)
0392                R214(J)=R214(J)/(SMA3*SMA7)
0393                R215(J)=R215(J)/(SMA3*SMA7)
0394                R220(J)=R220(J)/(SMA4*SMA1)
0395                R221(J)=R221(J)/(SMA4*SMA1)
0396                R222(J)=R222(J)/(SMA4*SMA6)
0397                R223(J)=R223(J)/(SMA4*SMA6)
0398                R224(J)=R224(J)/(SMA4*SMA7)
0399                R225(J)=R225(J)/(SMA4*SMA7)
0400                R230(J)=R230(J)/(SMA5*SMA1)
0401                R231(J)=R231(J)/(SMA5*SMA1)
0402                R232(J)=R232(J)/(SMA5*SMA6)
0403                R233(J)=R233(J)/(SMA5*SMA6)
0404                R234(J)=R234(J)/(SMA5*SMA7)
0405                R235(J)=R235(J)/(SMA5*SMA7)
0406                R300(J)=R300(J)/(SMA1*SMA6)
0407                R301(J)=R301(J)/(SMA1*SMA6)
0408                R302(J)=R302(J)/(SMA1*SMA7)
0409                R303(J)=R303(J)/(SMA1*SMA7)
0410                R304(J)=R304(J)/(SMA6*SMA7)
0411          210   R305(J)=R305(J)/(SMA6*SMA7)
0412                WRITE(4,26)
0413                WRITE(4,23)(I,R200(I),R201(I),R202(I),R203(I),R204(I),R205(I),I=1,
                   1LS)
0414                WRITE(4,27)
0415                WRITE(4,23)(I,R210(I),R211(I),R212(I),R213(I),R214(I),R215(I),I=1,
                   1LS)
0416                WRITE(4,28)
0417                WRITE(4,23)(I,R220(I),R221(I),R222(I),R223(I),R224(I),R225(I),I=1,
                   1LS)
0418                WRITE(4,29)
0419                WRITE(4,23)(I,R230(I),R231(I),R232(I),R233(I),R234(I),R235(I),I=1,
                   1LS)
0420                WRITE(4,30)
0421                WRITE(4,23)(I,R300(I),R301(I),R302(I),R303(I),R304(I),R305(I),I=1,
                   1LS)
0422                AL1=0.0
0423                AL2=0.0
0424                AL3=0.0
0425                AL4=0.0
0426                AL5=0.0
0427                AL6=0.0
0428                AL7=0.0
0429                AL8=0.0
0430                AL9=0.0
0431                AL10=0.0
0432                AL11=0.0
```

```
0433              DO 220 I=1,L
0434              AL2=AL2+(R2(I)*ST)
0435              AL3=AL3+(R3(I)*ST)
0436              AL4=AL4+(R4(I)*ST)
0437        220   AL5=AL5+(R5(I)*ST)
0438              DO 221 I=1,LS
0439              AL1=AL1+(R1(I)*2.0*ST)
0440              AL6=AL6+(R6(I)*2.0*ST)
0441        221   AL7=AL7+(R7(I)*2.0*ST)
0442              WRITE(4,33)
0443              WRITE(4,34) AL2,AL3,AL4,AL5,AL1,AL6,AL7
0444              VMAX1=200.0*C2
0445              VMAX2=200.0*C3
0446              VMAX3=200.0*C4
0447              VMAX4=200.0*C5
0448              IF(VMAX1-VMAX2)400,400,401
0449        400   VMAXF=VMAX2
0450              GO TO 411
0451        401   VMAXF=VMAX1
0452        411   IF(VMAXF-VMAX3)402,402,403
0453        402   VMAXF=VMAX3
0454        403   IF(VMAXF-VMAX4)404,404,405
0455        404   VMAXF=VMAX4
0456        405   CONTINUE
0457              VMAXF=VMAXF*1.20
0458              DO 410 J=1,NM
0459              FM1(J)=FM1(J)/VMAXF
0460              IF(FM1(J)-1.0)900,900,901
0461         901  FM1(J)=1.0
0462         900  FM2(J)=FM2(J)/VMAXF
0463              IF(FM2(J)-1.0)902,902,903
0464         903  FM2(J)=1.0
0465         902  FM3(J)=FM3(J)/VMAXF
0466              IF(FM3(J)-1.0)904,904,905
0467         905  FM3(J)=1.0
0468         904  FM4(J)=FM4(J)/VMAXF
0469              IF(FM4(J)-1.0)410,410,906
0470         906  FM4(J)=1.0
0471         410  CONTINUE
0472              DO 420 J=1,NFND
0473              U(J)=U(J)/8.0
0474              IF(U(J)-1.0)910,910,911
0475         911  U(J)=1.0
0476         910  DU(J)=DU(J)/3.5
0477              IF(DU(J)-1.0)912,912,913
0478         913  DU(J)=1.0
0479         912  DT(J)=DT(J)/3.5
0480              IF(DT(J)-1.0)420,420,914
0481         914  DT(J)=1.0
0482         420  CONTINUE
0483              DO 500 J=1,L
0484        500   X1(J)=FLOAT(J-1)*ST
0485              DO 501 J=1,LS
0486        501   X2(J)=FLOAT(J-1)*ST*2.0
0487              DO 502 J=1,NM
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0488              XX1(J)=FLOAT(J-1)*ST
0489              XX2(J)=FLOAT(J-1)*ST+(ST/6.0)
0490              XX3(J)=FLOAT(J-1)*ST+(ST/3.0)
0491        502   XX4(J)=FLOAT(J-1)*ST+(ST/2.0)
0492              DO 503 J=1,NFND
0493              XX5(J)=FLOAT(J-1)*2.0*ST+(ST*0.667)
0494              XX6(J)=FLOAT(J-1)*2.0*ST+(ST*0.833)
0495        503   XX7(J)=FLOAT(J-1)*2.0*ST+(ST*1.833)
0496              XTEST=X1(L)
0497              XTEST=XTEST/10.0
0498              XTEST=FLOAT(IFIX(XTEST))
0499              XTEST=XTEST*10.0
0500              XMIN=-(XTEST+10.0)
0501              AXLTH1=(XTEST/10.0)+1.0
0502              AXLTH2=(XX4(NM)/20.0)+1.0
0503              AXLTH3=2.0*AXLTH1
0504              XPOS2=2.0*AXLTH1+1.0+0.5
0505              XPOS3=3.0*AXLTH1+2.0+0.5
0506              XPOS4=XPOS2-AXLTH1
0507              M=L
0508              DO 504 J=1,L
0509              R102R(M)=R102(J)
0510              R104R(M)=R104(J)
0511              R106R(M)=R106(J)
0512              R108R(M)=R108(J)
0513              R110R(M)=R110(J)
0514              R112R(M)=R112(J)
0515        504   M=M-1
0516              DO 610 J=1,NFND
0517              IF(DT(J))611,610,610
0518         611  DT(J)=-DT(J)
0519         610  CONTINUE
0520              CALL PLTXMX(160.0)
0521              CALL PAXIS(0.5,0.5,'TIME (SEC)',-10,AXLTH1,0.0,0.0,10.0,1.0)
0522              CALL PAXIS(0.5,0.5,'AUTOCORRELATION',15,10.0,90.0,-1.0,0.2,1.0)
0523              CALL PSYMB(1.0,1.0,-0.1,'DPH76 C.D.JONES',0.0,15)
0524              CALL PSYMB(3.0,1.0,-0.1,DATIME,0.0,15)
0525              CALL PLTOFS(0.0,10.0,-1.0,0.2,0.5,0.5)
0526              CALL PLINE(X1,R2,L,1,4,0,1.0)
0527              CALL PLINE(X1,R3,L,1,4,1,1.0)
0528              CALL PLINE(X1,R4,L,1,4,2,1.0)
0529              CALL PLINE(X1,R5,L,1,4,3,1.0)
0530              CALL PLINE(X2,R1,LS,1,3,4,1.0)
0531              CALL PLINE(X2,R6,LS,1,3,5,1.0)
0532              CALL PLINE(X2,R7,LS,1,3,6,1.0)
0533              CALL PAXIS(XPOS4,0.5,'TIME (SEC)',-10,AXLTH3,0.0,XMIN,10.0,1.0)
0534              CALL PAXIS(XPOS2,0.5,'CROSSCORRELATION',16,10.0,90.0,-1.0,0.2,1.0)
0535              XPOS4=XPOS2-X1(L)/10.0
0536              CALL PLTOFS(0.0,10.0,-1.0,0.2,XPOS4,0.5)
0537              CALL PLINE(X1,R102R,L,1,4,0,1.0)
0538              CALL PLINE(X1,R104R,L,1,4,1,1.0)
0539              CALL PLINE(X1,R106R,L,1,4,2,1.0)
0540              CALL PLINE(X1,R108R,L,1,4,3,1.0)
0541              CALL PLINE(X1,R110R,L,1,4,4,1.0)
0542              CALL PLINE(X1,R112R,L,1,4,5,1.0)
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0543                CALL PLTOFS(0.0,10.0,-1.0,0.2,XPOS2,0.5)
0544                CALL PLINE(X1,R101,L,1,4,0,1.0)
0545                CALL PLINE(X1,R103,L,1,4,1,1.0)
0546                CALL PLINE(X1,R105,L,1,4,2,1.0)
0547                CALL PLINE(X1,R107,L,1,4,3,1.0)
0548                CALL PLINE(X1,R109,L,1,4,4,1.0)
0549                CALL PLINE(X1,R111,L,1,4,5,1.0)
0550                CALL PAXIS(XPOS3,0.5,'TIME (SEC)',-10,AXLTH2,0.0,0.0,20.0,1.0)
0551                CALL PAXIS(XPOS3,0.5,'ARB UNITS',9,10.0,90.0,0.0,0.1,1.0)
0552                CALL PLTOFS(0.0,20.0,0.0,0.1,XPOS3,0.5)
0553                CALL PLINE(XX1,FM1,NM,1,4,0,1.0)
0554                CALL PLINE(XX2,FM2,NM,1,4,1,1.0)
0555                CALL PLINE(XX3,FM3,NM,1,4,2,1.0)
0556                CALL PLINE(XX4,FM4,NM,1,4,3,1.0)
0557                CALL PLINE(XX5,DT,NFND,1,3,6,1.0)
0558                CALL PLINE(XX6,DU,NFND,1,3,5,1.0)
0559                CALL PLINE(XX7,U,NFND,1,3,4,1.0)
0560                CALL PLTEND
0561                STOP
0562                END
```

TOTAL MEMORY REQUIREMENTS 020662 BYTES
"DPRO" DOES NOT EXIST.

```
0165                ZDASH=X(I)*TAN(BETA)
0166                Z(I)=H+(AZ*T*SIN(2.*PI*FZ*T))
0167                Z(I)=Z(I)+ZDASH
0168                IF(Z(I)-0.1)301,300,300
0169          301   Z(I)=0.1
0170          300   T=T+DELT
0171                DO 310 I=1,JMAX
0172                IF(AY)400,400,401
0173          400   Y(I)=0.0
0174                GO TO 402
0175          401   Y(I)=Y(I)/(AY*TMAX)
0176          402   CONTINUE
0177                IF(BETA)600,600,601
0178          600   Z(I)=Z(I)/(H+(AZ*TMAX))
0179                GO TO 310
0180          601   Z(I)=Z(I)/(H+(AZ*TMAX)+(X(JMAX)*TAN(BETA)))
0181          310   CONTINUE
0182                AXLTH=TMAX/2.0
0183                AXLTH1=XMAX/10.
0184                XPOS1=AXLTH+3.
0185                XPOS2=AXLTH+AXLTH1+6.
0186                CALL PLTXMX(100.)
0187                CALL PAXIS(0.5,0.5,'TIME (SEC)',-10,AXLTH,0.0,0.0,2.0,1.0)
0188                CALL PAXIS(0.5,0.5,'ARB UNITS',9,10.0,90.0,0.0,0.1,1.0)
0189                CALL PSYMB(1.0,1.0,-0.1,'DPH 76 C.D.JONES',0.0,16)
0190                CALL PSYMB(1.0,9.0,-0.1,RUN,0.0,15)
0191                CALL PLTOFS(0.0,2.0,0.0,0.1,0.5,0.5)
0192                CALL PLINE(XX,FM1,KMAX,1,4,0,1.0)
0193                CALL PLINE(XX,FM2,KMAX,1,4,1,1.0)
0194                CALL PLINE(XX,FM3,KMAX,1,4,2,1.0)
0195                CALL PAXIS(XPOS1,0.5,'DIST (M) X',-10,AXLTH1,0.0,0.0,10.0,1.0)
0196                CALL PAXIS(XPOS1,0.5,'DIST (M) Y',-10,10.0,90.0,-1.0,0.2,1.0)
0197                CALL PLTOFS(0.0,10.0,-1.0,0.2,XPOS1,0.5)
0198                CALL PLINE(X,Y,JMAX,1,0,0,1.0)
0199                CALL PAXIS(XPOS2,0.5,'DIST (M) X',-10,AXLTH1,0.0,0.0,10.0,1.0)
0200                CALL PAXIS(XPOS2,0.5,'DIST (M) Z',-10,10.0,90.0,0.0,0.1,1.0)
0201                CALL PLTOFS(0.0,10.0,0.0,0.1,XPOS2,0.5)
0202                CALL PLINE(X,Z,JMAX,1,0,0,1.0)
0203                CALL PLTEND
0204                STOP
0205                END
```

TOTAL MEMORY REQUIREMENTS 020CAE BYTES

*** GLOBAL TIME LIMIT EXCEEDED AT A0509504

```
0111              C5(I)=C5(I)/(SM2*SM3)
0112           60 C6(I)=C6(I)/(SM2*SM3)
0113              WRITE(4,3)(I,A1(I),A2(I),A3(I),C1(I),C2(I),C3(I),C4(I),C5(I),C6(I)
                 1,I=1,L)
0114              SFM1=0.
0115              SFM2=0.
0116              SFM3=0.
0117              SKFM1=0.
0118              SKFM2=0.
0119              SKFM3=0.
0120              FKMAX=FLOAT(KMAX)
0121              DO 500 I=1,KMAX
0122              SFM1=SFM1+FM1(I)
0123              SFM2=SFM2+FM2(I)
0124          500 SFM3=SFM3+FM3(I)
0125              SFM1=SFM1/FKMAX
0126              SFM2=SFM2/FKMAX
0127              SFM3=SFM3/FKMAX
0128              DO 501 I=1,KMAX
0129              SKFM1=SKFM1+((FM1(I)-SFM1)**3)
0130              SKFM2=SKFM2+((FM2(I)-SFM2)**3)
0131          501 SKFM3=SKFM3+((FM3(I)-SFM3)**3)
0132              SKFM1=SKFM1/(FKMAX*(SM1**3))
0133              SKFM2=SKFM2/(FKMAX*(SM2**3))
0134              SKFM3=SKFM3/(FKMAX*(SM3**3))
0135              WRITE(4,8)
0136              WRITE(4,9) SFM1,SFM2,SFM3
0137              WRITE(4,9) SM1,SM2,SM3
0138              WRITE(4,9) SKFM1,SKFM2,SKFM3
0139              DO 70 K=1,KMAX
0140           70 XX(K)=FLOAT(K)*DDT
0141              KMAX1=KMAX-1
0142              FMMX=1.0
0143              DO 200 I=1,KMAX1
0144          102 IF(FM1(I)-FMMX)100,100,101
0145          101 FMMX=2.*FMMX
0146              GO TO 102
0147          100 CONTINUE
0148          105 IF(FM2(I)-FMMX)103,103,104
0149          104 FMMX=2.*FMMX
0150              GO TO 105
0151          103 CONTINUE
0152          108 IF(FM3(I)-FMMX)106,106,107
0153          107 FMMX=2.*FMMX
0154              GO TO 108
0155          106 CONTINUE
0156          200 CONTINUE
0157              DO 210 I=1,KMAX
0158              FM1(I)=FM1(I)/FMMX
0159              FM2(I)=FM2(I)/FMMX
0160          210 FM3(I)=FM3(I)/FMMX
0161              T=0.
0162              DO 300 I=1,JMAX
0163              X(I)=U*T
0164              Y(I)=AY*T*SIN(2.*PI*FY*T)
```

```
0056              IF(Z(I)-0.1)11,11,12
0057          11  Z(I)=0.1
0058          12  CONTINUE
0059          10  T=T+DELT
0060              JMAX1=JMAX-1
0061              DO 20 I=1,JMAX1
0062              DXX(I)=X(I+1)-X(I)
0063              DYY(I)=Y(I+1)-Y(I)
0064              DZZ(I)=Z(I+1)-Z(I)
0065              DS(I)=SQRT(DXX(I)**2+DYY(I)**2+DZZ(I)**2)
0066          20  CONTINUE
0067              DS(JMAX)=DS(JMAX1)
0068              DO 30 I=1,JMAX
0069              X1(I)=X(I)-XM1
0070              X2(I)=X(I)-XM2
0071              Y1(I)=Y(I)-YM1
0072              Y2(I)=Y(I)-YM2
0073              X3(I)=X(I)-XM3
0074          30  Y3(I)=Y(I)-YM3
0075              DO 40 I=1,JMAX
0076              R1(I)=SQRT(X1(I)**2+Y1(I)**2+Z(I)**2)
0077              R2(I)=SQRT(X2(I)**2+Y2(I)**2+Z(I)**2)
0078              R3(I)=SQRT(X3(I)**2+Y3(I)**2+Z(I)**2)
0079              SINFI1(I)=Z(I)/R1(I)
0080              SINFI2(I)=Z(I)/R2(I)
0081              SINFI3(I)=Z(I)/R3(I)
0082              R1(I)=R1(I)**2
0083              R2(I)=R2(I)**2
0084              P3(I)=R3(I)**2
0085              FLD1=FLD1+(RHO*SINFI1(I)*DS(I))/(2.0*PI*EPSLON*R1(I))
0086              FLD2=FLD2+(RHO*SINFI2(I)*DS(I))/(2.0*PI*EPSLON*R2(I))
0087              FLD3=FLD3+(RHO*SINFI3(I)*DS(I))/(2.0*PI*EPSLON*R3(I))
0088          40  CONTINUE
0089              FM1(II)=FLD1
0090              FM2(II)=FLD2
0091              FM3(II)=FLD3
0092              II=II+1
0093              DT=DT+DDT
0094              IF(KMAX-II)50,51,51
0095          50  WRITE(4,2)(FM1(I),FM2(I),FM3(I),I=1,KMAX)
0096              L=KMAX/2
0097              CALL AUTO(FM1,KMAX,L,A1)
0098              CALL AUTO(FM2,KMAX,L,A2)
0099              CALL AUTO(FM3,KMAX,L,A3)
0100              CALL CROSS(FM1,FM2,KMAX,L,C1,C2)
0101              CALL CROSS(FM1,FM3,KMAX,L,C3,C4)
0102              CALL CROSS(FM2,FM3,KMAX,L,C5,C6)
0103              SM1=SQRT(A1(1))
0104              SM2=SQRT(A2(1))
0105              SM3=SQRT(A3(1))
0106              DO 60 I=1,L
0107              C1(I)=C1(I)/(SM1*SM2)
0108              C2(I)=C2(I)/(SM1*SM2)
0109              C3(I)=C3(I)/(SM1*SM3)
0110              C4(I)=C4(I)/(SM1*SM3)
```

OSCPLMPROG

