APPENDIX C. USER'S GUIDE, LISTING, AND SAMPLE OUTPUT FOR PROGRAM WAGSLAB

The input data are described as follows. Most quantities are pictured in Figure 3 (or 1). Note on Card 3 that the antenna heights are referred to the ground, not the top of the slab.

Card 1: KIND, TD (I10, F10.0)
KIND = beginning type of distance at which F(x) will be evaluated.
1 is specified on next cards
0 is equidistant
TD = total distance in kilometers

Card 2A: X(I) (8F10.5)
X(I) = specific distances in kilometers at which F(x) will be evaluated.
IF KIND = 1 use these cards to begin giving specific distances until you are done or want to change to equidistant points.
Terminate this set of distances with a 0.

Card 2B1: NED (I2)
NED = number (limited to 50) of consecutive sections with F(x) evaluated at equidistant points. (This should agree with the number of pairs of DEP and FINT).

Card 2B2: (DEP(I), FINT(I), I = 1,NED) (8F10.0)
DEP(I) = distance in kilometers at which this set of equidistant points ends.
FINT(I) = interval of these equidistant points in kilometers.
If KIND = 0, use these cards to begin.

Note: There may be a series of 2A and 2B cards to reach the total distance given on card 1.

Card 3: HA, FREQ, HAR, AKM (4F10.5)
HA = transmitter antenna height in kilometers = h_a-D
FREQ = frequency in MHz
HAR = receiver antenna height in kilometers = h_r-D
AKM = effective earth radius in kilometers

Card 4: ID (8A10)
ID = path identification.

Card 5: N, IXUNITS, IZUNITS, REFEL (3I10,F10.1)
N = number of points on terrain profile
IXUNITS = 0, distance input in kilometers
= 1, distance input in statute miles
IZUNITS = 0, height input in meters
= 1, height input in feet
REFEL = reference elevation in IZUNITS(=height at d=0)

Card 6 to M: (X(I), I = 1,N) (4(F10.2,F10.0))
X(I) = terrain distances in IXUNITS
Z(I) = terrain heights in IZUNITS

Card M+1: NGC (I10)
NGC = number of sets of ground constants
(limited to 50).

Card M+2 to end: (DX(I), SIGX(I), EPSX(I), ISLAB, T(I), EH(I), EV(I), SH(I), SV(I), I = 1,NGC) (F8.2,F8.6,F8.2,I2,3F8.2,2F8.6)
DX(I) = maximum distance in kilometers for given set of ground constants
SIGX(I) = conductivity of ground = σ_g (S/m)
EPSX(I) = relative permittivity of ground = ε_g
ISLAB = 0 is no slab in this section
= 1 slab ground constants to follow
T(I) = thickness of slab in meters = D
EH(I) = horizontal relative permittivity for slab = ε_h
EV(I) = vertical relative permittivity for slab = ε_v
SH(I) = horizontal conductivity for slab = σ_h (S/m)
SV(I) = vertical conductivity for slab = σ_v (S/m)

