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C PROGRAM QKAREA
C *QUICK AREA*
C TO ILLUSTRATE THE USE OF THE LONGLEY-RICE MODEL
C IN THE AREA PREDICTION MODE
C
C INPUT IS IN 10-COL FIELDS, THE FIRST OF WHICH IS
C A SEQUENCE OF DIGITS
C IN PARTICULAR,
C COL 1 IS THE *EXECUTE* COLUMN--A NON-ZERO DIGIT
C WILL FORCE OUTPUT
C COL 2 INDICATES THE CARD TYPE--
C
C           COL
C           12      11, ...
C STOP-      X0      (OR A BLANK CARD)
C TITLE-     X1      (NEXT CARD HAS 60-COL TITLE)
C DISTANCES- X2      D0,D1,DS1,D2,DS2
C RELIABILITY- X3V    QT,QL
C CONFIDENCE- X4      QC1,QC2, ...
C ENVIRONMENT- X5C    DH,N0,ZS,EPS,SGM
C SYSTEM-     X6NPSS  FMHZ,HG1,HG2
C (ALTERNATE) X7NPSS  FMHZ,HG1,HG2,DH,NS,EPS,SGM
C EXECUTE-    X8
C RESET-     X9
C
C COMMON/PROP/KWX,AREF,MDP,DIST,HG(2),WN,DH,ENS,GME,ZGND,
X HE(2),DL(2),THE(2)
C           COMPLEX ZGND
C COMMON/PROPV/LVAR,SGC,MDVAR,KLIM
C
C COMMON/PROPA/DLSA,DX,AEL,AK1,AK2,AED,EMD,AES,EMS,DLS(2),DLA,THA
C COMMON/SAVE/SAVE(50)
C
C DIMENSION JIN(6),XIN(7)
C DIMENSION ITL(15)
C DIMENSION KST(2)
C DIMENSION QC(7),ZC(7),XLB(7)
C
C LOGICAL WQIT,WCON,WTL
C
C     THE I/O UNITS ARE DEFINED HERE
DATA KIN,KOT/5,6/
C
DATA GMA/157E-9/
C
DATA DB/8.685890/
DATA AKM/1000./
C
WQIT=.FALSE.
WCON=.TRUE.
GO TO 190
C
10 CONTINUE
C     READ INPUT SEQUENCE

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C
1000 FORMAT(6I1,4X,7F10.0)
1001 FORMAT(15A4)
C
      JIN(1)=0
      JIN(2)=0
      READ(KIN,1000) JIN,XIN
      WCON=JIN(1) .EQ. 0
      JQ=JIN(2)
      IF(JQ .NE. 0)
      X   GO TO (110,120,130,140,150,160,170,180,190),JQ
C
      WQIT=.TRUE.
      GO TO 20
110   CONTINUE
      READ(KIN,1001) ITL
      WTL=.TRUE.
      GO TO 20
120   CONTINUE
      XIN(1)=DIM(XIN(1),0.)
      Q=XIN(2)-XIN(1)
      IF(Q .GT. 0.) GO TO 121
          IF(XIN(1) .EQ. 0.) GO TO 128
          D0=XIN(1)
          DS=0.
          DSC=0.
          ND=1
          NDC=0
          GO TO 128
121   IF(XIN(3) .LE. 0.) XIN(3)=AMAX1(1.,AINT(Q/20.+0.5))
      IF(XIN(1) .LE. 0.) XIN(1)=XIN(3)
      D0=XIN(1)
      DS=XIN(3)
      DSC=DS
      ND=DIM(XIN(2),XIN(1))/DS+1.75
      NDC=0
      IF(XIN(4) .LE. XIN(2)) GO TO 128
          IF(XIN(5) .LE. 0.) XIN(5)=5.*XIN(3)
          DSC=XIN(5)
          JQ=(XIN(4)-XIN(2))/DSC+0.75
          NDC=ND
          ND=ND+JQ
128   GO TO 20
130   CONTINUE
      MDVAR=MIN0(JIN(3),3)
      LVAR=MAX0(LVAR,4)
      QT=50.
      QL=50.
      ZT=0.
      ZL=0.
      IF(XIN(1) .LE. 0.) GO TO 131
          QT=XIN(1)
          ZT=QERFI(QT/100.)