```
0001              DIMENSION X(1000),Y(1000),Z(1000),DXX(1000),DYY(1000),DZZ(1000)
0002              DIMENSION DS(1000),X1(1000),X2(1000),Y1(1000),Y2(1000),FM1(1000)
0003              DIMENSION FM2(1000),SINFI1(1000),SINFI2(1000),R1(1000),R2(1000)
0004              DIMENSION A1(1000),A2(1000),C1(1000),C2(1000)
0005              DIMENSION X3(1000),Y3(1000),FM3(1000),SINFI3(1000),R3(1000)
0006              DIMENSION A3(1000),C3(1000),C4(1000),C5(1000),C6(1000)
0007              DIMENSION XX(1000)
0008              DIMENSION RUN(4)
0009            1 FORMAT('1TRIAL')
0010              WRITE(4,1)
0011            2 FORMAT(3E15.3)
0012            3 FORMAT(I4,3E15.3,6F10.3)
0013            4 FORMAT(8E15.3)
0014            5 FORMAT(6F10.3)
0015            6 FORMAT(4A4)
0016            7 FORMAT('1 OSC.PLUME')
0017            8  FORMAT('1 MEAN,SD,SKEW  MILLS')
0018            9 FORMAT(3E15.3)
0019              WRITE(4,7)
0020              READ(5,6) RUN
0021              READ(5,5) RR1,RR2,RR3,ALFA1,ALFA2,ALFA3
0022              READ(5,5) AY,AZ,FY,FZ,U,H
0023              READ(5,5) DDT,DX,TMAX,XMAX,BETA
0024              WRITE(4,5) RR1,RR2,RR3,ALFA1,ALFA2,ALFA3
0025              WRITE(4,5) AY,AZ,FY,FZ,U,H
0026              WRITE(4,5) DDT,DX,TMAX,XMAX,BETA
0027              CURR=0.C0001
0028              EPSLON=8.85E-12
0029              PI=3.14
0030              DELT=DX/U
0031              JMAX=IFIX(XMAX/DX)
0032              KMAX=IFIX(TMAX/DDT)
0033              RHO=CURR/U
0034              ALFA1=ALFA1*PI/180.0
0035              ALFA2=ALFA2*PI/180.0
0036              ALFA3=ALFA3*PI/180.0
0037              BETA=BETA*PI/180.
0038              XM1=RR1*COS(ALFA1)
0039              YM1=RR1*SIN(ALFA1)
0040              XM2=RR2*COS(ALFA2)
0041              YM2=RR2*SIN(ALFA2)
0042              XM3=RR3*COS(ALFA3)
0043              YM3=RR3*SIN(ALFA3)
0044              II=1
0045              DT=0.0
0046           51 FLD1=0.0
0047              FLD2=0.0
0048              FLD3=0.0
0049              T=0.0
0050              DO 10 I=1,JMAX
0051              X(I)=U*T
0052              Y(I)=AY*T*SIN(2.0*PI*FY*(T+DT))
0053              ZDASH=X(I)*TAN(BETA)
0054              Z(I)=H+AZ*T*SIN(2.0*PI*FZ*(T+DT))
0055              Z(I)=Z(I)+ZDASH
```

PLMPOSNPROG

```
0001        11    FORMAT(8A4)
0002        12    FORMAT(F10.3)
0003              DIMENSION DATIME(8)
0004              DIMENSION XP(50),YP(50),ZP(50)
0005              REAL*8 TT
0006              XPOS=0.5
0007              IMAX=40
0008              IMIN=IMAX-20
0009              READ(3,11) DATIME
0010              CALL PLTXMX(160.)
0011              CALL PSYMB(1.0,10.0,-0.1,DATIME,0.0,32)
0012              CALL PSYMB(1.0,9.0,-0.1,'DPH76',0.0,5)
0013              READ(3,12) DT
0014        104   READ(3) I,MM,(XP(J),YP(J),ZP(J),J=1,MM)
0015              IF(I-IMIN)103,103,101
0016        101   IF(IMAX-I)100,102,102
0017        102   CONTINUE
0018              T=DT*FLOAT(I)
0019              XPOS1=XPOS+0.5
0020              MMM=MM-1
0021              TT=T
0022              CALL PAXIS(XPOS,2.5,'X (M)',-5,5.0,0.0,0.0,10.0,1.0)
0023              CALL PAXIS(XPOS,0.5,'Y (M)',5,4.0,90.0,10.0,-5.0,1.0)
0024              CALL PLTOFS(0.0,10.0,0.0,-5.0,XPOS,2.5)
0025              CALL PLINE(XP,YP,MMM,1,1,0,1.0)
0026              CALL PAXIS(XPOS,5.5,'X (M)',-5,5.0,0.0,0.0,10.0,1.0)
0027              CALL PAXIS(XPOS,5.5,'Z (M)',5,4.0,90.0,0.0,5.0,1.0)
0028              CALL PFNMBR(XPOS1,9.5,0.1,TT,0.0,'F10.2 *',0.0)
0029              CALL PLTOFS(0.0,10.0,0.0,5.0,XPOS,5.5)
0030              CALL PLINE(XP,ZP,MMM,1,1,0,1.0)
0031              XPOS=XPOS+6.5
0032              IF(IMAX-I)100,100,103
0033        103   GO TO 104
0034        100   CONTINUE
0035              CALL PLTEND
0036              STOP
0037              END
```

TOTAL MEMORY REQUIREMENTS 000786 BYTES
EXECUTION TERMINATED

PLM PROG

```
0001         1      FORMAT(4F15.7)
0002         2      FORMAT(T2,4F15.7)
0003              3 FORMAT(1EA.1,10E11.3)
0004              4 FORMAT(8F8.3,4E12.3)
0005         5      FORMAT(2F15.5,1F15.4,4F15.1)
0006                READ(5,1)SH,CURR
0007                READ(5,1)R,Z2,BETA
0008                READ(5,1)GKY,GKZ,U
0009                READ(5,1)SP,BP,QMIN
0010                WRITE(6,2)SH,CURR
0011                WRITE(6,1)R,Z2,BETA
0012                WRITE(6,1)GKY,GKZ,U
0013                WRITE(6,1)SP,BP,QMIN
0014                PI=3.14159
0015                EPSLON=8.854E-12
0016         50     R=-100.
0017           60   EX1=0.0
0018                EX2=0.0
0019                EY1=0.0
0020                EY2=0.0
0021                EZ1=0.0
0022                EZ2=0.0
0023                P=SP
0024                DP=10.
0025                BETRAD=BETA*PI/180.0
0026           70   DIFANG=2.0*(SQRT((9.21*GKY)/(U*(P+(DP/2.)))))
0027                DIFRAD=DIFANG*PI/180.0
0028                DALFA=DIFRAD/10.0
0029                SALFA=-DIFRAD/2.0
0030                BALFA=+DIFRAD/2.0
0031                HZ=SQRT((9.21*GKZ*(P+(DP/2.)))/U)
0032                DZ1=HZ/5.0
0033                DVOL=P*DP*DALFA*DZ1
0034                ALFA=SALFA
0035            80  AZI=-9.2104*((ALFA**2)/(DIFRAD**2))
0036                AZI=EXP(AZI)
0037                Z1=SH-HZ
0038                BZ1=SH+HZ+(DZ1/10.0)
0039            99  CONTINUE
0040                IF(Z1)100,100,101
0041         101    A=0.0
0042                ELLO=Z1-SH
0043                ELLO=-2.3026*((ELLO**2)/(HZ**2))
0044                CHI1=(AZI*(EXP(ELLO)))/HZ
0045                CHI1=(CHI1*4.6052*CURR)/(PI*U*P*DIFRAD)
0046         102    QSQD=(P*COS(ALFA)-R*COS(BETRAD))**2+(P*SIN(ALFA)-R*SIN(BETRAD))**2
                   1+(Z1-Z2)**2
0047                Q=SQRT(QSQD)
0048                IF(Q-QMIN)98,104,104
0049         104    SINFI=(Z1-Z2)/Q
0050                IF(1.0+SINFI)200,201,201
0051         200    SINFI=-1.0
0052                GO TO 211
0053         201    CONTINUE
0054                IF(1.0-SINFI)210,211,211
0055         210    SINFI=+1.0
0056         211    CONTINUE
0057                FI=ARSIN(SINFI)
```

```
0058              COSFI=COS(FI)
0059              COSTHE=(P*COS(ALFA)-R*COS(BETRAD))/(Q*COSFI)
0060              IF(1.0+COSTHE)300,301,301
0061          300 COSTHE=-1.0
0062              GO TO 311
0063          301 CONTINUE
0064              IF(1.0-COSTHE)310,311,311
0065          310 COSTHE=+1.0
0066          311 CONTINUE
0067              THE=ARCOS(COSTHE)
0068              SINTHE=SIN(THE)
0069              ELFLD1=-(CHI1*DVOL)/(4.0*PI*EPSLON*QSQD)
0070              EX1=EX1+ELFLD1*COSTHE*COSFI
0071              EZ1=EZ1+ELFLD1*SINFI
0072              VECT=P*SIN(ALFA)-R*SIN(BETRAD)
0073              IF(VECT)600,600,601
0074          600 ELFLD1=-ELFLD1
0075          601 EY1=EY1+ELFLD1*SINTHE*COSFI
0076              IF(VECT)800,800,801
0077          800 ELFLD1=-ELFLD1
0078          801 CONTINUE
0079           98 CHI1=-CHI1
0080              Z1=-Z1
0081              A=A+1.5
0082              IF(2.0-A)100,100,102
0083          100 Z1=Z1+DZ1
0084              IF(BZ1-Z1)103,103,99
0085          103 Z1=0.0
0086          110 BZ1=HZ-SH-Z1+(DZ1/10.0)
0087              IF(BZ1)111,115,115
0088          115 A=0.0
0089              ELHI=Z1+SH
0090              ELHI=-2.3026*((ELHI**2)/(HZ**2))
0091              CHI2=(AZI*(EXP(ELHI)))/HZ
0092              CHI2=(CHI2*4.6052*CURR)/(PI*U*P*DIFRAD)
0093          112 QSQD=(P*COS(ALFA)-R*COS(BETRAD))**2+(P*SIN(ALFA)-R*SIN(BETRAD))**2
                 1+(Z1-Z2)**2
0094              IF(Q-QMIN)114,116,116
0095          116 SINFI=(Z1-Z2)/Q
0096              IF(1.0+SINFI)400,401,401
0097          400 SINFI=-1.0
0098              GO TO 411
0099          401 CONTINUE
0100              IF(1.0-SINFI)410,411,411
0101          410 SINFI=+1.0
0102          411 CONTINUE
0103              FI=ARSIN(SINFI)
0104              COSFI=COS(FI)
0105              COSTHE=(P*COS(ALFA)-R*COS(BETRAD))/(Q*COSFI)
0106              IF(1.0+COSTHE)500,501,501
0107          500 COSTHE=-1.0
0108              GO TO 511
0109          501 CONTINUE
0110              IF(1.0-COSTHE)510,511,511
0111          510 COSTHE=+1.0
0112          511 CONTINUE
0113              THE=ARCOS(COSTHE)
0114              SINTHE=SIN(THE)
```

```
0115              ELFLD2=-(CHI2*DVOL)/(4.0*PI*EPSLON*QSQD)
0116              EX2=EX2+ELFLD2*COSTHE*COSFI
0117              EZ2=EZ2+ELFLD2*SINFI
0118              VECT=P*SIN(ALFA)-R*SIN(BETRAD)
0119              IF(VECT)700,700,701
0120          700 ELFLD2=-ELFLD2
0121          701 EY2=EY2+ELFLD2*SINTHE*COSFI
0122              IF(VECT)900,900,901
0123          900 ELFLD2=-ELFLD2
0124          901 CONTINUE
0125          114 CHI2=-CHI2
0126              Z1=-Z1
0127              A=A+1.5
0128              IF(2.0-A)113,113,112
0129          113 Z1=Z1+DZ1
0130              GO TO 110
0131          111 ALFA=ALFA+DALFA
0132              IF(BALFA+(DALFA/10.0)-ALFA)119,80,80
0133          119 EX=EX1+EX2
0134              EY=EY1+EY2
0135              EZ=EZ1+EZ2
0136              P=P+DP
0137              IF(BP+(DP/10.0)-P)120,120,70
0138          120 IF(R)1100,1100,1101
0139         1100 PLUDIM=0.
0140              GO TO 1102
0141         1101 PLUDIM=SQRT((9.21*GKZ*R)/U)
0142         1102 CONTINUE
0143              WRITE(6,5) GKY,GKZ,PLUDIM,R,EZ1,EZ2,EZ
0144              Z2=Z2+1.
0145              IF(0.9-Z2)130,60,60
0146          130 Z2=0.0
0147              R=R+20.
0148              IF(80.-R)140,60,60
0149          140 IF(200.-R)150,141,141
0150          141 R=R+10.
0151              GO TO 60
0152          150 IF(R-290.)1000,1000,1001
0153         1000 R=300.
0154              GO TO 60
0155         1001 R=R+190.
0156              IF(R-1000.)1010,1010,1011
0157         1010 CONTINUE
0158              GO TO 60
0159         1011 GKY=GKY*10.
0160              GKZ=GKZ*10.
0161              IF(110.-GKY)2000,50,50
0162         2000 STOP
0163              END
```

SUPPROG

```
0001            1 FORMAT(1F10.2)
0002            2 FORMAT('OMEANS,MILLS,U,DU,DT')
0003            3 FORMAT(7E15.3)
0004            4 FORMAT('OSD,MILLS,U,DU,DT')
0005            5 FORMAT('OSKEW,MILLS,U,DU,DT')
0006            6 FORMAT(I5,3F15.5)
0007            7 FORMAT(12I5)
0008            8 FORMAT('1FURTHER STATISTICAL ANALYSIS SERIES 1')
0009              WRITE(6,8)
0010            9 FORMAT('1POWER SPECTRUM MILLS')
0011           10 FORMAT('1POWER SPECTRUM U,DU,DT')
0012           11 FORMAT(I5,4E15.3)
0013           12 FORMAT(I5,3E15.3)
0014         13   FORMAT('OKURTOSIS MILLS,U,DU,DT')
0015       14     FORMAT('1 COHERENCE FUNCTION MILLS')
0016       15     FORMAT(I5,6E15.3)
0017       16     FORMAT('1 PHASE ANGLE MILLS')
0018              DIMENSION R1(100),R2(100),R3(100),R4(100),R5(100),R6(100)
0019              DIMENSION R7(100),R8(100),R9(100),R10(100),R11(100),R12(100)
0020              DIMENSION PS1(100),PS2(100),PS3(100),PS4(100),PS5(100),PS6(100)
0021              DIMENSION CS1(100),CS2(100),CS3(100),CS4(100),CS5(100),CS6(100)
0022              DIMENSION FM1(1000),FM2(1000),FM3(1000),FM4(1000)
0023              DIMENSION U(1000),DU(1000),DT(1000)
0024              DIMENSION G1(100),G2(100),G3(100),G4(100),G5(50),G6(50),G7(50)
0025              DIMENSION XX1(100),XX2(100)
0026              DIMENSION PWFM1(1000),PWFM2(1000),PWFM3(1000),PWFM4(1000)
0027              DIMENSION PWU(1000),PWDU(1000),PWDT(1000)
0028              READ(5,1) FF
0029              READ(5,1) RUNTIM
0030              J=0
0031       100    READ(5,6)I,A,B,C
0032              J=J+1
0033              GO TO(101,102,103,104,105,106,107,108,109,110,111),I
0034       101    A1=A
0035              B1=B
0036              C1=C
0037              GO TO 100
0038       102    A2=A
0039              B2=B
0040              C2=C
0041              GO TO 100
0042       103    A3=A
0043              B3=B
0044              C3=C
0045              GO TO 100
0046       104    A4=A
0047              B4=B
0048              C4=C
0049              GO TO 100
0050       105    A5=A
0051              B5=B
0052              C5=C
0053              GO TO 100
0054       106    A6=A
0055              B6=B
```

```
0056              C6=C
0057              GO TO 100
0058        107   A7=A
0059              B7=B
0060              C7=C
0061              GO TO 100
0062        108   A8=A
0063              B8=B
0064              C8=C
0065              GO TO 100
0066        109   A9=A
0067              B9=B
0068              C9=C
0069              GO TO 100
0070        110   A10=A
0071              B10=B
0072              C10=C
0073              GO TO 100
0074        111   A11=A
0075              B11=B
0076              C11=C
0077              IF(J-11)126,120,126
0078        126   STOP
0079        120   CONTINUE
0080              J=1000
0081              K=500
0082              NFND=0
0083         130  READ(5,7)M,I1,I11,I10,I9,I8,I6,I7,I5,I4,I3,I2
0084              IF(M-9999)131,132,131
0085        131   NFND=NFND+1
0086              COMP=703./FLOAT(M)
0087              U(K)=(A1*FLOAT(I1)+B1)*C1
0088              FM1(J-1)=(A2*FLOAT(I2)+B2)*C2
0089              FM2(J-1)=(A3*FLOAT(I3)+B3)*C3
0090              FM3(J-1)=(A4*FLOAT(I4)+B4)*C4
0091              FM4(J-1)=(A5*FLOAT(I5)+B5)*C5
0092              DU(K)=(A6*FLOAT(I6)+B6)*C6
0093              DT(K)=(A7*FLOAT(I7)+B7)*C7
0094              FM1(J)=(A8*FLOAT(I8)+B8)*C8
0095              FM2(J)=(A9*FLOAT(I9)+B9)*C9
0096              FM3(J)=(A10*FLOAT(I10)+B10)*C10
0097              FM4(J)=(A11*FLOAT(I11)+B11)*C11
0098              U(K)=U(K)*COMP
0099              FM1(J-1)=FM1(J-1)*COMP
0100              FM2(J-1)=FM2(J-1)*COMP
0101              FM3(J-1)=FM3(J-1)*COMP
0102              FM4(J-1)=FM4(J-1)*COMP
0103              DU(K)=DU(K)*COMP
0104              DT(K)=DT(K)*COMP
0105              FM1(J)=FM1(J)*COMP
0106              FM2(J)=FM2(J)*COMP
0107              FM3(J)=FM3(J)*COMP
0108              FM4(J)=FM4(J)*COMP
0109              J=J-2
0110              K=K-1
```