A listing of program WAGSLAB and all subroutines is given below. Program WAGSLAB is essentially a modification of program WAGNER (Ott et al., 1979) to allow for the effect of a slab over the ground.

```
      PROGRAM WAGSLAB(INPUT,OUTPUT,TAPE60=INPUT,TAPE2)
C
C     MODIFICATION OF WAGNER FOR DAVE HILL, 5/82, TO ACCOMMODATE SLABS OF
C     SNOW ,BUILDINGS, AND VEGETATION.  MAIN CHANGES IN SUBROUTINE IN
C     USING GROUND CONSTANTS TO COMPUTE DELTA (IMPEDANCE).  GHA(1)
C     AND GHR(NGC) (DEPENDENT ON PARTICULAR SETS OF GROUND CONSTANTS)
C     ARE COMPUTED IN IN AND USED IN FH(X) WHICH IS COMPUTED IN WAGSLAB.
C     H AND HP ARE MODIFIED IN TERRANE WHEN A SLAB IS PRESENT.
C     VERTICAL POLARIZATION IS SET CONSTANT.  PREVIOUS REFERENCES TO
C     HA ARE ELIMINATED.
C
      DIMENSION IPOL(2)
      DIMENSION ADAB(3),ADGH(3)
      DIMENSION F(2000),R13(2000),R14(2000),R15(2000),R16(2000),
     CR17(2000),R18(2000),R19(2000),R20(2000),R21(2000)
      COMMON /1/ HA,HAR,AKM
      COMMON /2/ D,H,HP
      COMMON /3/ DELTAR,WAVE
      COMMON /4/ FREQ,POL
      COMMON /5/ NG,AB(48),GH(48)
      COMMON /6/ N,X(2001),INDEX
      COMMON /INPUT/ DUMM(10320),ID(8),REFEL
      COMMON /GCX/ NGC,DX(50),ETAX(50),DELTAX(50),SIGX(50),EPSX(50),
     CT(50),SH(50),SV(50),EH(50),EV(50),GHA,GHR(50)
      COMMON/PMF/FLDS(2000),DKM(2000)
      DOUBLE PRECISION DAB,DGH
      COMPLEX FEWH,F,ALAMZ,SUM,DELTAR,ETAR
      COMPLEX KERNL,P0,P1,P2,P3,P4,CTMP
      COMPLEX ETA,DELTA
      COMPLEX GHA,GHR,ETAX,DELTAX,FH
      DATA (NG=5)
      DATA (ADAB=.9061798459,.5384693101,0.)
      DATA (ADGH=.2369268851,.4786286704,.56888888888)
      CANG(Z)=ATAN2(AIMAG(Z),REAL(Z))
      IPOL(1)=8H  VERTIC$IPOL(2)=8HHORIZONT
C
C     READ GAUSSIAN QUADRATURE ABCISSAS AND WEIGHTS
C
      NR=(NG+1)/2
      DO 1 L=1,NR
      DAB=ADAB(L)
      DGH=ADGH(L)
      J=NG-L+1
      AB(L)=DAB
      AB(J)=-AB(L)
      GH(L)=DGH
1     GH(J)=GH(L)
C
C     CALL SUBROUTINE DISTX TO SET UP DISTANCE ARRAY X IN METERS.
C     START WITH X(2).  X(1)=0. HAS ALREADY BEEN SET.
C     THE DISTANCES DO NOT HAVE TO BE EQUALLY SPACED.
C     SUBROUTINE DISTX SHOULD TEST N TO BE LESS THAN OR EQUAL TO 2000.
C
4     X(1)=0.
      F(1)=(1.,0.)
      CALL DISTX
C
C     MAKE SURE THERE ARE AT LEAST 4 DISTANCES.
C
      IF (N.GE.4) GO TO 2
      PRINT 18
      CALL EXIT
C
2     SQRTX2=SQRT(X(2))
      SQRTX3=SQRT(X(3))
      SQRTX4=SQRT(X(4))
```

```
      D1=SQRT(X(2)*X(3)*X(4))*(X(2)*(SQRTX4-SQRTX3)+X(3)*(SQRTX2-SQRTX4)
     1+X(4)*(SQRTX3-SQRTX2))
      R1=X(3)*X(4)*(SQRTX4-SQRTX3)/D1
      R2=X(2)*X(4)*(SQRTX2-SQRTX4)/D1
      R3=X(2)*X(3)*(SQRTX3-SQRTX2)/D1
      R4=((X(2)*(SQRTX4**3-SQRTX3**3)+X(3)*(SQRTX2**3-SQRTX4**3)+X(4)*(SQ
     1RTX3**3-SQRTX2**3))/D1
      R5=SQRT(X(3)*X(4))*(X(3)-X(4))/D1
      R6=SQRT(X(2)*X(4))*(X(4)-X(2))/D1
      R7=SQRT(X(2)*X(3))*(X(2)-X(3))/D1
      R8=(SQRTX2*(SQRTX3**3-SQRTX4**3)+SQRTX3*(SQRTX4**3-SQRTX2**3)+SQRT
     1X4*(SQRTX2**3-SQRTX3**3))/D1
      R9=SQRT(X(3)*X(4))*(SQRTX4-SQRTX3)/D1
      R10=SQRT(X(2)*X(4))*(SQRTX2-SQRTX4)/D1