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131      IF(XIN(2) .LE. 0.) GO TO 138
          QL=XIN(2)
          ZL=QERFI(QL/100.)
138      GO TO 20
140      CONTINUE
          NC=0
          DO 141 JC=1,7
              IF(XIN(JC) .LE. 0.) GO TO 141
              NC=NC+1
              QC(NC)=XIN(JC)
              ZC(NC)=QERFI(QC(NC)/100.)
141      CONTINUE
              IF(NC .GT. 0) GO TO 148
              NC=1
              QC(1)=50.
              ZC(1)=0.
148      GO TO 20
150      CONTINUE
              IF(JIN(3) .LE. 0) GO TO 151
              KLIM=JIN(3)
              LVAR=5
151      IF(XIN(1) .GE. 0.) DH=XIN(1)
              IF(XIN(2) .LE. 0.) GO TO 152
              EN0=XIN(2)
              ZSYS=XIN(3)
152      IF(XIN(4) .LE. 0.) GO TO 158
              EPS=XIN(4)
              SGM=XIN(5)
158      GO TO 20
160      CONTINUE
              IF(JIN(3) .EQ. 1) GO TO 161
              IPOL=MIN0(JIN(4),1)
              KST(1)=MIN0(JIN(5),2)
              KST(2)=MIN0(JIN(6),2)
161      IF(XIN(1) .GT. 0.) FMHZ=XIN(1)
              IF(XIN(2) .GT. 0.) HG(1)=XIN(2)
              IF(XIN(3) .GT. 0.) HG(2)=XIN(3)
              GO TO 20
170      CONTINUE
              IF(JIN(3) .EQ. 1) GO TO 171
              IPOL=MIN0(JIN(4),1)
              KST(1)=MIN0(JIN(5),2)
              KST(2)=MIN0(JIN(6),2)
171      IF(XIN(1) .GT. 0.) FMHZ=XIN(1)
              IF(XIN(2) .GT. 0.) HG(1)=XIN(2)
              IF(XIN(3) .GT. 0.) HG(2)=XIN(3)
              IF(XIN(4) .GE. 0.) DH=XIN(4)
              IF(XIN(5) .LE. 0.) GO TO 172
              EN0=XIN(5)
              ZSYS=0.
172      IF(XIN(6) .LE. 0.) GO TO 178
              EPS=XIN(6)
              SGM=XIN(7)

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178 GO TO 20
180   CONTINUE
      WCON=.FALSE.
      GO TO 20
190   CONTINUE
      FMHZ=100.
      HG(1)=3.
      HG(2)=3.
      DH=90.
      EN0=301.
      ZSYS=0.
      EPS=15.
      SGM=0.005
      IPOL=1
      KST(1)=0
      KST(2)=0
      KLIM=5
      MDVAR=3
      LVAR=5
      NC=3
      QC(1)=50.
      QC(2)=90.
      QC(3)=10.
      QT=50.
      QL=50.
      ZC(1)=0.
      ZC(2)=-1.28155
      ZC(3)= 1.28155
      ZT=0.
      ZL=0.
      D0=10.
      DS=10.
      DSC=50.
      ND=22
      NDC=15
      WTL=.FALSE.

C
20   CONTINUE
      IF(WCON) GO TO 30
C
C       EXECUTION
C
      KWX=0
      CALL QLRPS(FMHZ,ZSYS,EN0,IPOL,EPS,SGM)
      CALL QLRA(KST,-1,-1)

C
C       WRITE HEADING
2001 FORMAT(1H1/1H0)
2002 FORMAT(1H )
2010 FORMAT(3X,
      .62HAREA PREDICTIONS FROM THE LONGLEY-RICE MODEL, VERSION 1.2.1    )
2011 FORMAT(3X,15A4)
2015 FORMAT(12X,9HFREQUENCY,F12.0,4H MHZ)

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2016 FORMAT(6X,15HANTENNA HEIGHTS,2F8.1,2H M)
2017 FORMAT(4X,17HEFFECTIVE HEIGHTS,2F8.1,
.    12H M (SITING=,I1,1H,,I1,1H))
2018 FORMAT(5X,16HTERRAIN, DELTA H,F12.0,2H M)
C
        WRITE(KOT,2001)
        IF(WTL) GO TO 211
        WRITE(KOT,2010)
        GO TO 212
211  WRITE(KOT,2011) ITL
212  WRITE(KOT,2002)
        WRITE(KOT,2002)
        WRITE(KOT,2015) FMHZ
        WRITE(KOT,2016) HG
        WRITE(KOT,2017) HE,KST
        WRITE(KOT,2018) DH
        WRITE(KOT,2002)