```
0111                GO TO 130
0112          132   J=J+2
0113                K=K+1
0114                NM=2*NFND
0115                DO 140 JN=1,NM
0116                FM1(JN)=FM1(J)
0117                FM2(JN)=FM2(J)
0118                FM3(JN)=FM3(J)
0119                FM4(JN)=FM4(J)
0120          140   J=J+1
0121                DO 141 KN=1,NFND
0122                U(KN)=U(K)
0123                DU(KN)=DU(K)
0124                DT(KN)=DT(K)
0125          141   K=K+1
0126                FNM=FLOAT(NM)
0127                FNFND=FLOAT(NFND)
0128                SM1=0.0
0129                SM2=0.0
0130                SM3=0.0
0131                SM4=0.0
0132                SM5=0.0
0133                SM6=0.0
0134                SM7=0.0
0135                SSD1=0.0
0136                SSD2=0.0
0137                SSD3=0.0
0138                SSD4=0.0
0139                SSD5=0.0
0140                SSD6=0.0
0141                SSD7=0.0
0142                SSK1=0.0
0143                SSK2=0.0
0144                SSK3=0.0
0145                SSK4=0.0
0146                SSK5=0.0
0147                SSK6=0.0
0148                SSK7=0.0
0149                DO 150 J=1,NM
0150                SM1=SM1+FM1(J)
0151                SM2=SM2+FM2(J)
0152                SM3=SM3+FM3(J)
0153          150   SM4=SM4+FM4(J)
0154                SM1=SM1/FNM
0155                SM2=SM2/FNM
0156                SM3=SM3/FNM
0157                SM4=SM4/FNM
0158                DO 151 J=1,NFND
0159                SM5=SM5+U(J)
0160                SM6=SM6+DU(J)
0161          151   SM7=SM7+DT(J)
0162                SM5=SM5/FNFND
0163                SM6=SM6/FNFND
0164                SM7=SM7/FNFND
0165                DO 160 J=1,NM
```

```
0166                SSD1=SSD1+(FM1(J)-SM1)**2
0167                SSD2=SSD2+(FM2(J)-SM2)**2
0168                SSD3=SSD3+(FM3(J)-SM3)**2
0169          160   SSD4=SSD4+(FM4(J)-SM4)**2
0170                SSD1=SQRT(SSD1/FNM)
0171                SSD2=SQRT(SSD2/FNM)
0172                SSD3=SQRT(SSD3/FNM)
0173                SSD4=SQRT(SSD4/FNM)
0174                DO 161 J=1,NFND
0175                SSD5=SSD5+(U(J)-SM5)**2
0176                SSD6=SSD6+(DU(J)-SM6)**2
0177          161   SSD7=SSD7+(DT(J)-SM7)**2
0178                SSD5=SQRT(SSD5/FNFND)
0179                SSD6=SQRT(SSD6/FNFND)
0180                SSD7=SQRT(SSD7/FNFND)
0181                DO 170 J=1,NM
0182                SSK1=SSK1+(FM1(J)-SM1)**3
0183                SSK2=SSK2+(FM2(J)-SM2)**3
0184                SSK3=SSK3+(FM3(J)-SM3)**3
0185          170   SSK4=SSK4+(FM4(J)-SM4)**3
0186                SSK1=SSK1/(FNM*(SSD1**3))
0187                SSK2=SSK2/(FNM*(SSD2**3))
0188                SSK3=SSK3/(FNM*(SSD3**3))
0189                SSK4=SSK4/(FNM*(SSD4**3))
0190                DO 171 J=1,NFND
0191                SSK5=SSK5+(U(J)-SM5)**3
0192                SSK6=SSK6+(DU(J)-SM6)**3
0193          171   SSK7=SSK7+(DT(J)-SM7)**3
0194                SSK5=SSK5/(FNFND*(SSD5**3))
0195                SSK6=SSK6/(FNFND*(SSD6**3))
0196                SSK7=SSK7/(FNFND*(SSD7**3))
0197                SK1=0.0
0198                SK2=0.0
0199                SK3=0.0
0200                SK4=0.0
0201                SK5=0.0
0202                SK6=0.0
0203                SK7=0.0
0204                DO 180 J=1,NM
0205                SK1=SK1+(FM1(J)-SM1)**4
0206                SK2=SK2+(FM2(J)-SM2)**4
0207                SK3=SK3+(FM3(J)-SM3)**4
0208          180   SK4=SK4+(FM4(J)-SM4)**4
0209                SK1=SK1/(FNM*(SSD1**4))
0210                SK2=SK2/(FNM*(SSD2**4))
0211                SK3=SK3/(FNM*(SSD3**4))
0212                SK4=SK4/(FNM*(SSD4**4))
0213                DO 181 J=1,NFND
0214                SK5=SK5+(U(J)-SM5)**4
0215                SK6=SK6+(DU(J)-SM6)**4
0216          181   SK7=SK7+(DT(J)-SM7)**4
0217                SK5=SK5/(FNFND*(SSD5**4))
0218                SK6=SK6/(FNFND*(SSD6**4))
0219                SK7=SK7/(FNFND*(SSD7**4))
0220                WRITE(6,2)
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0221                WRITE(6,3) SM1,SM2,SM3,SM4,SM5,SM6,SM7
0222                WRITE(6,4)
0223                WRITE(6,3) SSD1,SSD2,SSD3,SSD4,SSD5,SSD6,SSD7
0224                WRITE(6,5)
0225                WRITE(6,3) SSK1,SSK2,SSK3,SSK4,SSK5,SSK6,SSK7
0226                WRITE(6,13)
0227                WRITE(6,3) SK1,SK2,SK3,SK4,SK5,SK6,SK7
0228                L=NM/10
0229                LS=L/2
0230                DO 300 K=2,NM
0231                PWFM1(K)=FM1(K)-FF*FM1(K-1)
0232                PWFM2(K)=FM2(K)-FF*FM2(K-1)
0233                PWFM3(K)=FM3(K)-FF*FM3(K-1)
0234          300   PWFM4(K)=FM4(K)-FF*FM4(K-1)
0235                DO 301 K=2,NFND
0236                PWU(K)=U(K)-FF*U(K-1)
0237                PWDU(K)=DU(K)-FF*DU(K-1)
0238          301   PWDT(K)=DT(K)-FF*DT(K-1)
0239                DO 302 K=2,NM
0240                FM1(K)=PWFM1(K)
0241                FM2(K)=PWFM2(K)
0242                FM3(K)=PWFM3(K)
0243          302   FM4(K)=PWFM4(K)
0244                DO 303 K=2,NFND
0245                U(K)=PWU(K)
0246                DU(K)=PWDU(K)
0247          303   DT(K)=PWDT(K)
0248                CALL AUTO(FM1,NM,L,R1)
0249                CALL AUTO(FM2,NM,L,R2)
0250                CALL AUTO(FM3,NM,L,R3)
0251                CALL AUTO(FM4,NM,L,R4)
0252                CALL AUTO(U,NFND,LS,R5)
0253                CALL AUTO(DU,NFND,LS,R6)
0254                CALL AUTO(DT,NFND,LS,R7)
0255                DDT=(RUNTIM*60.)/FNM
0256                DELF=1./(2.*FLOAT(L-1)*DDT)
0257                CALL ASPECT(DELF,L,R1,G1)
0258                CALL ASPECT(DELF,L,R2,G2)
0259                CALL ASPECT(DELF,L,R3,G3)
0260                CALL ASPECT(DELF,L,R4,G4)
0261                CALL ASPECT(DELF,LS,R5,G5)
0262                CALL ASPECT(DELF,LS,R6,G6)
0263                CALL ASPECT(DELF,LS,R7,G7)
0264                WRITE(6,9)
0265                WRITE(6,11)(K,G1(K),G2(K),G3(K),G4(K),K=1,L)
0266                WRITE(6,10)
0267                WRITE(6,12)(K,G5(K),G6(K),G7(K),K=1,LS)
0268                CALL CROSS(FM1,FM2,NM,L,R1,R2)
0269                CALL CROSS(FM1,FM3,NM,L,R3,R4)
0270                CALL CROSS(FM1,FM4,NM,L,R5,R6)
0271                CALL CROSS(FM2,FM3,NM,L,R7,R8)
0272                CALL CROSS(FM2,FM4,NM,L,R9,R10)
0273                CALL CROSS(FM3,FM4,NM,L,R11,R12)
0274                CALL XSPECT(DELF,L,R1,R2,CS1,PS1)
0275                CALL XSPECT(DELF,L,R3,R4,CS2,PS2)
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0276              CALL XSPECT(DELF,L,R5,R6,CS3,PS3)
0277              CALL XSPECT(DELF,L,R7,R8,CS4,PS4)
0278              CALL XSPECT(DELF,L,R9,R10,CS5,PS5)
0279              CALL XSPECT(DELF,L,R11,R12,CS6,PS6)
0280              DO 400 K=1,L
0281              CS1(K)=CS1(K)/(G1(K)*G2(K))
0282              CS2(K)=CS2(K)/(G1(K)*G3(K))
0283              CS3(K)=CS3(K)/(G1(K)*G4(K))
0284              CS4(K)=CS4(K)/(G2(K)*G3(K))
0285              CS5(K)=CS5(K)/(G2(K)*G4(K))
0286        400   CS6(K)=CS6(K)/(G3(K)*G4(K))
0287              WRITE(6,14)
0288              WRITE(6,15)(K,CS1(K),CS2(K),CS3(K),CS4(K),CS5(K),CS6(K),K=1,L)
0289              WRITE(6,16)
0290              WRITE(6,15)(K,PS1(K),PS2(K),PS3(K),PS4(K),PS5(K),PS6(K),K=1,L)
0291              A1=0.
0292              A2=0.
0293              A3=0.
0294              A4=0.
0295              A5=0.
0296              A6=0
0297              A7=0
0298              DO 200 K=1,L
0299              IF(G1(K)-A1)201,201,202
0300        202   A1=G1(K)
0301        201   IF(G2(K)-A2)204,204,205
0302        205   A2=G2(K)
0303        204   IF(G3(K)-A3)206,206,207
0304        207   A3=G3(K)
0305        206   IF(G4(K)-A4)208,200,208
0306        208   A4=G4(K)
0307        200   CONTINUE
0308              DO 210 K=1,L
0309              G1(K)=G1(K)/A1
0310              G2(K)=G2(K)/A2
0311              G3(K)=G3(K)/A3
0312        210   G4(K)=G4(K)/A4
0313              DO 220 K=1,LS
0314              IF(G5(K)-A5)221,221,222
0315        222   A5=G5(K)
0316        221   IF(G6(K)-A6)223,223,224
0317        224   A6=G6(K)
0318        223   IF(G7(K)-A7)220,220,225
0319        225   A7=G7(K)
0320        220   CONTINUE
0321              DO 211 K=1,LS
0322              G5(K)=G5(K)/A5
0323              G6(K)=G6(K)/A6
0324        211   G7(K)=G7(K)/A7
0325              DO 230 K=1,L
0326        230   XX1(K)=DELF*FLOAT(K)
0327              DO 231 K=1,LS
0328        231   XX2(K)=DELF*FLOAT(K)
0329              CALL PLTXMX(120.)
0330              CALL PAXIS(0.5,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
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0331                CALL PAXIS(0.5,0.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0332                CALL PSYMB(1.0,1.0,-0.1,'DPH76 C.D.JONES',0.0,15)
0333                CALL PLTOFS(0.0,0.05,0.0,0.25,0.5,0.5)
0334                CALL PLINE(XX1,G1,L,1,5,0,1.0)
0335                CALL PAXIS(0.5,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0336                CALL PAXIS(0.5,5.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0337                CALL PLTOFS(0.0,0.05,0.0,0.25,0.5,5.5)
0338                CALL PLINE(XX1,G2,L,1,5,1,1.0)
0339                CALL PAXIS(10.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0340                CALL PAXIS(10.0,0.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0341                CALL PLTOFS(0.0,0.05,0.0,0.25,10.0,0.5)
0342                CALL PLINE(XX1,G3,L,1,5,2,1.0)
0343                CALL PAXIS(10.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0344                CALL PAXIS(10.0,5.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0345                CALL PLTOFS(0.0,0.05,0.0,0.25,10.0,5.5)
0346                CALL PLINE(XX1,G4,L,1,5,3,1.0)
0347                CALL PAXIS(20.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0348                CALL PAXIS(20.0,0.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0349                CALL PLTOFS(0.0,0.05,0.0,0.25,20.0,0.5)
0350                CALL PLINE(XX2,G5,LS,1,5,4,1.0)
0351                CALL PAXIS(20.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0352                CALL PAXIS(20.0,5.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0353                CALL PLTOFS(0.0,0.05,0.0,0.25,20.0,5.5)
0354                CALL PLINE(XX2,G6,LS,1,5,5,1.0)
0355                CALL PLINE(XX2,G7,LS,1,5,6,1.0)
0356                CALL PAXIS(30.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0357                CALL PAXIS(30.0,0.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0358                CALL PLTOFS(0.0,0.05,0.0,0.25,30.0,0.5)
0359                CALL PLINE(XX1,CS1,L,1,5,0,1.0)
0360                CALL PAXIS(30.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0361                CALL PAXIS(30.0,5.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0362                CALL PLTOFS(0.0,0.05,0.0,0.25,30.0,5.5)
0363                CALL PLINE(XX1,CS2,L,1,5,1,1.0)
0364                CALL PAXIS(40.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0365                CALL PAXIS(40.0,0.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0366                CALL PLTOFS(0.0,0.05,0.0,0.25,40.0,0.5)
0367                CALL PLINE(XX1,CS3,L,1,5,2,1.0)
0368                CALL PAXIS(40.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0369                CALL PAXIS(40.0,5.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0370                CALL PLTOFS(0.0,0.05,0.0,0.25,40.0,5.5)
0371                CALL PLINE(XX1,CS4,L,1,5,3,1.0)
0372                CALL PAXIS(50.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0373                CALL PAXIS(50.0,0.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0374                CALL PLTOFS(0.0,0.05,0.0,0.25,50.0,0.5)
0375                CALL PLINE(XX1,CS5,L,1,5,4,1.0)
0376                CALL PAXIS(50.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0377                CALL PAXIS(50.0,5.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0378                CALL PLTOFS(0.0,0.05,0.0,0.25,50.0,5.5)
0379                CALL PLINE(XX1,CS6,L,1,5,5,1.0)
0380                CALL PAXIS(60.0,2.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0381                CALL PAXIS(60.0,0.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0382                CALL PLTOFS(0.0,0.05,0.0,90.0,60.0,2.5)
0383                CALL PLINE(XX1,PS1,L,1,5,0,1.0)
0384                CALL PAXIS(60.0,7.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0385                CALL PAXIS(60.0,5.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
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0386                CALL PLTOFS(0.0,0.05,0.0,90.0,60.0,7.5)
0387                CALL PLINE(XX1,PS2,L,1,5,1,1.0)
0388                CALL PAXIS(70.0,2.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0389                CALL PAXIS(70.0,0.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0390                CALL PLTOFS(0.0,0.05,0.0,90.0,70.0,2.5)
0391                CALL PLINE(XX1,PS3,L,1,5,2,1.0)
0392                CALL PAXIS(70.0,7.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0393                CALL PAXIS(70.0,5.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0394                CALL PLTOFS(0.0,0.05,0.0,90.0,70.0,7.5)
0395                CALL PLINE(XX1,PS4,L,1,5,3,1.0)
0396                CALL PAXIS(80.0,2.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0397                CALL PAXIS(80.0,0.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0398                CALL PLTOFS(0.0,0.05,0.0,90.0,80.0,2.5)
0399                CALL PLINE(XX1,PS5,L,1,5,4,1.0)
0400                CALL PAXIS(80.0,7.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0401                CALL PAXIS(80.0,5.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0402                CALL PLTOFS(0.0,0.05,0.0,90.0,80.0,7.5)
0403                CALL PLINE(XX1,PS6,L,1,5,5,1.0)
0404                CALL PLTEND
0405                STOP
0406                END
```

TOTAL MEMORY REQUIREMENTS 013B8E BYTES

```
0001            SUBROUTINE ASPECT(DELF,L,R,G)
0002            DIMENSION G(100),R(100)
0003            DIMENSION GG(100)
0004            PI=3.142
0005            SGMA=0.
0006            M=L-1
0007            XM=FLOAT(M)
0008            DO 20 K=1,L
0009            KK=K-1
0010            KKK=2+KK-IFIX(2.*FLOAT(IFIX(0.5*FLOAT(KK))))
0011            DO 10 J=2,M
0012            THETA=(PI/XM)*FLOAT((J-1)*KK)
0013          101 IF(THETA-2.*PI)99,99,100
0014          100 THETA=THETA-2.*PI
0015            GO TO 101
0016           99 AA=R(J)*COS(THETA)
0017           10 SGMA=SGMA+AA
0018            BRKT=R(1)+2.*SGMA+((-1.)**KKK)*R(L)
0019            G(K)=BRKT/(XM*DELF)
0020            SGMA=0.
0021           20 CONTINUE
0022            GG(1)=0.5*G(1)+0.5*G(2)
0023            GG(L)=0.5*G(L-1)+0.5*G(L)
0024            DO 30 K=2,M
0025         30 GG(K)=0.25*G(K-1)+0.5*G(K)+0.25*G(K+1)
0026            DO 40 K=1,L
0027         40 G(K)=GG(K)
0028            RETURN
0029            END
```

TOTAL MEMORY REQUIREMENTS 00063A BYTES

```
0001            SUBROUTINE XSPECT(DELF,L,R,S,GXY,PHIXY)
0002            DIMENSION R(100),S(100),A(100),B(100)
0003            DIMENSION C(100),Q(100),GXY(100),PHIXY(100)
0004            DIMENSION CC(100),QQ(100)
0005            PI=3.142
0006            SGMA=0.
0007            SGMB=0.
0008            M=L-1
0009            XM=FLOAT(M)
0010            DO 5 I=1,L
0011            A(I)=(R(I)+S(I))/2.
0012       5    B(I)=(R(I)-S(I))/2.
0013            DO 20 K=1,L
0014            KK=K-1
0015            KKK=2+KK-IFIX(2.*FLOAT(IFIX(0.5*FLOAT(KK))))
0016            DO 10 J=2,M
0017            THETA=(PI/XM)*FLOAT((J-1)*KK)
0018       101  IF(THETA-2.*PI)99,99,100
0019       100  THETA=THETA-2.*PI
0020            GO TO 101
0021       99   CONTINUE
0022            AA=A(J)*COS(THETA)
0023            BB=B(J)*SIN(THETA)
0024            SGMA=SGMA+AA
0025       10   SGMB=SGMB+BB
0026            BRKT=A(1)+2.*SGMA+((-1.)**KKK)*A(L)
0027            C(K)=BRKT/(XM*DELF)
0028            Q(K)=2.*SGMB/(XM*DELF)
0029            SGMA=0.
0030            SGMB=0.
0031       20   CONTINUE
0032            CC(1)=0.5*C(1)+0.5*C(2)
0033            CC(L)=0.5*C(L-1)+0.5*C(L)
0034            QQ(1)=0.5*Q(1)+0.5*Q(2)
0035            QQ(L)=0.5*Q(L-1)+0.5*Q(L)
0036            DO 30 K=2,M
0037            CC(K)=0.25*C(K-1)+0.5*C(K)+0.25*C(K+1)
0038       30   QQ(K)=0.25*Q(K-1)+0.5*Q(K)+0.25*Q(K+1)
0039            DO 50 K=1,L
0040            C(K)=CC(K)
0041       50   Q(K)=QQ(K)
0042            DO 40 I=1,L
0043            GXY(I)=C(I)**2+Q(I)**2
0044            PHIXY(I)=ATAN(Q(I)/C(I))
0045       40   PHIXY(I)=PHIXY(I)*360./6.284
0046            RETURN
0047            END
```

TOTAL MEMORY REQUIREMENTS 000F8A BYTES
EXECUTION TERMINATED

DATA PROG

```
0001            6 FORMAT(I5,3F15.5)
0002            7 FORMAT(12I5)
0003            9 FORMAT('0ACTUAL VALUES')
0004           10 FORMAT(I4,4F9.1,3F7.2,4F9.1)
0005           11 FORMAT('1 MEANS,STD.DEV.AND COEFF.VAR')
0006           12 FORMAT(F10.2,4F10.1,2F10.2,4F10.1)
0007           13 FORMAT('0RI')
0008           14 FORMAT(1F11.3)
0009           15 FORMAT('0ST')
0010           16 FORMAT('1AUTOCOV,FM1,FM2,FM3,FM4')
0011           17 FORMAT(I4,4E15.3)
0012           18 FORMAT('1AUTOCOV,U,DU,DT')
0013           20 FORMAT('1AUTO-DERIVED STD DEV')
0014           22 FORMAT('1XCOR,FM1/FM2,FM1/FM3,FM1/FM4')
0015           23 FORMAT(I4,6E15.3)
0016           24 FORMAT('1XCOR,FM2/FM3,FM2/FM4,FM3/FM4')
0017           26 FORMAT('1XCOR,FM1/U,FM1/DU,FM1/DT')
0018           27 FORMAT('1XCOR,FM2/U,FM2/DU,FM2/DT')
0019           28 FORMAT('1XCOR,FM3/U,FM3/DU,FM3/DT')
0020           29 FORMAT('1XCOR,FM4/U,FM4/DU,FM4/DT')
0021           30 FORMAT('1XCOR,U/DU,U/DT,DU/DT')
0022           32 FORMAT(I4,3E15.3)
0023           33 FORMAT('1AUTOLENGTH')
0024           34 FORMAT(7F10.2)
0025           40 FORMAT(11F10.3)
0026          49  FORMAT('RUNTIM')
0027          50  FORMAT(1F10.1)
0028           51 FORMAT(4A4)
0029           53 FORMAT(I1)
0030          60  FORMAT('1DATA ANALYSIS')
0031              DIMENSION DATIME(4)
0032              DIMENSION FM1(1000),FM2(1000),FM3(1000),FM4(1000)
0033              DIMENSION U(1000),DU(1000),DT(1000)
0034              DIMENSION R1(200),R2(200),R3(200),R4(200),R5(200),R6(200),R7(200)
0035              DIMENSION R101(200),R102(200),R103(200),R104(200),R105(200)
0036              DIMENSION R106(200),R107(200),R108(200),R109(200),R110(200)
0037              DIMENSION R111(200),R112(200)
0038              DIMENSION R200(200),R201(200),R202(200),R203(200),R204(200)
0039              DIMENSION R205(200)
0040              DIMENSION R210(200),R211(200),R212(200),R213(200),R214(200)
0041              DIMENSION R215(200)
0042              DIMENSION R220(200),R221(200),R222(200),R223(200),R224(200)
0043              DIMENSION R225(200)
0044              DIMENSION R230(200),R231(200),R232(200),R233(200),R234(200)
0045              DIMENSION R235(200)
0046              DIMENSION R300(200),R301(200),R302(200),R303(200),R304(200)
0047              DIMENSION R305(200)
0048              DIMENSION FMS1(1000),FMS2(1000),FMS3(1000),FMS4(1000)
0049              DIMENSION X1(200),X2(200)
0050              DIMENSION XX1(1000),XX2(1000),XX3(1000),XX4(1000)
0051              DIMENSION XX5(1000),XX6(1000),XX7(1000)
0052              DIMENSION R102R(200),R104R(200),R106R(200)
0053              DIMENSION R108R(200),R110R(200),R112R(200)
0054              WRITE(4,60)
0055              READ(5,51) DATIME
```

```
0056              WRITE(4,51) DATIME
0057              READ(5,50) RUNTIM
0058              WRITE(4,49)
0059              WRITE(4,50) RUNTIM
0060              RUNTIM=60.0*RUNTIM
0061              READ(5,53) IDT
0062              WRITE(4,9)
0063              J=0
0064        100   READ(5,6)I,A,B,C
0065              J=J+1
0066              GO TO(101,102,103,104,105,106,107,108,109,110,111),I
0067        101   A1=A
0068              B1=B
0069              C1=C
0070              GO TO 100                                    --
0071        102   A2=A
0072              B2=B
0073              C2=C
0074              GO TO 100
0075        103   A3=A
0076              B3=B
0077              C3=C
0078              GO TO 100
0079        104   A4=A
0080              B4=B
0081              C4=C
0082              GO TO 100
0083        105   A5=A
0084              B5=B
0085              C5=C
0086              GO TO 100
0087        106   A6=A
0088              B6=B
0089              C6=C
0090              GO TO 100
0091        107   A7=A
0092              B7=B
0093              C7=C
0094              GO TO 100
0095        108   A8=A
0096              B8=B
0097              C8=C
0098              GO TO 100
0099        109   A9=A
0100              B9=B
0101              C9=C
0102              GO TO 100
0103        110   A10=A
0104              B10=B
0105              C10=C
0106              GO TO 100
0107        111   A11=A
0108              B11=B
0109              C11=C
0110              IF(J-11)126,120,126
```

```
0111        126   STOP
0112        120   CONTINUE
0113              J=999
0114              K=500
0115              NFND=0
0116        130   READ(5,7)M,I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11
0117              IF(M-9999)131,132,131
0118        131   NFND=NFND+1
0119              COMP=703.0/FLOAT(M)
0120              U(K)=(A1*FLOAT(I1)+B1)*C1
0121              U(K)=U(K)*COMP
0122              DU(K)=(A6*FLOAT(I6)+B6)*C6
0123              DU(K)=DU(K)*COMP
0124              IF(1-IDT)600,601,600
0125         601  DT(K)=(A7*FLOAT(I7)+B7)*C7
0126              GO TO 602
0127         600  DT(K)=-(A7*FLOAT(I7)+B7)*C7
0128         602  CONTINUE
0129              DT(K)=DT(K)*COMP
0130              FM1(J)=(A2*FLOAT(I11)+B2)*C2
0131              FM1(J)=FM1(J)*COMP
0132              FM1(J+1)=(A8*FLOAT(I5)+B8)*C8
0133              FM1(J+1)=FM1(J+1)*COMP
0134              FM2(J)=(A3*FLOAT(I10)+B3)*C3
0135              FM2(J)=FM2(J)*COMP
0136              FM2(J+1)=(A9*FLOAT(I4)+B9)*C9
0137              FM2(J+1)=FM2(J+1)*COMP
0138              FM3(J)=(A4*FLOAT(I9)+B4)*C4
0139              FM3(J)=FM3(J)*COMP
0140              FM3(J+1)=(A10*FLOAT(I3)+B10)*C10
0141              FM3(J+1)=FM3(J+1)*COMP
0142              FM4(J)=(A5*FLOAT(I8)+B5)*C5
0143              FM4(J)=FM4(J)*COMP
0144              FM4(J+1)=(A11*FLOAT(I2)+B11)*C11
0145              FM4(J+1)=FM4(J+1)*COMP
0146              J=J-2
0147              K=K-1
0148              GO TO 130
0149        132   J=J+2
0150              K=K+1
0151              NM=2*NFND
0152              L=NM/10
0153              LS=L/2
0154              DO 140 JN=1,NM
0155              FM1(JN)=FM1(J)
0156              FM2(JN)=FM2(J)
0157              FM3(JN)=FM3(J)
0158              FM4(JN)=FM4(J)
0159        140   J=J+1
0160              DO 141 KN=1,NFND
0161              U(KN)=U(K)
0162              DU(KN)=DU(K)
0163              DT(KN)=DT(K)
0164        141   K=K+1
0165              D1=8.0
```

```
0166                D1=D1/2.0
0167                D2=C1*200.0
0168                D2=D2/10.0
0169                D3=C2*200.0
0170                D3=D3/10.0
0171                D4=C3*200.0
0172                D4=D4/10.0
0173                D5=C4*200.0
0174                D5=D5/10.0
0175                D6=3.5
0176                D6=D6/2.0
0177                D7=3.5
0178                D7=D7/2.0
0179                NMA=NM-1
0180                NFNDA=NFND-1
0181                DO 700 I=2,NMA
0182                Q2=((FM1(I-1)+FM1(I+1))/2.0)-FM1(I)
0183                IF(D2-Q2)701,702,702
0184          701   FM1(I)=(FM1(I-1)+FM1(I+1))/2.0
0185          702   CONTINUE
0186                Q3=((FM2(I-1)+FM2(I+1))/2.0)-FM2(I)
0187                IF(D3-Q3)703,704,704
0188          703   FM2(I)=(FM2(I-1)+FM2(I+1))/2.0
0189          704   CONTINUE
0190                Q4=((FM3(I-1)+FM3(I+1))/2.0)-FM3(I)
0191                IF(D4-Q4)705,706,706
0192          705   FM3(I)=(FM3(I-1)+FM3(I+1))/2.0
0193          706   CONTINUE
0194                Q5=((FM4(I-1)+FM4(I+1))/2.0)-FM4(I)
0195                IF(D5-Q5)707,700,700
0196          707   FM4(I)=(FM4(I-1)+FM4(I+1))/2.0
0197          700   CONTINUE
0198                DO 800 I=2,NFNDA
0199                Q1=((U(I-1)+U(I+1))/2.0)-U(I)
0200                IF(D1-Q1)801,802,802
0201          801   U(I)=(U(I-1)+U(I+1))/2.0
0202          802   CONTINUE
0203                Q6=((DU(I-1)+DU(I+1))/2.0)-DU(I)
0204                IF(D6-Q6)803,804,804
0205          803   DU(I)=(DU(I-1)+DU(I+1))/2.0
0206          804   CONTINUE
0207                Q7=((DT(I-1)+DT(I+1))/2.0)-DT(I)
0208                IF(D7-Q7)805,800,800
0209          805   DT(I)=(DT(I-1)+DT(I+1))/2.0
0210          800   CONTINUE
0211                FNM=FLOAT(NM)
0212                FNFND=FLOAT(NFND)
0213                J=1
0214                K=1
0215          149   WRITE(4,10) K,FM1(J),FM2(J),FM3(J),FM4(J),U(K),DU(K),DT(K),FM1(J+1
                    1),FM2(J+1),FM3(J+1),FM4(J+1)
0216                IF(K-NFND)150,151,151
0217          150   J=J+2
0218                K=K+1
0219                GO TO 149
```

```
0220        151   SM1=0.0
0221              SM2=0.0
0222              SM3=0.0
0223              SM4=0.0
0224              SM5=0.0
0225              SM6=0.0
0226              SM7=0.0
0227              SM8=0.0
0228              SM9=0.0
0229              SM10=0.0
0230              SM11=0.0
0231              DO 160 J=1,NM
0232              SM2=SM2+FM1(J)
0233              SM3=SM3+FM2(J)
0234              SM4=SM4+FM3(J)
0235        160   SM5=SM5+FM4(J)
0236              DO 161 K=1,NFND
0237              SM1=SM1+U(K)
0238              SM6=SM6+DU(K)
0239        161   SM7=SM7+DT(K)
0240              SM1=SM1/FNFND
0241              SM2=SM2/FNM
0242              SM3=SM3/FNM
0243              SM4=SM4/FNM
0244              SM5=SM5/FNM
0245              SM6=SM6/FNFND
0246              SM7=SM7/FNFND
0247              WRITE(4,11)
0248              WRITE(4,12) SM1,SM2,SM3,SM4,SM5,SM6,SM7,SM8,SM9,SM10,SM11
0249              VAR1=0.0
0250              VAR2=0.0
0251              VAR3=0.0
0252              VAR4=0.0
0253              VAR5=0.0
0254              VAR6=0.0
0255              VAR7=0.0
0256              VAR8=0.0
0257              VAR9=0.0
0258              VAR10=0.0
0259              VAR11=0.0
0260              DO 170 J=1,NM
0261              VAR2=VAR2+(FM1(J)-SM2)**2
0262              VAR3=VAR3+(FM2(J)-SM3)**2
0263              VAR4=VAR4+(FM3(J)-SM4)**2
0264        170   VAR5=VAR5+(FM4(J)-SM5)**2
0265              DO 171 K=1,NFND
0266              VAR1=VAR1+(U(K)-SM1)**2
0267              VAR6=VAR6+(DU(K)-SM6)**2
0268        171   VAR7=VAR7+(DT(K)-SM7)**2
0269              SD1=SQRT(VAR1/FNFND)
0270              SD2=SQRT(VAR2/FNM)
0271              SD3=SQRT(VAR3/FNM)
0272              SD4=SQRT(VAR4/FNM)
0273              SD5=SQRT(VAR5/FNM)
0274              SD6=SQRT(VAR6/FNFND)
```

```
0275              SD7=SQRT(VAR7/FNFND)
0276              WRITE(4,12) SD1,SD2,SD3,SD4,SD5,SD6,SD7
0277              CV1=SD1/SM1
0278              CV2=SD2/SM2
0279              CV3=SD3/SM3
0280              CV4=SD4/SM4
0281              CV5=SD5/SM5
0282              CV6=SD6/SM6
0283              CV7=SD7/SM7
0284              WRITE(4,40) CV1,CV2,CV3,CV4,CV5,CV6,CV7
0285              G=9.81
0286              T=285.0
0287              DELZ=7.0
0288              GAMMA=0.01
0289              DELU=SM6/DELZ
0290              DELU=DELU**2
0291              DELT=-SM7/DELZ
0292              RI=(G*(DELT+GAMMA))/(T*DELU)
0293              WRITE(4,13)
0294              WRITE(4,14) RI
0295              ST=RUNTIM/FNFND
0296              ST=ST/2.0
0297              WRITE(4,15)
0298              WRITE(4,14) ST
0299              CALL AUTO(FM1,NM,L,R2)
0300              CALL AUTO(FM2,NM,L,R3)
0301              CALL AUTO(FM3,NM,L,R4)
0302              CALL AUTO(FM4,NM,L,R5)
0303              CALL AUTO(U,NFND,LS,R1)
0304              CALL AUTO(DU,NFND,LS,R6)
0305              CALL AUTO(DT,NFND,LS,R7)
0306              SMA1=SQRT(R1(1))
0307              SMA2=SQRT(R2(1))
0308              SMA3=SQRT(R3(1))
0309              SMA4=SQRT(R4(1))
0310              SMA5=SQRT(R5(1))
0311              SMA6=SQRT(R6(1))
0312              SMA7=SQRT(R7(1))
0313              WRITE(4,16)
0314              WRITE(4,17)(I,R2(I),R3(I),R4(I),R5(I),I=1,L)
0315              WRITE(4,18)
0316              WRITE(4,32)(I,R1(I),R6(I),R7(I),I=1,LS)
0317              WRITE(4,20)
0318              WRITE(4,12) SMA2,SMA3,SMA4,SMA5,SMA1,SMA6,SMA7
0319              RR1=R1(1)
0320              RR2=R2(1)
0321              RR3=R3(1)
0322              RR4=R4(1)
0323              RR5=R5(1)
0324              RR6=R6(1)
0325              RR7=R7(1)
0326              DO 180 I=1,L
0327              R2(I)=R2(I)/RR2
0328              R3(I)=R3(I)/RR3
0329              R4(I)=R4(I)/RR4
```

```
0330        180   R5(I)=R5(I)/RR5
0331              DO 181 I=1,LS
0332              R1(I)=R1(I)/RR1
0333              R6(I)=R6(I)/RR6
0334        181   R7(I)=R7(I)/RR7
0335              CALL CROSS(FM1,FM2,NM,L,R101,R102)
0336              CALL CROSS(FM1,FM3,NM,L,R103,R104)
0337              CALL CROSS(FM1,FM4,NM,L,R105,R106)
0338              CALL CROSS(FM2,FM3,NM,L,R107,R108)
0339              CALL CROSS(FM2,FM4,NM,L,R109,R110)
0340              CALL CROSS(FM3,FM4,NM,L,R111,R112)
0341              DO 190 I=1,L
0342              R101(I)=R101(I)/(SMA2*SMA3)
0343              R102(I)=R102(I)/(SMA2*SMA3)
0344              R103(I)=R103(I)/(SMA2*SMA4)
0345              R104(I)=R104(I)/(SMA2*SMA4)
0346              R105(I)=R105(I)/(SMA2*SMA5)
0347              R106(I)=R106(I)/(SMA2*SMA5)
0348              R107(I)=R107(I)/(SMA3*SMA4)
0349              R108(I)=R108(I)/(SMA3*SMA4)
0350              R109(I)=R109(I)/(SMA3*SMA5)
0351              R110(I)=R110(I)/(SMA3*SMA5)
0352              R111(I)=R111(I)/(SMA4*SMA5)
0353        190   R112(I)=R112(I)/(SMA4*SMA5)
0354              WRITE(4,22)
0355              WRITE(4,23)(I,R101(I),R102(I),R103(I),R104(I),R105(I),R106(I),I=1,
                 1L)
0356              WRITE(4,24)
0357              WRITE(4,23)(I,R107(I),R108(I),R109(I),R110(I),R111(I),R112(I),I=1,
                 1L)
0358              J=1
0359              MNM=NM-1
0360              DO 200 JN=1,MNM,2
0361              FMS1(J)=(FM1(JN)+FM1(JN+1))/2.0
0362              FMS2(J)=(FM2(JN)+FM2(JN+1))/2.0
0363              FMS3(J)=(FM3(JN)+FM3(JN+1))/2.0
0364              FMS4(J)=(FM4(JN)+FM4(JN+1))/2.0
0365        200   J=J+1
0366              CALL CROSS(FMS1,U,NFND,LS,R200,R201)
0367              CALL CROSS(FMS1,DU,NFND,LS,R202,R203)
0368              CALL CROSS(FMS1,DT,NFND,LS,R204,R205)
0369              CALL CROSS(FMS2,U,NFND,LS,R210,R211)
0370              CALL CROSS(FMS2,DU,NFND,LS,R212,R213)
0371              CALL CROSS(FMS2,DT,NFND,LS,R214,R215)
0372              CALL CROSS(FMS3,U,NFND,LS,R220,R221)
0373              CALL CROSS(FMS3,DU,NFND,LS,R222,R223)
0374              CALL CROSS(FMS3,DT,NFND,LS,R224,R225)
0375              CALL CROSS(FMS4,U,NFND,LS,R230,R231)
0376              CALL CROSS(FMS4,DU,NFND,LS,R232,R233)
0377              CALL CROSS(FMS4,DT,NFND,LS,R234,R235)
0378              CALL CROSS(U,DU,NFND,LS,R300,R301)
0379              CALL CROSS(U,DT,NFND,LS,R302,R303)
0380              CALL CROSS(DU,DT,NFND,LS,R304,R305)
0381              DO 210 J=1,LS
0382              R200(J)=R200(J)/(SMA2*SMA1)
```