C
2021 FORMAT(3X,4HPOL=,I1,6H, EPS=,F3.0,6H, SGM=,F6.3,4H S/M)
2022 FORMAT(3X,5HCLIM=,I1,5H, N0=,F4.0,5H, NS=,F4.0,4H, K=,F6.3)
C
        Q=GMA/GME
        WRITE(KOT,2021) IPOL,EPS,SGM
        WRITE(KOT,2022) KLIM,EN0,ENS,Q
        WRITE(KOT,2002)

C
2030 FORMAT(3X,22HSINGLE-MESSAGE SERVICE)
2031 FORMAT(3X,18HACCIDENTAL SERVICE/
.    8X,F5.1,27H PER CENT TIME AVAILABILITY)
2032 FORMAT(3X,14HMOBILE SERVICE/
.    8X,21HREQUIRED RELIABILITY-,F5.1,9H PER CENT)
2033 FORMAT(3X,17HBROADCAST SERVICE/
.    8X,21HREQUIRED RELIABILITY-,F5.1,14H PER CENT TIME/
.    29X,F5.1,19H PER CENT LOCATIONS)
C
        IF(MDVAR .NE. 0)
        X      GO TO (231,232,233),MDVAR
C
        WRITE(KOT,2030)
        GO TO 238
231   WRITE(KOT,2031) QT
        GO TO 238
232   WRITE(KOT,2032) QT
        GO TO 238
233   WRITE(KOT,2033) QT,QL
238   WRITE(KOT,2002)

C
2040 FORMAT(3X,
.62HESTIMATED QUANTILES OF BASIC TRANSMISSION LOSS(DB)
2041 FORMAT(7X,4HDIST,5X,4HFREE,4X,15HWITH CONFIDENCE/
.    8X,2HKM,5X,6HSPACE ,7F8.1)
2045 FORMAT(2X,3F9.1,6F8.1)
C

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C      COMPUTE AND PRINT VALUES
      WRITE(KOT,2040)
      WRITE(KOT,2002)
      WRITE(KOT,2041) (QC(JC),JC=1,NC)
      WRITE(KOT,2002)
      DT=DS
      D=D0
      DO 240 JD=1,ND
          LVAR=MAX0(1,LVAR)
          CALL LPROP(D*AKM)
          FS=DB*ALOG(2.*WN*DIST)
          DO 241 JC=1,NC
241    XLB(JC)=FS+AVAR(ZT,ZL,ZC(JC))
          WRITE(KOT,2045) D,FS,(XLB(JC),JC=1,NC)
          IF(JD .EQ. NDC) DT=DSC
          D=D+DT
240    CONTINUE
C
2081  FORMAT(3X,
     .62H**WARNING- SOME PARAMETERS ARE NEARLY OUT OF RANGE. /
     .   3X,
     .62H RESULTS SHOULD BE USED WITH CAUTION. )
2082  FORMAT(3X,
     .62H**NOTE- DEFAULT PARAMETERS HAVE BEEN SUBSTITUTED /
     .   3X,
     .62H FOR IMPOSSIBLE ONES. )
2083  FORMAT(3X,
     .62H**WARNING- A COMBINATION OF PARAMETERS IS OUT OF RANGE. /
     .   3X,
     .62H RESULTS ARE PROBABLY INVALID. )
2084  FORMAT(3X,
     .62H**WARNING- SOME PARAMETERS ARE OUT OF RANGE. /
     .   3X,
     .62H RESULTS ARE PROBABLY INVALID. )
C
      IF(KWX .EQ. 0) GO TO 28
C
C      PRINT ERROR MESSAGES
      WRITE(KOT,2002)
      GO TO (281,282,283,284),KWX
281    WRITE(KOT,2081)
      GO TO 28
282    WRITE(KOT,2082)
      GO TO 28
283    WRITE(KOT,2083)
      GO TO 28
284    WRITE(KOT,2084)
28    CONTINUE
C
      30  CONTINUE
      IF(.NOT. WQIT) GO TO 10
C
      STOP
      END

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