```
0383                R201(J)=R201(J)/(SMA2*SMA1)
0384                R202(J)=R202(J)/(SMA2*SMA6)
0385                R203(J)=R203(J)/(SMA2*SMA6)
0386                R204(J)=R204(J)/(SMA2*SMA7)
0387                R205(J)=R205(J)/(SMA2*SMA7)
0388                R210(J)=R210(J)/(SMA3*SMA1)
0389                R211(J)=R211(J)/(SMA3*SMA1)
0390                R212(J)=R212(J)/(SMA3*SMA6)
0391                R213(J)=R213(J)/(SMA3*SMA6)
0392                P214(J)=R214(J)/(SMA3*SMA7)
0393                R215(J)=R215(J)/(SMA3*SMA7)
0394                R220(J)=R220(J)/(SMA4*SMA1)
0395                R221(J)=R221(J)/(SMA4*SMA1)
0396                R222(J)=R222(J)/(SMA4*SMA6)
0397                R223(J)=R223(J)/(SMA4*SMA6)
0398                R224(J)=R224(J)/(SMA4*SMA7)
0399                R225(J)=R225(J)/(SMA4*SMA7)
0400                P230(J)=R230(J)/(SMA5*SMA1)
0401                R231(J)=R231(J)/(SMA5*SMA1)
0402                R232(J)=R232(J)/(SMA5*SMA6)
0403                R233(J)=R233(J)/(SMA5*SMA6)
0404                R234(J)=R234(J)/(SMA5*SMA7)
0405                R235(J)=R235(J)/(SMA5*SMA7)
0406                R300(J)=R300(J)/(SMA1*SMA6)
0407                R301(J)=R301(J)/(SMA1*SMA6)
0408                R302(J)=R302(J)/(SMA1*SMA7)
0409                R303(J)=R303(J)/(SMA1*SMA7)
0410                R304(J)=R304(J)/(SMA6*SMA7)
0411          210   R305(J)=R305(J)/(SMA6*SMA7)
0412                WRITE(4,26)
0413                WRITE(4,23)(I,R200(I),R201(I),R202(I),R203(I),R204(I),R205(I),I=1,
                   1LS)
0414                WRITE(4,27)
0415                WRITE(4,23)(I,R210(I),R211(I),R212(I),R213(I),R214(I),R215(I),I=1,
                   1LS)
0416                WRITE(4,28)
0417                WRITE(4,23)(I,R220(I),R221(I),R222(I),R223(I),R224(I),R225(I),I=1,
                   1LS)
0418                WRITE(4,29)
0419                WRITE(4,23)(I,R230(I),R231(I),R232(I),R233(I),R234(I),R235(I),I=1,
                   1LS)
0420                WRITE(4,30)
0421                WRITE(4,23)(I,R300(I),R301(I),R302(I),R303(I),R304(I),R305(I),I=1,
                   1LS)
0422                AL1=0.0
0423                AL2=0.0
0424                AL3=0.0
0425                AL4=0.0
0426                AL5=0.0
0427                AL6=0.0
0428                AL7=0.0
0429                AL8=0.0
0430                AL9=0.0
0431                AL10=0.0
0432                AL11=0.0
```

```
0433              DO 220 I=1,L
0434              AL2=AL2+(R2(I)*ST)
0435              AL3=AL3+(R3(I)*ST)
0436              AL4=AL4+(R4(I)*ST)
0437        220   AL5=AL5+(R5(I)*ST)
0438              DO 221 I=1,LS
0439              AL1=AL1+(R1(I)*2.0*ST)
0440              AL6=AL6+(R6(I)*2.0*ST)
0441        221   AL7=AL7+(R7(I)*2.0*ST)
0442              WRITE(4,33)
0443              WRITE(4,34) AL2,AL3,AL4,AL5,AL1,AL6,AL7
0444              VMAX1=200.0*C2
0445              VMAX2=200.0*C3
0446              VMAX3=200.0*C4
0447              VMAX4=200.0*C5
0448              IF(VMAX1-VMAX2)400,400,401
0449        400   VMAXF=VMAX2
0450              GO TO 411
0451        401   VMAXF=VMAX1
0452        411   IF(VMAXF-VMAX3)402,402,403
0453        402   VMAXF=VMAX3
0454        403   IF(VMAXF-VMAX4)404,404,405
0455        404   VMAXF=VMAX4
0456        405   CONTINUE
0457              VMAXF=VMAXF*1.20
0458              DO 410 J=1,NM
0459              FM1(J)=FM1(J)/VMAXF
0460              IF(FM1(J)-1.0)900,900,901
0461         901  FM1(J)=1.0
0462         900  FM2(J)=FM2(J)/VMAXF
0463              IF(FM2(J)-1.0)902,902,903
0464         903  FM2(J)=1.0
0465         902  FM3(J)=FM3(J)/VMAXF
0466              IF(FM3(J)-1.0)904,904,905
0467         905  FM3(J)=1.0
0468         904  FM4(J)=FM4(J)/VMAXF
0469              IF(FM4(J)-1.0)410,410,906
0470         906  FM4(J)=1.0
0471         410  CONTINUE
0472              DO 420 J=1,NFND
0473              U(J)=U(J)/8.0
0474              IF(U(J)-1.0)910,910,911
0475         911  U(J)=1.0
0476         910  DU(J)=DU(J)/3.5
0477              IF(DU(J)-1.0)912,912,913
0478         913  DU(J)=1.0
0479         912  DT(J)=DT(J)/3.5
0480              IF(DT(J)-1.0)420,420,914
0481         914  DT(J)=1.0
0482         420  CONTINUE
0483              DO 500 J=1,L
0484        500   X1(J)=FLOAT(J-1)*ST
0485              DO 501 J=1,LS
0486        501   X2(J)=FLOAT(J-1)*ST*2.0
0487              DO 502 J=1,NM
```

```
0488              XX1(J)=FLOAT(J-1)*ST
0489              XX2(J)=FLOAT(J-1)*ST+(ST/6.0)
0490              XX3(J)=FLOAT(J-1)*ST+(ST/3.0)
0491        502   XX4(J)=FLOAT(J-1)*ST+(ST/2.0)
0492              DO 503 J=1,NFND
0493              XX5(J)=FLOAT(J-1)*2.0*ST+(ST*0.667)
0494              XX6(J)=FLOAT(J-1)*2.0*ST+(ST*0.833)
0495        503   XX7(J)=FLOAT(J-1)*2.0*ST+(ST*1.833)
0496              XTEST=X1(L)
0497              XTEST=XTEST/10.0
0498              XTEST=FLOAT(IFIX(XTEST))
0499              XTEST=XTEST*10.0
0500              XMIN=-(XTEST+10.0)
0501              AXLTH1=(XTEST/10.0)+1.0
0502              AXLTH2=(XX4(NM)/20.0)+1.0
0503              AXLTH3=2.0*AXLTH1
0504              XPOS2=2.0*AXLTH1+1.0+0.5
0505              XPOS3=3.0*AXLTH1+2.0+0.5
0506              XPOS4=XPOS2-AXLTH1
0507              M=L
0508              DO 504 J=1,L
0509              R102R(M)=R102(J)
0510              R104R(M)=R104(J)
0511              R106R(M)=R106(J)
0512              R108R(M)=R108(J)
0513              R110R(M)=R110(J)
0514              R112R(M)=R112(J)
0515        504   M=M-1
0516              DO 610 J=1,NFND
0517              IF(DT(J))611,610,610
0518        611   DT(J)=-DT(J)
0519        610   CONTINUE
0520              CALL PLTXMX(160.0)
0521              CALL PAXIS(0.5,0.5,'TIME (SEC)',-10,AXLTH1,0.0,0.0,10.0,1.0)
0522              CALL PAXIS(0.5,0.5,'AUTOCORRELATION',15,10.0,90.0,-1.0,0.2,1.0)
0523              CALL PSYMB(1.0,1.0,-0.1,'OPH76 C.D.JONES',0.0,15)
0524              CALL PSYMB(3.0,1.0,-0.1,DATIME,0.0,15)
0525              CALL PLTOFS(0.0,10.0,-1.0,0.2,0.5,0.5)
0526              CALL PLINE(X1,R2,L,1,4,0,1.0)
0527              CALL PLINE(X1,R3,L,1,4,1,1.0)
0528              CALL PLINE(X1,R4,L,1,4,2,1.0)
0529              CALL PLINE(X1,R5,L,1,4,3,1.0)
0530              CALL PLINE(X2,R1,LS,1,3,4,1.0)
0531              CALL PLINE(X2,R6,LS,1,3,5,1.0)
0532              CALL PLINE(X2,R7,LS,1,3,6,1.0)
0533              CALL PAXIS(XPOS4,0.5,'TIME (SEC)',-10,AXLTH3,0.0,XMIN,10.0,1.0)
0534              CALL PAXIS(XPOS2,0.5,'CROSSCORRELATION',16,10.0,90.0,-1.0,0.2,1.0)
0535              XPOS4=XPOS2-X1(L)/10.0
0536              CALL PLTOFS(0.0,10.0,-1.0,0.2,XPOS4,0.5)
0537              CALL PLINE(X1,R102R,L,1,4,0,1.0)
0538              CALL PLINE(X1,R104R,L,1,4,1,1.0)
0539              CALL PLINE(X1,R106R,L,1,4,2,1.0)
0540              CALL PLINE(X1,R108R,L,1,4,3,1.0)
0541              CALL PLINE(X1,R110R,L,1,4,4,1.0)
0542              CALL PLINE(X1,R112R,L,1,4,5,1.0)
```

```
0543                CALL PLTOFS(0.0,10.0,-1.0,0.2,XPOS2,0.5)
0544                CALL PLINE(X1,R101,L,1,4,0,1.0)
0545                CALL PLINE(X1,R103,L,1,4,1,1.0)
0546                CALL PLINE(X1,R105,L,1,4,2,1.0)
0547                CALL PLINE(X1,R107,L,1,4,3,1.0)
0548                CALL PLINE(X1,R109,L,1,4,4,1.0)
0549                CALL PLINE(X1,R111,L,1,4,5,1.0)
0550                CALL PAXIS(XPOS3,0.5,'TIME (SEC)',-10,AXLTH2,0.0,0.0,20.0,1.0)
0551                CALL PAXIS(XPOS3,0.5,'ARB UNITS',9,10.0,90.0,0.0,0.1,1.0)
0552                CALL PLTOFS(0.0,20.0,0.0,0.1,XPOS3,0.5)
0553                CALL PLINE(XX1,FM1,NM,1,4,0,1.0)
0554                CALL PLINE(XX2,FM2,NM,1,4,1,1.0)
0555                CALL PLINE(XX3,FM3,NM,1,4,2,1.0)
0556                CALL PLINE(XX4,FM4,NM,1,4,3,1.0)
0557                CALL PLINE(XX5,DT,NFND,1,3,6,1.0)
0558                CALL PLINE(XX6,DU,NFND,1,3,5,1.0)
0559                CALL PLINE(XX7,U,NFND,1,3,4,1.0)
0560                CALL PLTEND
0561                STOP
0562                END
```

TOTAL MEMORY REQUIREMENTS 020662 BYTES
"DPRO" DOES NOT EXIST.

PLN PROG

```
0001         1      FORMAT(4F15.7)
0002         2      FORMAT(T2,4F15.7)
0003              3 FORMAT(1F6.1,10E11.3)
0004              4 FORMAT(8F8.3,4E12.3)
0005         5      FORMAT(2F15.5,1F15.4,4F15.1)
0006                READ(5,1)SH,CURR
0007                READ(5,1)R,Z2,BETA
0008                READ(5,1)GKY,GKZ,U
0009                READ(5,1)SP,BP,QMIN
0010                WRITE(6,2)SH,CURR
0011                WRITE(6,1)R,Z2,BETA
0012                WRITE(6,1)GKY,GKZ,U
0013                WRITE(6,1)SP,BP,QMIN
0014                PI=3.14159
0015                EPSLON=8.854E-12
0016         50     R=-100.
0017          60    EX1=0.0
0018                EX2=0.0
0019                EY1=0.0
0020                EY2=0.0
0021                EZ1=0.0
0022                EZ2=0.0
0023                P=SP
0024                DP=10.
0025                BETRAD=BETA*PI/180.0
0026           70   DIFANG=2.0*(SQRT((9.21*GKY)/(U*(P+(DP/2.)))))
0027                DIFRAD=DIFANG*PI/180.0
0028                DALFA=DIFRAD/10.0
0029                SALFA=-DIFRAD/2.0
0030                BALFA=+DIFRAD/2.0
0031                HZ=SQRT((9.21*GKZ*(P+(DP/2.)))/U)
0032                DZ1=HZ/5.0
0033                DVOL=P*DP*DALFA*DZ1
0034                ALFA=SALFA
0035           80   AZI=-9.2104*((ALFA**2)/(DIFRAD**2))
0036                AZI=EXP(AZI)
0037                Z1=SH-HZ
0038                BZ1=SH+HZ+(DZ1/10.0)
0039           99   CONTINUE
0040                IF(Z1)100,100,101
0041        101     A=0.0
0042                ELLO=Z1-SH
0043                ELLO=-2.3026*((ELLO**2)/(HZ**2))
0044                CHI1=(AZI*(EXP(ELLO)))/HZ
0045                CHI1=(CHI1*4.6052*CURR)/(PI*U*P*DIFRAD)
0046        102     QSQD=(P*COS(ALFA)-R*COS(BETRAD))**2+(P*SIN(ALFA)-R*SIN(BETRAD))**2
                   1+(Z1-Z2)**2
0047                Q=SQRT(QSQD)
0048                IF(Q-QMIN)98,104,104
0049        104     SINFI=(Z1-Z2)/Q
0050                IF(1.0+SINFI)200,201,201
0051        200     SINFI=-1.0
0052                GO TO 211
0053        201     CONTINUE
0054                IF(1.0-SINFI)210,211,211
0055        210     SINFI=+1.0
0056        211     CONTINUE
0057                FI=ARSIN(SINFI)
```

```
0058              COSFI=COS(FI)
0059              COSTHE=(P*COS(ALFA)-R*COS(BETRAD))/(Q*COSFI)
0060              IF(1.0+COSTHE)300,301,301
0061         300  COSTHE=-1.0
0062              GO TO 311
0063         301  CONTINUE
0064              IF(1.0-COSTHE)310,311,311
0065         310  COSTHE=+1.0
0066         311  CONTINUE
0067              THE=ARCOS(COSTHE)
0068              SINTHE=SIN(THE)
0069              ELFLD1=-(CHI1*DVOL)/(4.0*PI*EPSLON*QSQD)
0070              EX1=EX1+ELFLD1*COSTHE*COSFI
0071              EZ1=EZ1+ELFLD1*SINFI
0072              VECT=P*SIN(ALFA)-R*SIN(BETRAD)
0073              IF(VECT)600,600,601
0074         600  ELFLD1=-ELFLD1
0075         601  EY1=EY1+ELFLD1*SINTHE*COSFI
0076              IF(VECT)800,800,801
0077         800  ELFLD1=-ELFLD1
0078         801  CONTINUE
0079          98  CHI1=-CHI1
0080              Z1=-Z1
0081              A=A+1.5
0082              IF(2.0-A)100,100,102
0083         100  Z1=Z1+DZ1
0084              IF(BZ1-Z1)103,103,99
0085         103  Z1=0.0
0086         110  BZ1=HZ-SH-Z1+(DZ1/10.0)
0087              IF(BZ1)111,115,115
0088         115  A=0.0
0089              ELHI=Z1+SH
0090              ELHI=-2.3026*((ELHI**2)/(HZ**2))
0091              CHI2=(AZI*(EXP(ELHI)))/HZ
0092              CHI2=(CHI2*4.6052*CURR)/(PI*U*P*DIFRAD)
0093         112  QSQD=(P*COS(ALFA)-R*COS(BETRAD))**2+(P*SIN(ALFA)-R*SIN(BETRAD))**2
                 1+(Z1-Z2)**2
0094              IF(Q-QMIN)114,116,116
0095         116  SINFI=(Z1-Z2)/Q
0096              IF(1.0+SINFI)400,401,401
0097         400  SINFI=-1.0
0098              GO TO 411
0099         401  CONTINUE
0100              IF(1.0-SINFI)410,411,411
0101         410  SINFI=+1.0
0102         411  CONTINUE
0103              FI=ARSIN(SINFI)
0104              COSFI=COS(FI)
0105              COSTHE=(P*COS(ALFA)-R*COS(BETRAD))/(Q*COSFI)
0106              IF(1.0+COSTHE)500,501,501
0107         500  COSTHE=-1.0
0108              GO TO 511
0109         501  CONTINUE
0110              IF(1.0-COSTHE)510,511,511
0111         510  COSTHE=+1.0
0112         511  CONTINUE
0113              THE=ARCOS(COSTHE)
0114              SINTHE=SIN(THE)
```

```
0115              ELFLD2=-(CHI2*DVOL)/(4.0*PI*EPSLON*QSQD)
0116              EX2=EX2+ELFLD2*COSTHE*COSFI
0117              EZ2=EZ2+ELFLD2*SINFI
0118              VECT=P*SIN(ALFA)-R*SIN(BETRAD)
0119              IF(VECT)700,700,701
0120          700 ELFLD2=-ELFLD2
0121          701 EY2=EY2+ELFLD2*SINTHE*COSFI
0122              IF(VECT)900,900,901
0123          900 ELFLD2=-ELFLD2
0124          901 CONTINUE
0125          114 CHI2=-CHI2
0126              Z1=-Z1
0127              A=A+1.5
0128              IF(2.0-A)113,113,112
0129          113 Z1=Z1+DZ1
0130              GO TO 110
0131          111 ALFA=ALFA+DALFA
0132              IF(BALFA+(DALFA/10.0)-ALFA)119,80,80
0133          119 EX=EX1+EX2
0134              EY=EY1+EY2
0135              EZ=EZ1+EZ2
0136              P=P+DP
0137              IF(BP+(DP/10.0)-P)120,120,70
0138          120 IF(R)1100,1100,1101
0139         1100 PLUDIM=0.
0140              GO TO 1102
0141         1101 PLUDIM=SQRT((9.21*GKZ*R)/U)
0142         1102 CONTINUE
0143              WRITE(6,5) GKY,GKZ,PLUDIM,R,EZ1,EZ2,EZ
0144              Z2=Z2+1.
0145              IF(0.9-Z2)130,60,60
0146          130 Z2=0.0
0147              R=R+20.
0148              IF(80.-R)140,60,60
0149          140 IF(200.-R)150,141,141
0150          141 R=R+10.
0151              GO TO 60
0152          150 IF(R-290.)1000,1000,1001
0153         1000 R=300.
0154              GO TO 60
0155         1001 R=R+190.
0156              IF(R-1000.)1010,1010,1011
0157         1010 CONTINUE
0158              GO TO 60
0159         1011 GKY=GKY*10.
0160              GKZ=GKZ*10.
0161              IF(110.-GKY)2000,50,50
0162         2000 STOP
0163              END
```

OSCPLMPROG

```
0001              DIMENSION X(1000),Y(1000),Z(1000),DXX(1000),DYY(1000),DZZ(1000)
0002              DIMENSION DS(1000),X1(1000),X2(1000),Y1(1000),Y2(1000),FM1(1000)
0003              DIMENSION FM2(1000),SINFI1(1000),SINFI2(1000),R1(1000),R2(1000)
0004              DIMENSION A1(1000),A2(1000),C1(1000),C2(1000)
0005              DIMENSION X3(1000),Y3(1000),FM3(1000),SINFI3(1000),R3(1000)
0006              DIMENSION A3(1000),C3(1000),C4(1000),C5(1000),C6(1000)
0007              DIMENSION XX(1000)
0008              DIMENSION RUN(4)
0009            1 FORMAT('1TRIAL')
0010              WRITE(4,1)
0011            2 FORMAT(3E15.3)
0012            3 FORMAT(I4,3E15.3,6F10.3)
0013            4 FORMAT(8E15.3)
0014            5 FORMAT(6F10.3)
0015            6 FORMAT(4A4)
0016            7 FORMAT('1 OSC.PLUME')
0017            8  FORMAT('1 MEAN,SD,SKEW  MILLS')
0018            9 FORMAT(3E15.3)
0019              WRITE(4,7)
0020              READ(5,6) RUN
0021              READ(5,5) RR1,RR2,RR3,ALFA1,ALFA2,ALFA3
0022              READ(5,5) AY,AZ,FY,FZ,U,H
0023              READ(5,5) DDT,DX,TMAX,XMAX,BETA
0024              WRITE(4,5) RR1,RR2,RR3,ALFA1,ALFA2,ALFA3
0025              WRITE(4,5) AY,AZ,FY,FZ,U,H
0026              WRITE(4,5) DDT,DX,TMAX,XMAX,BETA
0027              CURR=0.000001
0028              EPSLON=8.85E-12
0029              PI=3.14
0030              DELT=DX/U
0031              JMAX=IFIX(XMAX/DX)
0032              KMAX=IFIX(TMAX/DDT)
0033              RHO=CURR/U
0034              ALFA1=ALFA1*PI/180.0
0035              ALFA2=ALFA2*PI/180.0
0036              ALFA3=ALFA3*PI/180.0
0037              BETA=BETA*PI/180.
0038              XM1=RR1*COS(ALFA1)
0039              YM1=RR1*SIN(ALFA1)
0040              XM2=RR2*COS(ALFA2)
0041              YM2=RR2*SIN(ALFA2)
0042              XM3=RR3*COS(ALFA3)
0043              YM3=RR3*SIN(ALFA3)
0044              II=1
0045              DT=0.0
0046           51 FLD1=0.0
0047              FLD2=0.0
0048              FLD3=0.0
0049              T=0.0
0050              DO 10 I=1,JMAX
0051              X(I)=U*T
0052              Y(I)=AY*T*SIN(2.0*PI*FY*(T+DT))
0053              ZDASH=X(I)*TAN(BETA)
0054              Z(I)=H+AZ*T*SIN(2.0*PI*FZ*(T+DT))
0055              Z(I)=Z(I)+ZDASH
```

```
0056            IF(Z(I)-0.1)11,11,12
0057         11 Z(I)=0.1
0058         12 CONTINUE
0059         10 T=T+DELT
0060            JMAX1=JMAX-1
0061            DO 20 I=1,JMAX1
0062            DXX(I)=X(I+1)-X(I)
0063            DYY(I)=Y(I+1)-Y(I)
0064            DZZ(I)=Z(I+1)-Z(I)
0065            DS(I)=SQRT(DXX(I)**2+DYY(I)**2+DZZ(I)**2)
0066         20 CONTINUE
0067            DS(JMAX)=DS(JMAX1)
0068            DO 30 I=1,JMAX
0069            X1(I)=X(I)-XM1
0070            X2(I)=X(I)-XM2
0071            Y1(I)=Y(I)-YM1
0072            Y2(I)=Y(I)-YM2
0073            X3(I)=X(I)-XM3
0074         30 Y3(I)=Y(I)-YM3
0075            DO 40 I=1,JMAX
0076            R1(I)=SQRT(X1(I)**2+Y1(I)**2+Z(I)**2)
0077            R2(I)=SQRT(X2(I)**2+Y2(I)**2+Z(I)**2)
0078            R3(I)=SQRT(X3(I)**2+Y3(I)**2+Z(I)**2)
0079            SINFI1(I)=Z(I)/R1(I)
0080            SINFI2(I)=Z(I)/R2(I)
0081            SINFI3(I)=Z(I)/R3(I)
0082            R1(I)=R1(I)**2
0083            R2(I)=R2(I)**2
0084            R3(I)=R3(I)**2
0085            FLD1=FLD1+(RHO*SINFI1(I)*DS(I))/(2.0*PI*EPSLON*R1(I))
0086            FLD2=FLD2+(RHO*SINFI2(I)*DS(I))/(2.0*PI*EPSLON*R2(I))
0087            FLD3=FLD3+(RHO*SINFI3(I)*DS(I))/(2.0*PI*EPSLON*R3(I))
0088         40 CONTINUE
0089            FM1(II)=FLD1
0090            FM2(II)=FLD2
0091            FM3(II)=FLD3
0092            II=II+1
0093            DT=DT+DDT
0094            IF(KMAX-II)50,51,51
0095         50 WRITE(4,2)(FM1(I),FM2(I),FM3(I),I=1,KMAX)
0096            L=KMAX/2
0097            CALL AUTO(FM1,KMAX,L,A1)
0098            CALL AUTO(FM2,KMAX,L,A2)
0099            CALL AUTO(FM3,KMAX,L,A3)
0100            CALL CROSS(FM1,FM2,KMAX,L,C1,C2)
0101            CALL CROSS(FM1,FM3,KMAX,L,C3,C4)
0102            CALL CROSS(FM2,FM3,KMAX,L,C5,C6)
0103            SM1=SQRT(A1(1))
0104            SM2=SQRT(A2(1))
0105            SM3=SQRT(A3(1))
0106            DO 60 I=1,L
0107            C1(I)=C1(I)/(SM1*SM2)
0108            C2(I)=C2(I)/(SM1*SM2)
0109            C3(I)=C3(I)/(SM1*SM3)
0110            C4(I)=C4(I)/(SM1*SM3)
```

```
0111              C5(I)=C5(I)/(SM2*SM3)
0112           60 C6(I)=C6(I)/(SM2*SM3)
0113              WRITE(4,3)(I,A1(I),A2(I),A3(I),C1(I),C2(I),C3(I),C4(I),C5(I),C6(I)
                 1,I=1,L)
0114              SFM1=0.
0115              SFM2=0.
0116              SFM3=0.
0117              SKFM1=0.
0118              SKFM2=0.
0119              SKFM3=0.
0120              FKMAX=FLOAT(KMAX)
0121              DO 500 I=1,KMAX
0122              SFM1=SFM1+FM1(I)
0123              SFM2=SFM2+FM2(I)
0124          500 SFM3=SFM3+FM3(I)
0125              SFM1=SFM1/FKMAX
0126              SFM2=SFM2/FKMAX
0127              SFM3=SFM3/FKMAX
0128              DO 501 I=1,KMAX
0129              SKFM1=SKFM1+((FM1(I)-SFM1)**3)
0130              SKFM2=SKFM2+((FM2(I)-SFM2)**3)
0131          501 SKFM3=SKFM3+((FM3(I)-SFM3)**3)
0132              SKFM1=SKFM1/(FKMAX*(SM1**3))
0133              SKFM2=SKFM2/(FKMAX*(SM2**3))
0134              SKFM3=SKFM3/(FKMAX*(SM3**3))
0135              WRITE(4,8)
0136              WRITE(4,9) SFM1,SFM2,SFM3
0137              WRITE(4,9) SM1,SM2,SM3
0138              WRITE(4,9) SKFM1,SKFM2,SKFM3
0139              DO 70 K=1,KMAX
0140           70 XX(K)=FLOAT(K)*DDT
0141              KMAX1=KMAX-1
0142              FMMX=1.0
0143              DO 200 I=1,KMAX1
0144          102 IF(FM1(I)-FMMX)100,100,101
0145          101 FMMX=2.*FMMX
0146              GO TO 102
0147          100 CONTINUE
0148          105 IF(FM2(I)-FMMX)103,103,104
0149          104 FMMX=2.*FMMX
0150              GO TO 105
0151          103 CONTINUE
0152          108 IF(FM3(I)-FMMX)106,106,107
0153          107 FMMX=2.*FMMX
0154              GO TO 108
0155          106 CONTINUE
0156          200 CONTINUE
0157              DO 210 I=1,KMAX
0158              FM1(I)=FM1(I)/FMMX
0159              FM2(I)=FM2(I)/FMMX
0160          210 FM3(I)=FM3(I)/FMMX
0161              T=0.
0162              DO 300 I=1,JMAX
0163              X(I)=U*T
0164              Y(I)=AY*T*SIN(2.*PI*FY*T)
```

```
0165              ZDASH=X(I)*TAN(BETA)
0166              Z(I)=H+(AZ*T*SIN(2.*PI*FZ*T))
0167              Z(I)=Z(I)+ZDASH
0168              IF(Z(I)-0.1)301,300,300
0169         301  Z(I)=0.1
0170         300  T=T+DELT
0171              DO 310 I=1,JMAX
0172              IF(AY)400,400,401
0173         400  Y(I)=0.0
0174              GO TO 402
0175         401  Y(I)=Y(I)/(AY*TMAX)
0176         402  CONTINUE
0177              IF(BETA)600,600,601
0178         600  Z(I)=Z(I)/(H+(AZ*TMAX))
0179              GO TO 310
0180         601  Z(I)=Z(I)/(H+(AZ*TMAX)+(X(JMAX)*TAN(BETA)))
0181         310  CONTINUE
0182              AXLTH=TMAX/2.0
0183              AXLTH1=XMAX/10.
0184              XPOS1=AXLTH+3.
0185              XPOS2=AXLTH+AXLTH1+6.
0186              CALL PLTXMX(100.)
0187              CALL PAXIS(0.5,0.5,'TIME (SEC)',-10,AXLTH,0.0,0.0,2.0,1.0)
0188              CALL PAXIS(0.5,0.5,'ARB UNITS',9,10.0,90.0,0.0,0.1,1.0)
0189              CALL PSYMB(1.0,1.0,-0.1,'DPH 76 C.D.JONES',0.0,16)
0190              CALL PSYMB(1.0,9.0,-0.1,RUN,0.0,15)
0191              CALL PLTOFS(0.0,2.0,0.0,0.1,0.5,0.5)
0192              CALL PLINE(XX,FM1,KMAX,1,4,0,1.0)
0193              CALL PLINE(XX,FM2,KMAX,1,4,1,1.0)
0194              CALL PLINE(XX,FM3,KMAX,1,4,2,1.0)
0195              CALL PAXIS(XPOS1,0.5,'DIST (M) X',-10,AXLTH1,0.0,0.0,10.0,1.0)
0196              CALL PAXIS(XPOS1,0.5,'DIST (M) Y',-10,10.0,90.0,-1.0,0.2,1.0)
0197              CALL PLTOFS(0.0,10.0,-1.0,0.2,XPOS1,0.5)
0198              CALL PLINE(X,Y,JMAX,1,0,0,1.0)
0199              CALL PAXIS(XPOS2,0.5,'DIST (M) X',-10,AXLTH1,0.0,0.0,10.0,1.0)
0200              CALL PAXIS(XPOS2,0.5,'DIST (M) Z',-10,10.0,90.0,0.0,0.1,1.0)
0201              CALL PLTOFS(0.0,10.0,0.0,0.1,XPOS2,0.5)
0202              CALL PLINE(X,Z,JMAX,1,0,0,1.0)
0203              CALL PLTEND
0204              STOP
0205              END
```

*** GLOBAL TIME LIMIT EXCEEDED AT 90509982

PLMPOSN PROG

```
0001        11    FORMAT(8A4)
0002        12    FORMAT(F10.3)
0003              DIMENSION DATIME(8)
0004              DIMENSION XP(50),YP(50),ZP(50)
0005              REAL*8 TT
0006              XPOS=0.5
0007              IMAX=40
0008              IMIN=IMAX-20
0009              READ(3,11) DATIME
0010              CALL PLTXMX(16.)
0011              CALL PSYMB(1.0,10.0,-0.1,DATIME,0.0,32)
0012              CALL PSYMB(1.0,9.0,-0.1,'DPH76',0.0,5)
0013              READ(3,12) DT
0014        104   READ(3) I,MM,(XP(J),YP(J),ZP(J),J=1,MM)
0015              IF(I-IMIN)103,103,101
0016        101   IF(IMAX-I)100,102,102
0017        102   CONTINUE
0018              T=DT*FLOAT(I)
0019              XPOS1=XPOS+0.5
0020              MMM=MM-1
0021              TT=T
0022              CALL PAXIS(XPOS,2.5,'X (M)',-5,5.0,0.0,0.0,10.0,1.0)
0023              CALL PAXIS(XPOS,0.5,'Y (M)',5,4.0,90.0,10.0,-5.0,1.0)
0024              CALL PLTOFS(0.0,10.0,0.0,-5.0,XPOS,2.5)
0025              CALL PLINE(XP,YP,MMM,1,1,0,1.0)
0026              CALL PAXIS(XPOS,5.5,'X (M)',-5,5.0,0.0,0.0,10.0,1.0)
0027              CALL PAXIS(XPOS,5.5,'Z (M)',5,4.0,90.0,0.0,5.0,1.0)
0028              CALL PFNMBR(XPOS1,9.5,0.1,TT,0.0,'F10.2 *',0.0)
0029              CALL PLTOFS(0.0,10.0,0.0,5.0,XPOS,5.5)
0030              CALL PLINE(XP,ZP,MMM,1,1,0,1.0)
0031              XPOS=XPOS+6.5
0032              IF(IMAX-I)100,100,103
0033        103   GO TO 104
0034        100   CONTINUE
0035              CALL PLTEND
0036              STOP
0037              END

   TOTAL MEMORY REQUIREMENTS 00C7E6 BYTES
EXECUTION TERMINATED
```

```
0001            SUBROUTINE XSPECT(DELF,L,R,S,GXY,PHIXY)
0002            DIMENSION R(100),S(100),A(100),B(100)
0003            DIMENSION C(100),Q(100),GXY(100),PHIXY(100)
0004            DIMENSION CC(100),QQ(100)
0005            PI=3.142
0006            SGMA=0.
0007            SGMB=0.
0008            M=L-1
0009            XM=FLOAT(M)
0010            DO 5 I=1,L
0011            A(I)=(R(I)+S(I))/2.
0012       5    B(I)=(R(I)-S(I))/2.
0013            DO 20 K=1,L
0014            KK=K-1
0015            KKK=2+KK-IFIX(2.*FLOAT(IFIX(0.5*FLOAT(KK))))
0016            DO 10 J=2,M
0017            THETA=(PI/XM)*FLOAT((J-1)*KK)
0018       101  IF(THETA-2.*PI)99,99,100
0019       100  THETA=THETA-2.*PI
0020            GO TO 101
0021       99   CONTINUE
0022            AA=A(J)*COS(THETA)
0023            BB=B(J)*SIN(THETA)
0024            SGMA=SGMA+AA
0025       10   SGMB=SGMB+BB
0026            BRKT=A(1)+2.*SGMA+((-1.)**KKK)*A(L)
0027            C(K)=BRKT/(XM*DELF)
0028            Q(K)=2.*SGMB/(XM*DELF)
0029            SGMA=0.
0030            SGMB=0.
0031       20   CONTINUE
0032            CC(1)=0.5*C(1)+0.5*C(2)
0033            CC(L)=0.5*C(L-1)+0.5*C(L)
0034            QQ(1)=0.5*Q(1)+0.5*Q(2)
0035            QQ(L)=0.5*Q(L-1)+0.5*Q(L)
0036            DO 30 K=2,M
0037            CC(K)=0.25*C(K-1)+0.5*C(K)+0.25*C(K+1)
0038       30   QQ(K)=0.25*Q(K-1)+0.5*Q(K)+0.25*Q(K+1)
0039            DO 50 K=1,L
0040            C(K)=CC(K)
0041       50   Q(K)=QQ(K)
0042            DO 40 I=1,L
0043            GXY(I)=C(I)**2+Q(I)**2
0044            PHIXY(I)=ATAN(Q(I)/C(I))
0045       40   PHIXY(I)=PHIXY(I)*360./6.284
0046            RETURN
0047            END
```

TOTAL MEMORY REQUIREMENTS 000F8A BYTES
EXECUTION TERMINATED

```
0001              SUBROUTINE ASPECT(DELF,L,R,G)
0002              DIMENSION G(100),R(100)
0003              DIMENSION GG(100)
0004              PI=3.142
0005              SGMA=0.
0006              M=L-1
0007              XM=FLOAT(M)
0008              DO 20 K=1,L
0009              KK=K-1
0010              KKK=2+KK-IFIX(2.*FLOAT(IFIX(0.5*FLOAT(KK))))
0011              DO 10 J=2,M
0012              THETA=(PI/XM)*FLOAT((J-1)*KK)
0013          101 IF(THETA-2.*PI)99,99,100
0014          100 THETA=THETA-2.*PI
0015              GO TO 101
0016           99 AA=R(J)*COS(THETA)
0017           10 SGMA=SGMA+AA
0018              BRKT=R(1)+2.*SGMA+((-1.)**KKK)*R(L)
0019              G(K)=BRKT/(XM*DELF)
0020              SGMA=0.
0021           20 CONTINUE
0022              GG(1)=0.5*G(1)+0.5*G(2)
0023              GG(L)=0.5*G(L-1)+0.5*G(L)
0024              DO 30 K=2,M
0025          30  GG(K)=0.25*G(K-1)+0.5*G(K)+0.25*G(K+1)
0026              DO 40 K=1,L
0027          40  G(K)=GG(K)
0028              RETURN
0029              END
```

TOTAL MEMORY REQUIREMENTS 00063A BYTES

```
0386                CALL PLTOFS(0.0,0.05,0.0,90.0,60.0,7.5)
0387                CALL PLINE(XX1,PS2,L,1,5,1,1.0)
0388                CALL PAXIS(70.0,2.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0389                CALL PAXIS(70.0,0.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0390                CALL PLTOFS(0.0,0.05,0.0,90.0,70.0,2.5)
0391                CALL PLINE(XX1,PS3,L,1,5,2,1.0)
0392                CALL PAXIS(70.0,7.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0393                CALL PAXIS(70.0,5.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0394                CALL PLTOFS(0.0,0.05,0.0,90.0,70.0,7.5)
0395                CALL PLINE(XX1,PS4,L,1,5,3,1.0)
0396                CALL PAXIS(80.0,2.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0397                CALL PAXIS(80.0,0.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0398                CALL PLTOFS(0.0,0.05,0.0,90.0,80.0,2.5)
0399                CALL PLINE(XX1,PS5,L,1,5,4,1.0)
0400                CALL PAXIS(80.0,7.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0401                CALL PAXIS(80.0,5.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0402                CALL PLTOFS(0.0,0.05,0.0,90.0,80.0,7.5)
0403                CALL PLINE(XX1,PS6,L,1,5,5,1.0)
0404                CALL PLTEND
0405                STOP
0406                END
```

TOTAL MEMORY REQUIREMENTS 013B8E BYTES

```
0331                CALL PAXIS(0.5,0.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0332                CALL PSYMB(1.0,1.0,-0.1,'DPH76 C.D.JONES',0.0,15)
0333                CALL PLTOFS(0.0,0.05,0.0,0.25,0.5,0.5)
0334                CALL PLINE(XX1,G1,L,1,5,0,1.0)
0335                CALL PAXIS(0.5,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0336                CALL PAXIS(0.5,5.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0337                CALL PLTOFS(0.0,0.05,0.0,0.25,0.5,5.5)
0338                CALL PLINE(XX1,G2,L,1,5,1,1.0)
0339                CALL PAXIS(10.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0340                CALL PAXIS(10.0,0.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0341                CALL PLTOFS(0.0,0.05,0.0,0.25,10.0,0.5)
0342                CALL PLINE(XX1,G3,L,1,5,2,1.0)
0343                CALL PAXIS(10.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0344                CALL PAXIS(10.0,5.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0345                CALL PLTOFS(0.0,0.05,0.0,0.25,10.0,5.5)
0346                CALL PLINE(XX1,G4,L,1,5,3,1.0)
0347                CALL PAXIS(20.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0348                CALL PAXIS(20.0,0.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0349                CALL PLTOFS(0.0,0.05,0.0,0.25,20.0,0.5)
0350                CALL PLINE(XX2,G5,LS,1,5,4,1.0)
0351                CALL PAXIS(20.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0352                CALL PAXIS(20.0,5.5,'RELATIVE PSD',12,4.0,90.0,0.0,0.25,1.0)
0353                CALL PLTOFS(0.0,0.05,0.0,0.25,20.0,5.5)
0354                CALL PLINE(XX2,G6,LS,1,5,5,1.0)
0355                CALL PLINE(XX2,G7,LS,1,5,6,1.0)
0356                CALL PAXIS(30.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0357                CALL PAXIS(30.0,0.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0358                CALL PLTOFS(0.0,0.05,0.0,0.25,30.0,0.5)
0359                CALL PLINE(XX1,CS1,L,1,5,0,1.0)
0360                CALL PAXIS(30.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0361                CALL PAXIS(30.0,5.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0362                CALL PLTOFS(0.0,0.05,0.0,0.25,30.0,5.5)
0363                CALL PLINE(XX1,CS2,L,1,5,1,1.0)
0364                CALL PAXIS(40.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0365                CALL PAXIS(40.0,0.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0366                CALL PLTOFS(0.0,0.05,0.0,0.25,40.0,0.5)
0367                CALL PLINE(XX1,CS3,L,1,5,2,1.0)
0368                CALL PAXIS(40.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0369                CALL PAXIS(40.0,5.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0370                CALL PLTOFS(0.0,0.05,0.0,0.25,40.0,5.5)
0371                CALL PLINE(XX1,CS4,L,1,5,3,1.0)
0372                CALL PAXIS(50.0,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0373                CALL PAXIS(50.0,0.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0374                CALL PLTOFS(0.0,0.05,0.0,0.25,50.0,0.5)
0375                CALL PLINE(XX1,CS5,L,1,5,4,1.0)
0376                CALL PAXIS(50.0,5.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0377                CALL PAXIS(50.0,5.5,'COHERENCY SPECTRUM',18,4.0,90.0,0.0,0.25,1.0)
0378                CALL PLTOFS(0.0,0.05,0.0,0.25,50.0,5.5)
0379                CALL PLINE(XX1,CS6,L,1,5,5,1.0)
0380                CALL PAXIS(60.0,2.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0381                CALL PAXIS(60.0,0.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
0382                CALL PLTOFS(0.0,0.05,0.0,90.0,60.0,2.5)
0383                CALL PLINE(XX1,PS1,L,1,5,0,1.0)
0384                CALL PAXIS(60.0,7.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
0385                CALL PAXIS(60.0,5.5,'PHASE SPECTRUM',14,4.0,90.0,-180.0,90.0,1.0)
```

```
0276                CALL XSPECT(DELF,L,R5,R6,CS3,PS3)
0277                CALL XSPECT(DELF,L,R7,R8,CS4,PS4)
0278                CALL XSPECT(DELF,L,R9,R10,CS5,PS5)
0279                CALL XSPECT(DELF,L,R11,R12,CS6,PS6)
0280                DO 400 K=1,L
0281                CS1(K)=CS1(K)/(G1(K)*G2(K))
0282                CS2(K)=CS2(K)/(G1(K)*G3(K))
0283                CS3(K)=CS3(K)/(G1(K)*G4(K))
0284                CS4(K)=CS4(K)/(G2(K)*G3(K))
0285                CS5(K)=CS5(K)/(G2(K)*G4(K))
0286          400   CS6(K)=CS6(K)/(G3(K)*G4(K))
0287                WRITE(6,14)
0288                WRITE(6,15)(K,CS1(K),CS2(K),CS3(K),CS4(K),CS5(K),CS6(K),K=1,L)
0289                WRITE(6,16)
0290                WRITE(6,15)(K,PS1(K),PS2(K),PS3(K),PS4(K),PS5(K),PS6(K),K=1,L)
0291                A1=0.
0292                A2=0.
0293                A3=0.
0294                A4=0.
0295                A5=0.
0296                A6=0
0297                A7=0
0298                DO 200 K=1,L
0299                IF(G1(K)-A1)201,201,202
0300          202   A1=G1(K)
0301          201   IF(G2(K)-A2)204,204,205
0302          205   A2=G2(K)
0303          204   IF(G3(K)-A3)206,206,207
0304          207   A3=G3(K)
0305          206   IF(G4(K)-A4)200,200,208
0306          208   A4=G4(K)
0307          200   CONTINUE
0308                DO 210 K=1,L
0309                G1(K)=G1(K)/A1
0310                G2(K)=G2(K)/A2
0311                G3(K)=G3(K)/A3
0312          210   G4(K)=G4(K)/A4
0313                DO 220 K=1,LS
0314                IF(G5(K)-A5)221,221,222
0315          222   A5=G5(K)
0316          221   IF(G6(K)-A6)223,223,224
0317          224   A6=G6(K)
0318          223   IF(G7(K)-A7)220,220,225
0319          225   A7=G7(K)
0320          220   CONTINUE
0321                DO 211 K=1,LS
0322                G5(K)=G5(K)/A5
0323                G6(K)=G6(K)/A6
0324          211   G7(K)=G7(K)/A7
0325                DO 230 K=1,L
0326          230   XX1(K)=DELF*FLOAT(K)
0327                DO 231 K=1,LS
0328          231   XX2(K)=DELF*FLOAT(K)
0329                CALL PLTXMX(120.)
0330                CALL PAXIS(0.5,0.5,'FREQUENCY (HZ)',-14,7.0,0.0,0.0,0.05,1.0)
```

```
0221              WRITE(6,3) SM1,SM2,SM3,SM4,SM5,SM6,SM7
0222              WRITE(6,4)
0223              WRITE(6,3) SSD1,SSD2,SSD3,SSD4,SSD5,SSD6,SSD7
0224              WRITE(6,5)
0225              WRITE(6,3) SSK1,SSK2,SSK3,SSK4,SSK5,SSK6,SSK7
0226              WRITE(6,13)
0227              WRITE(6,3) SK1,SK2,SK3,SK4,SK5,SK6,SK7
0228              L=NM/10
0229              LS=L/2
0230              DO 300 K=2,NM
0231              PWFM1(K)=FM1(K)-FF*FM1(K-1)
0232              PWFM2(K)=FM2(K)-FF*FM2(K-1)
0233              PWFM3(K)=FM3(K)-FF*FM3(K-1)
0234         300  PWFM4(K)=FM4(K)-FF*FM4(K-1)
0235              DO 301 K=2,NFND
0236              PWU(K)=U(K)-FF*U(K-1)
0237              PWDU(K)=DU(K)-FF*DU(K-1)
0238         301  PWDT(K)=DT(K)-FF*DT(K-1)
0239              DO 302 K=2,NM
0240              FM1(K)=PWFM1(K)
0241              FM2(K)=PWFM2(K)
0242              FM3(K)=PWFM3(K)
0243         302  FM4(K)=PWFM4(K)
0244              DO 303 K=2,NFND
0245              U(K)=PWU(K)
0246              DU(K)=PWDU(K)
0247         303  DT(K)=PWDT(K)
0248              CALL AUTO(FM1,NM,L,R1)
0249              CALL AUTO(FM2,NM,L,R2)
0250              CALL AUTO(FM3,NM,L,R3)
0251              CALL AUTO(FM4,NM,L,R4)
0252              CALL AUTO(U,NFND,LS,R5)
0253              CALL AUTO(DU,NFND,LS,R6)
0254              CALL AUTO(DT,NFND,LS,R7)
0255              DDT=(RUNTIM*60.)/FNM
0256              DELF=1./(2.*FLOAT(L-1)*DDT)
0257              CALL ASPECT(DELF,L,R1,G1)
0258              CALL ASPECT(DELF,L,R2,G2)
0259              CALL ASPECT(DELF,L,R3,G3)
0260              CALL ASPECT(DELF,L,R4,G4)
0261              CALL ASPECT(DELF,LS,R5,G5)
0262              CALL ASPECT(DELF,LS,R6,G6)
0263              CALL ASPECT(DELF,LS,R7,G7)
0264              WRITE(6,9)
0265              WRITE(6,11)(K,G1(K),G2(K),G3(K),G4(K),K=1,L)
0266              WRITE(6,10)
0267              WRITE(6,12)(K,G5(K),G6(K),G7(K),K=1,LS)
0268              CALL CROSS(FM1,FM2,NM,L,R1,R2)
0269              CALL CROSS(FM1,FM3,NM,L,R3,R4)
0270              CALL CROSS(FM1,FM4,NM,L,R5,R6)
0271              CALL CROSS(FM2,FM3,NM,L,R7,R8)
0272              CALL CROSS(FM2,FM4,NM,L,R9,R10)
0273              CALL CROSS(FM3,FM4,NM,L,R11,R12)
0274              CALL XSPECT(DELF,L,R1,R2,CS1,PS1)
0275              CALL XSPECT(DELF,L,R3,R4,CS2,PS2)
```

```
0166                SSD1=SSD1+(FM1(J)-SM1)**2
0167                SSD2=SSD2+(FM2(J)-SM2)**2
0168                SSD3=SSD3+(FM3(J)-SM3)**2
0169          160   SSD4=SSD4+(FM4(J)-SM4)**2
0170                SSD1=SQRT(SSD1/FNM)
0171                SSD2=SQRT(SSD2/FNM)
0172                SSD3=SQRT(SSD3/FNM)
0173                SSD4=SQRT(SSD4/FNM)
0174                DO 161 J=1,NFND
0175                SSD5=SSD5+(U(J)-SM5)**2
0176                SSD6=SSD6+(DU(J)-SM6)**2
0177          161   SSD7=SSD7+(DT(J)-SM7)**2
0178                SSD5=SQRT(SSD5/FNFND)
0179                SSD6=SQRT(SSD6/FNFND)
0180                SSD7=SQRT(SSD7/FNFND)
0181                DO 170 J=1,NM
0182                SSK1=SSK1+(FM1(J)-SM1)**3
0183                SSK2=SSK2+(FM2(J)-SM2)**3
0184                SSK3=SSK3+(FM3(J)-SM3)**3
0185          170   SSK4=SSK4+(FM4(J)-SM4)**3
0186                SSK1=SSK1/(FNM*(SSD1**3))
0187                SSK2=SSK2/(FNM*(SSD2**3))
0188                SSK3=SSK3/(FNM*(SSD3**3))
0189                SSK4=SSK4/(FNM*(SSD4**3))
0190                DO 171 J=1,NFND
0191                SSK5=SSK5+(U(J)-SM5)**3
0192                SSK6=SSK6+(DU(J)-SM6)**3
0193          171   SSK7=SSK7+(DT(J)-SM7)**3
0194                SSK5=SSK5/(FNFND*(SSD5**3))
0195                SSK6=SSK6/(FNFND*(SSD6**3))
0196                SSK7=SSK7/(FNFND*(SSD7**3))
0197                SK1=0.0
0198                SK2=0.0
0199                SK3=0.0
0200                SK4=0.0
0201                SK5=0.0
0202                SK6=0.0
0203                SK7=0.0
0204                DO 180 J=1,NM
0205                SK1=SK1+(FM1(J)-SM1)**4
0206                SK2=SK2+(FM2(J)-SM2)**4
0207                SK3=SK3+(FM3(J)-SM3)**4
0208          180   SK4=SK4+(FM4(J)-SM4)**4
0209                SK1=SK1/(FNM*(SSD1**4))
0210                SK2=SK2/(FNM*(SSD2**4))
0211                SK3=SK3/(FNM*(SSD3**4))
0212                SK4=SK4/(FNM*(SSD4**4))
0213                DO 181 J=1,NFND
0214                SK5=SK5+(U(J)-SM5)**4
0215                SK6=SK6+(DU(J)-SM6)**4
0216          181   SK7=SK7+(DT(J)-SM7)**4
0217                SK5=SK5/(FNFND*(SSD5**4))
0218                SK6=SK6/(FNFND*(SSD6**4))
0219                SK7=SK7/(FNFND*(SSD7**4))
0220                WRITE(6,2)
```

```
0111                GO TO 130
0112          132   J=J+2
0113                K=K+1
0114                NM=2*NFND
0115                DO 140 JN=1,NM
0116                FM1(JN)=FM1(J)
0117                FM2(JN)=FM2(J)
0118                FM3(JN)=FM3(J)
0119                FM4(JN)=FM4(J)
0120          140   J=J+1
0121                DO 141 KN=1,NFND
0122                U(KN)=U(K)
0123                DU(KN)=DU(K)
0124                DT(KN)=DT(K)
0125          141   K=K+1
0126                FNM=FLOAT(NM)
0127                FNFND=FLOAT(NFND)
0128                SM1=0.0
0129                SM2=0.0
0130                SM3=0.0
0131                SM4=0.0
0132                SM5=0.0
0133                SM6=0.0
0134                SM7=0.0
0135                SSD1=0.0
0136                SSD2=0.0
0137                SSD3=0.0
0138                SSD4=0.0
0139                SSD5=0.0
0140                SSD6=0.0
0141                SSD7=0.0
0142                SSK1=0.0
0143                SSK2=0.0
0144                SSK3=0.0
0145                SSK4=0.0
0146                SSK5=0.0
0147                SSK6=0.0
0148                SSK7=0.0
0149                DO 150 J=1,NM
0150                SM1=SM1+FM1(J)
0151                SM2=SM2+FM2(J)
0152                SM3=SM3+FM3(J)
0153          150   SM4=SM4+FM4(J)
0154                SM1=SM1/FNM
0155                SM2=SM2/FNM
0156                SM3=SM3/FNM
0157                SM4=SM4/FNM
0158                DO 151 J=1,NFND
0159                SM5=SM5+U(J)
0160                SM6=SM6+DU(J)
0161          151   SM7=SM7+DT(J)
0162                SM5=SM5/FNFND
0163                SM6=SM6/FNFND
0164                SM7=SM7/FNFND
0165                DO 160 J=1,NM
```

```
0056              C6=C
0057              GO TO 100
0058        107   A7=A
0059              B7=B
0060              C7=C
0061              GO TO 100
0062        108   A8=A
0063              B8=B
0064              C8=C
0065              GO TO 100
0066        109   A9=A
0067              B9=B
0068              C9=C
0069              GO TO 100
0070        110   A10=A
0071              B10=B
0072              C10=C
0073              GO TO 100
0074        111   A11=A
0075              B11=B
0076              C11=C
0077              IF(J-11)126,120,126
0078        126   STOP
0079        120   CONTINUE
0080              J=1000
0081              K=500
0082              NFND=0
0083         130  READ(5,7)M,I1,I11,I10,I9,I8,I6,I7,I5,I4,I3,I2
0084              IF(M-9999)131,132,131
0085        131   NFND=NFND+1
0086              COMP=703./FLOAT(M)
0087              U(K)=(A1*FLOAT(I1)+B1)*C1
0088              FM1(J-1)=(A2*FLOAT(I2)+B2)*C2
0089              FM2(J-1)=(A3*FLOAT(I3)+B3)*C3
0090              FM3(J-1)=(A4*FLOAT(I4)+B4)*C4
0091              FM4(J-1)=(A5*FLOAT(I5)+B5)*C5
0092              DU(K)=(A6*FLOAT(I6)+B6)*C6
0093              DT(K)=(A7*FLOAT(I7)+B7)*C7
0094              FM1(J)=(A8*FLOAT(I8)+B8)*C8
0095              FM2(J)=(A9*FLOAT(I9)+B9)*C9
0096              FM3(J)=(A10*FLOAT(I10)+B10)*C10
0097              FM4(J)=(A11*FLOAT(I11)+B11)*C11
0098              U(K)=U(K)*COMP
0099              FM1(J-1)=FM1(J-1)*COMP
0100              FM2(J-1)=FM2(J-1)*COMP
0101              FM3(J-1)=FM3(J-1)*COMP
0102              FM4(J-1)=FM4(J-1)*COMP
0103              DU(K)=DU(K)*COMP
0104              DT(K)=DT(K)*COMP
0105              FM1(J)=FM1(J)*COMP
0106              FM2(J)=FM2(J)*COMP
0107              FM3(J)=FM3(J)*COMP
0108              FM4(J)=FM4(J)*COMP
0109              J=J-2
0110              K=K-1
```

SUPPROG

```
0001            1 FORMAT(1F10.2)
0002            2 FORMAT('0MEANS,MILLS,U,DU,DT')
0003            3 FORMAT(7E15.3)
0004            4 FORMAT('0SD,MILLS,U,DU,DT')
0005            5 FORMAT('0SKEW,MILLS,U,DU,DT')
0006            6 FORMAT(I5,3F15.5)
0007            7 FORMAT(12I5)
0008            8 FORMAT('1FURTHER STATISTICAL ANALYSIS SERIES 1')
0009              WRITE(6,8)
0010            9 FORMAT('1POWER SPECTRUM MILLS')
0011           10 FORMAT('1POWER SPECTRUM U,DU,DT')
0012           11 FORMAT(I5,4E15.3)
0013           12 FORMAT(I5,3E15.3)
0014         13   FORMAT('0KURTOSIS MILLS,U,DU,DT')
0015       14     FORMAT('1 COHERENCE FUNCTION MILLS')
0016       15     FORMAT(I5,6E15.3)
0017       16     FORMAT('1 PHASE ANGLE MILLS')
0018              DIMENSION R1(100),R2(100),R3(100),R4(100),R5(100),R6(100)
0019              DIMENSION R7(100),R8(100),R9(100),R10(100),R11(100),R12(100)
0020              DIMENSION PS1(100),PS2(100),PS3(100),PS4(100),PS5(100),PS6(100)
0021              DIMENSION CS1(100),CS2(100),CS3(100),CS4(100),CS5(100),CS6(100)
0022              DIMENSION FM1(1000),FM2(1000),FM3(1000),FM4(1000)
0023              DIMENSION U(1000),DU(1000),DT(1000)
0024              DIMENSION G1(100),G2(100),G3(100),G4(100),G5(50),G6(50),G7(50)
0025              DIMENSION XX1(100),XX2(100)
0026              DIMENSION PWFM1(1000),PWFM2(1000),PWFM3(1000),PWFM4(1000)
0027              DIMENSION PWU(1000),PWDU(1000),PWDT(1000)
0028              READ(5,1) FF
0029              READ(5,1) RUNTIM
0030              J=0
0031       100    READ(5,6)I,A,B,C
0032              J=J+1
0033              GO TO(101,102,103,104,105,106,107,108,109,110,111),I
0034       101    A1=A
0035              B1=B
0036              C1=C
0037              GO TO 100
0038       102    A2=A
0039              B2=B
0040              C2=C
0041              GO TO 100
0042       103    A3=A
0043              B3=B
0044              C3=C
0045              GO TO 100
0046       104    A4=A
0047              B4=B
0048              C4=C
0049              GO TO 100
0050       105    A5=A
0051              B5=B
0052              C5=C
0053              GO TO 100
0054       106    A6=A
0055              B6=B
```

BIVANEPROG

```
0001          1      FORMAT(I2,3F10.5)
0002          2      FORMAT(12I5)
0003          3      FORMAT(9F12.3)
0004          5      FORMAT('1 DATA ANALYSIS')
0005                 WRITE(6,5)
0006          7      FORMAT(3F10.3)
0007          8      FORMAT('MEAN COMPONENTS WRT EXPT FRAME')
0008          9      FORMAT('DOWNWIND VECTOR')
0009          10     FORMAT('TAU,USTAR,UDSHBR,VDSHBR,WDSHBR')
0010          11     FORMAT('1AUTOCOV UDASH,VDASH,WDASH')
0011          12     FORMAT(I5,3E12.3)
0012          13     FORMAT('1AUTOCOR UDASH,VDASH,WDASH')
0013          14     FORMAT('1ELEV,AZI,WSPD,ML,ML,UDASH,VDASH,WDASH,IC/ML')
0014          15     FORMAT('1XCOR UV,UW,VW')
0015          16     FORMAT(I5,6E12.3)
0016          17     FORMAT(8A4)
0017          18     FORMAT(2F10.3)
0018          19     FORMAT('0DT')
0019          20     FORMAT(3F15.2)
0020          21     FORMAT(4F10.1)
0021          22     FORMAT(4F15.1)
0022          23     FORMAT('1 AUTOCOV FM+TFM')
0023          24     FORMAT('1 XCOR FM1/TFM1,FM2/TFM2')
0024          25     FORMAT(I5,4E15.3)
0025                 DIMENSION X(100),Y(100),Z(100)
0026                 DIMENSION XX1(1000),XX2(1000),XX3(1000),XX4(1000),XX5(1000)
0027                 DIMENSION XX6(1000)
0028                 DIMENSION DATIME(8)
0029                 DIMENSION R1(100),R2(100),R3(100),R4(100),R5(100),R6(100)
0030                 DIMENSION R7(100),R8(100),R9(100)
0031                 DIMENSION VDASH(1000),UWDASH(1000),XXX(100),YYY(100),ZZZ(100)
0032                 DIMENSION DOWNU(1000),CROSSU(1000),VERTU(1000),UDASH(1000)
0033                 DIMENSION E(1000),A(1000),U(1000),FM1(1000),FM2(1000),DU(500)
0034                 DIMENSION X1(100),X2(100),Y1(100),Y2(100)
0035                 DIMENSION SINFI1(100),SINFI2(100),TFM1(1000),TFM2(1000)
0036                 DIMENSION FFM1(1000),FFM2(1000),FTFM1(1000),FTFM2(1000)
0037                 DIMENSION XP(100),YP(100),ZP(100)
0038                 RHO=1.293
0039                 PI=3.142
0040                 S1=0.
0041                 S2=0.
0042                 S3=0.
0043                 UW=0.
0044                 UDSHBR=0.
0045                 VDSHBR=0.
0046                 CURR=3.CE-07
0047                 EPSLON=8.854E-12
0048                 READ(5,17) DATIME
0049                 WRITE(6,17) DATIME
0050                 WRITE(8,17) DATIME
0051                 READ(5,18) RUNTIM,H
0052                 WRITE(6,18) RUNTIM,H
0053                 READ(5,21) RRR1,RRR2,ALFA1,ALFA2
0054                 WRITE(6,21) RRR1,RRR2,ALFA1,ALFA2
0055                 ALFA1=ALFA1*PI/180.
```

```
0056              ALFA2=ALFA2*PI/180.
0057              XM1=RRR1*COS(ALFA1)
0058              YM1=RRR1*SIN(ALFA1)
0059              XM2=RRR2*COS(ALFA2)
0060              YM2=RRR2*SIN(ALFA2)
0061              READ(5,1)I1,A1,B1,C1
0062              READ(5,1)I2,A2,B2,C2
0063              READ(5,1)I3,A3,B3,C3
0064              READ(5,1)I4,A4,B4,C4
0065              READ(5,1)I5,A5,B5,C5
0066              READ(5,1)I6,A6,B6,C6
0067              J=999
0068              K=500
0069              N=0
0070        130   READ(5,2)M,I1,I2,I3,I4,I5,I6,I7,I8,I9,I10,I11
0071              IF(M-9999)131,132,131
0072        131   N=N+1
0073              COMP=703./FLOAT(M)
0074              I1=IFIX(FLOAT(I1)*COMP)
0075              I2=IFIX(FLOAT(I2)*COMP)
0076              I3=IFIX(FLOAT(I3)*COMP)
0077              I4=IFIX(FLOAT(I4)*COMP)
0078              I5=IFIX(FLOAT(I5)*COMP)
0079              I6=IFIX(FLOAT(I6)*COMP)
0080              I7=IFIX(FLOAT(I7)*COMP)
0081              I8=IFIX(FLOAT(I8)*COMP)
0082              I9=IFIX(FLOAT(I9)*COMP)
0083              I10=IFIX(FLOAT(I10)*COMP)
0084              I11=IFIX(FLOAT(I11)*COMP)
0085              E(J)=(A1*FLOAT(I5)+B1)*C1
0086              E(J+1)=(A1*FLOAT(I11)+B1)*C1
0087              A(J)=(A2*FLOAT(I4)+B2)*C2
0088              A(J+1)=(A2*FLOAT(I10)+B2)*C2
0089              FM1(J)=(A3*FLOAT(I3)+B3)*C3
0090              FM1(J+1)=(A3*FLOAT(I9)+B3)*C3
0091              FM2(J)=(A4*FLOAT(I2)+B4)*C4
0092              FM2(J+1)=(A4*FLOAT(I8)+B4)*C4
0093              U(J)=(A5*FLOAT(I1)+B5)*C5
0094              U(J+1)=(A5*FLOAT(I7)+B5)*C5
0095              DU(K)=(A6*FLOAT(I6)+B6)*C6
0096              J=J-2
0097              K=K-1
0098              GO TO 130
0099        132   J=J+2
0100              K=K+1
0101              NN=2*N
0102              DO 140 JN=1,NN
0103              E(JN)=E(J)
0104              A(JN)=A(J)
0105              FM1(JN)=FM1(J)
0106              FM2(JN)=FM2(J)
0107              U(JN)=U(J)
0108        140   J=J+1
0109              DO 141 KN=1,N
0110              DU(KN)=DU(K)
```

```
0111        141   K=K+1
0112              L=NN/10
0113              FNN=FLOAT(NN)
0114              IMAX=NN
0115              DO 160 J=1,NN
0116              DOWNU(J)=U(J)*(COS(A(J)*PI/180.))
0117              CROSSU(J)=U(J)*(SIN(A(J)*PI/180.))
0118              VERTU(J)=U(J)*(SIN(E(J)*PI/180.))
0119              S1=S1+DOWNU(J)
0120              S2=S2+CROSSU(J)
0121        160   S3=S3+VERTU(J)
0122              S1=S1/FNN
0123              S2=S2/FNN
0124              S3=S3/FNN
0125              WRITE(6,8)
0126              WRITE(6,7) S1,S2,S3
0127              UBAR=SQRT(S1**2+S2**2)
0128              AVECT=(180./PI)*(ATAN(S2/S1))
0129              WRITE(6,9)
0130              WRITE(6,7) UBAR,AVECT
0131              DO 170 J=1,NN
0132              UDASH(J)=(U(J)*(COS((A(J)-AVECT)*(PI/180.))))-UBAR
0133              UDSHBR=UDSHBR+UDASH(J)
0134              VDASH(J)=(U(J)*(SIN((A(J)-AVECT)*(PI/180.))))
0135              VDSHBR=VDSHBR+VDASH(J)
0136              UWDASH(J)=UDASH(J)*VERTU(J)
0137        170   UW=UW+UWDASH(J)
0138              UWBAR=UW/FNN
0139              UDSHBR=UDSHBR/FNN
0140              VDSHBR=VDSHBR/FNN
0141              TAU=-RHO*UWBAR
0142              IF(UWBAR)200,200,201
0143        200   UWBAR=-UWBAR
0144        201   USTAR=SQRT(UWBAR)
0145              WRITE(6,10)
0146              WRITE(6,3) TAU,USTAR,UDSHBR,VDSHBR,S3
0147              WRITE(6,14)
0148              J=1
0149              K=1
0150        149   WRITE(6,3) E(J),A(J),U(J),FM1(J),FM2(J),UDASH(J),VDASH(J),VERTU(J)
                  1,DU(K)
0151              J=J+1
0152              WRITE(6,3) E(J),A(J),U(J),FM1(J),FM2(J),UDASH(J),VDASH(J),VERTU(J)
0153              J=J+1
0154              K=K+1
0155              IF(N-K)150,149,149
0156        150   CONTINUE
0157              CALL AUTO(UDASH,NN,L,R1)
0158              CALL AUTO(VERTU,NN,L,R2)
0159              CALL AUTO(VDASH,NN,L,R3)
0160              WRITE(6,11)
0161              WRITE(6,12)(J,R1(J),R3(J),R2(J),J=1,L)
0162              PR1=R1(1)
0163              RR2=R2(1)
0164              RR3=R3(1)
```

```
0165              DO 180 J=1,L
0166              R1(J)=R1(J)/RR1
0167              R2(J)=R2(J)/RR2
0168        180   R3(J)=R3(J)/RR3
0169              WRITE(6,13)
0170              WRITE(6,12)(J,R1(J),R3(J),R2(J),J=1,L)
0171              CALL CROSS(UDASH,VDASH,NN,L,R4,R5)
0172              CALL CROSS(UDASH,VERTU,NN,L,R6,R7)
0173              CALL CROSS(VDASH,VERTU,NN,L,R8,R9)
0174              DO 300 J=1,L
0175              R4(J)=R4(J)/SQRT(RR1*RR3)
0176              R5(J)=R5(J)/SQRT(RR1*RR3)
0177              R6(J)=R6(J)/SQRT(RR1*RR2)
0178              R7(J)=R7(J)/SQRT(RR1*RR2)
0179              R8(J)=R8(J)/SQRT(RR2*RR3)
0180              R9(J)=R9(J)/SQRT(RR2*RR3)
0181        300   CONTINUE
0182              WRITE(6,15)
0183              WRITE(6,16)(J,R4(J),R5(J),R6(J),R7(J),R8(J),R9(J),J=1,L)
0184              DT=(RUNTIM*60.)/FNN
0185              WRITE(6,19)
0186              WRITE(6,7) DT
0187              WRITE(8,7) DT
0188              Q=CURR*DT
0189              I=1
0190        508   T=DT*(FLOAT(I))
0191              FLDL1=0.
0192              FLDL2=0.
0193              II=1
0194        502   JJ=I-II+1
0195              IF(JJ)500,500,501
0196        501   X(II)=U(JJ)*FLOAT(II)*DT*COS(A(JJ)*PI/180.)
0197              Y(II)=X(II)*(TAN(A(JJ)*(PI/180.)))
0198              Z(II)=H+(X(II)*(TAN(E(JJ)*(PI/180.))))
0199              IF(Z(II)-0.2)510,510,511
0200        510   Z(II)=0.2
0201        511   IF(X(II)-50.)503,503,500
0202        503   II=II+1
0203              GO TO 502
0204        500   CONTINUE
0205              MM=II+1
0206              DO 600 J=2,MM
0207              XXX(J)=X(J-1)
0208              YYY(J)=Y(J-1)
0209        600   ZZZ(J)=Z(J-1)
0210              X(1)=0.
0211              Y(1)=0.
0212              Z(1)=H
0213              DO 602 J=2,MM
0214              X(J)=XXX(J)
0215              Y(J)=YYY(J)
0216        602   Z(J)=ZZZ(J)
0217              DO 2000 J=1,MM
0218              XP(J)=X(J)
0219              YP(J)=Y(J)
```

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0220        2000  ZP(J)=Z(J)
0221              DO 2010 J=1,MM
0222              IF(YP(J)-10.)2001,2001,2002
0223        2002  YP(J)=10.
0224        2001  IF(YP(J)+10.)2003,2003,2004
0225        2003  YP(J)=-10.
0226        2004  IF(ZP(J)-20.)2005,2005,2006
0227        2006  ZP(J)=20.
0228        2005  CONTINUE
0229        2010  CONTINUE
0230              WRITE(8) I,MM,(XP(J),YP(J),ZP(J),J=1,MM)
0231              DO 601 J=1,II
0232              X1(J)=X(J)+((X(J+1)-X(J))/2.)-XM1
0233              X2(J)=X1(J)+XM1-XM2
0234              Y1(J)=Y(J)+((Y(J+1)-Y(J))/2.)-YM1
0235              Y2(J)=Y1(J)+YM1-YM2
0236              R1(J)=SQRT(X1(J)**2+Y1(J)**2+Z(J)**2)
0237              R2(J)=SQRT(X2(J)**2+Y2(J)**2+Z(J)**2)
0238              SINFI1(J)=Z(J)/R1(J)
0239              SINFI2(J)=Z(J)/R2(J)
0240              R1(J)=R1(J)**2
0241              R2(J)=R2(J)**2
0242              IF(R1(J)-1.)1000,1000,1001
0243        1000  R1(J)=1.
0244        1001  IF(R2(J)-1.)1002,1002,1003
0245        1002  R2(J)=1.
0246        1003  FLDL1=FLDL1+(Q*SINFI1(J))/(2.*PI*EPSLON*R1(J))
0247              FLDL2=FLDL2+(Q*SINFI2(J))/(2.*PI*EPSLON*R2(J))
0248        601   CONTINUE
0249              TFM1(I)=FLDL1
0250              TFM2(I)=FLDL2
0251              I=I+1
0252              IF(I-IMAX)508,508,509
0253        509   CONTINUE
0254              NN1=NN-1
0255              DO 1100 J=2,NN1
0256              FFM1(J)=0.25*FM1(J-1)+0.5*FM1(J)+0.25*FM1(J+1)
0257              FFM2(J)=0.25*FM2(J-1)+0.5*FM2(J)+0.25*FM2(J+1)
0258              FTFM1(J)=0.25*TFM1(J-1)+0.5*TFM1(J)+0.25*TFM1(J+1)
0259              FTFM2(J)=0.25*TFM2(J-1)+0.5*TFM2(J)+0.25*TFM2(J+1)
0260        1100  CONTINUE
0261              DO 1101 J=2,NN1
0262              FM1(J)=FFM1(J)
0263              FM2(J)=FFM2(J)
0264              TFM1(J)=FTFM1(J)
0265              TFM2(J)=FTFM2(J)
0266        1101  CONTINUE
0267              CALL AUTO(FM1,NN,L,R1)
0268              CALL AUTO(TFM1,NN,L,R2)
0269              CALL AUTO(FM2,NN,L,R3)
0270              CALL AUTO(TFM2,NN,L,R4)
0271              WRITE(6,23)
0272              WRITE(6,25) (J,R1(J),R2(J),R3(J),R4(J),J=1,L)
0273              RR1=R1(1)
0274              RR2=R2(1)
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```
0275              RR3=R3(1)
0276              RR4=R4(1)
0277              CALL CROSS(FM1,TFM1,NN,L,R5,R6)
0278              CALL CROSS(FM2,TFM2,NN,L,R7,R8)
0279              DO 700 J=1,L
0280              R5(J)=R5(J)/SQRT(RR1*RR2)
0281              R6(J)=R6(J)/SQRT(RR1*RR2)
0282              R7(J)=R7(J)/SQRT(RR3*RR4)
0283              R8(J)=R8(J)/SQRT(RR3*RR4)
0284        700   CONTINUE
0285              WRITE(6,24)
0286              WRITE(6,25) (J,R5(J),R6(J),R7(J),R8(J),J=1,L)
0287              DO 710 L=1,NN
0288        710   XX1(L)=(FLOAT(L-1))*DT
0289              FMMX1=1.
0290              DO 711 I=1,NN
0291        802   IF(FM1(I)-FMMX1)800,800,801
0292        801   FMMX1=FMMX1*1.1
0293              GO TO 802
0294        800   CONTINUE
0295        805   IF(TFM1(I)-FMMX1)803,803,804
0296        804   FMMX1=FMMX1*1.1
0297              GO TO 805
0298        803   CONTINUE
0299        711   CONTINUE
0300              FMMX2=1.
0301              DO 712 I=1,NN
0302        902   IF(FM2(I)-FMMX2)900,900,901
0303        901   FMMX2=FMMX2*1.1
0304              GO TO 902
0305        900   CONTINUE
0306        905   IF(TFM2(I)-FMMX2)903,903,904
0307        904   FMMX2=FMMX2*1.1
0308              GO TO 905
0309        903   CONTINUE
0310        712   CONTINUE
0311              DO 713 I=1,NN
0312              FM1(I)=FM1(I)/FMMX1
0313              TFM1(I)=TFM1(I)/FMMX1
0314              FM2(I)=FM2(I)/FMMX2
0315        713   TFM2(I)=TFM2(I)/FMMX2
0316              AXLTH=(FNN*DT)/10.0
0317              XPOS=0.5
0318              XPOS2=XPOS+AXLTH+2.0
0319              XPOS3=XPOS+0.5
0320              CALL PLTXMX(150.)
0321              CALL PAXIS(XPOS,0.5,'TIME (SEC)',-10,AXLTH,0.0,0.0,10.0,1.0)
0322              CALL PAXIS(XPOS,0.5,'ARB UNITS',9,10.0,90.0,0.0,0.1,1.0)
0323              CALL PSYMB(XPOS3,1.0,-0.1,DATIME,0.0,32)
0324              CALL PLTOFS(0.0,10.0,0.0,0.1,XPOS,0.5)
0325              CALL PLINE(XX1,FM1,NN,1,4,0,1.0)
0326              CALL PLINE(XX1,TFM1,NN,1,4,1,1.0)
0327              CALL PAXIS(XPOS2,0.5,'TIME (SEC)',-10,AXLTH,0.0,0.0,10.0,1.0)
0328              CALL PAXIS(XPOS2,0.5,'ARB UNITS',9,10.0,90.0,0.0,0.1,1.0)
0329              CALL PLTOFS(0.0,10.0,0.0,0.1,XPOS2,0.5)
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 0330              CALL PLINE(XX1,FM2,NN,1,4,2,1.0)
 0331              CALL PLINE(XX1,TFM2,NN,1,4,3,1.0)
 0332              CALL PLTEND
 0333              STOP
 0334              END

   TOTAL MEMORY REQUIREMENTS 01BCE4 BYTES
EXECUTION TERMINATED
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