      R11=SQRT(X(2)*X(3))*(SQRTX3-SQRTX2)/D1
      R12=(SQRTX2*(X(4)-X(3))+SQRTX3*(X(2)-X(4))+SQRTX4*(X(3)-X(2)))/D1
      DO 3 M=5,N
      M1=M-1
      M2=M-2
      DELTA1=X(M)-X(M1)
      DELTA2=X(M)-X(M2)
      D2=(DELTA1-DELTA2)*DELTA1*DELTA2
      R13(M)=X(M1)*X(M2)*(X(M2)-X(M1))/D2
      R14(M)=X(M)*X(M2)*(X(M)-X(M2))/D2
      R15(M)=X(M)*X(M1)*(X(M1)-X(M))/D2
      R16(M)=(X(M1)**2-X(M2)**2)/D2
      R17(M)=(X(M2)**2-X(M)**2)/D2
      R18(M)=(X(M)**2-X(M1)**2)/D2
      R19(M)=(X(M2)-X(M1))/D2
      R20(M)=(X(M)-X(M2))/D2
3     R21(M)=(X(M1)-X(M))/D2
C
C     READ TRANSMITTER HEIGHT, FREQUENCY, RECEIVER HEIGHT AND EARTH RADIUS.
C     COL       DESCRIPTION
C     1-10      TRANSMITTER HEIGHT, KM
C     11-20     FREQUENCY, MHZ
C     21-30     RECEIVER HEIGHT, KM
C     31-40     EARTH RADIUS, KM
C
      READ 19, HA,FREQ,HAR,AKM
      POL=1.
C
C     NOTE THAT VERTICAL POLARIZATION IS NOW CONSTANT.
C
      HAR=HAR*1.E+3
      HA=HA*1.E3
      KPOL=POL
      ALAM=2.997925E2/FREQ
      WAVE=6.283185307/ALAM
      ALAMZ=((0.7071067812,0.7071067812)/SQRT (ALAM))
      TO=SECOND(DUM)
C
C     LOOP ON DISTANCE
C
      DO 14 I=1,N
      INDEX=I
      IF (I .NE. 1) GO TO 51
      CALL TERRAN2(X(I),H,HP,ETA,DELTA,ETAR,DELTAR,COND,EPS)
      PRINT 20, FREQ,IPOL(KPOL),AKM,HA,HAR
      GO TO 52
51    CALL TERRANE (X(I),H,HP,ETA,DELTA,ETAR,DELTAR,COND,EPS)
52    CONTINUE
      IF (I.EQ.1) GO TO 33
      D=X(I)+(H**2)/(2.*X(I))
      F(I)=FEWH(H,X(I))
      IF (I.LE.6) GO TO 13
C
C     J = 2 THROUGH 4
C
      SUM=(0.,0.)
      DO 9 J=2,4
      P0=P1=P2=P3=(0.,0.)
      K=J-1
      XP2=0.5*(X(J)+X(K))
      XM2=0.5*(X(J)-X(K))
```

```
      DO 7 M=1,NG
      XO=XP2+AB(M)*XM2
      CTMP=KERNL(XO)*GH(M)
      P1=P1+CTMP*SQRT(XO)
      P2=P2+CTMP*XO
      P3=P3+CTMP*SQRT(XO)**3
      IF (K.NE.1) GO TO 6
      XO=0.25*X(J)*(1.+AB(M))**2
      PO=PO+SQRT(XO)*KERNL(XO)*GH(M)
      GO TO 7
6     PO=PO+CTMP
7     CONTINUE
      P1=P1*XM2
      P2=P2*XM2
      P3=P3*XM2
      IF (K.NE.1) GO TO 8
      PO=PO*SQRT(X(J))
      GO TO 9
8     PO=PO*XM2
9     SUM=SUM+PO*R4*P1+R8*P2+R12*P3+F(2)*(R1*P1+R5*P2+R9*P3)+F(3)*(R2*P1
     1+R6*P2+R10*P3)+F(4)*(R3*P1+R7*P2+R11*P3)
C
C     J = 5 THROUGH I-1
C
      I1=I-1
      DO 11 J=5,I1
      PO=P2=P4=(0.,0.)
      XP2=0.5*(X(J)+X(J-1))
      XM2=0.5*(X(J)-X(J-1))
      DO 10 M=1,NG
      XO=XP2+AB(M)*XM2
      CTMP=KERNL(XO)*GH(M)
      PO=PO+CTMP
      P2=P2+CTMP*XO
10    P4=P4+CTMP*XO**2
      PO=PO*XM2
      P2=P2*XM2
      P4=P4*XM2
11    SUM=SUM+F(J-2)*(R15(J)*PO+R18(J)*P2+R21(J)*P4)+F(J-1)*(R14(J)*PO+R
     117(J)*P2+R20(J)*P4)+F(J)*(R13(J)*PO+R16(J)*P2+R19(J)*P4)
C
C     J=1
C
      THETA=ASIN (SQRT(X(I1)/X(I)))
      CTHETA=COS (THETA)
      PO=P2=P4=(0.,0.)
      DO 12 M=1,NG
      TEMP=1.-0.25*CTHETA**2*(1.+AB(M))**2
      XO=X(I)*TEMP
      CTMP=SQRT(X(I)-XO)*KERNL(XO)*GH(M)
      PO=PO+CTMP
      P2=P2+CTMP*TEMP
12    P4=P4+CTMP*TEMP**2
      PO=PO*CTHETA*SQRT(X(I))
      P2=P2*CTHETA*SQRT(X(I))**3
      P4=P4*CTHETA*SQRT(X(I))**5
      F(I)=(F(I)-ALAMZ*(SUM+F(I-2)*(R15(I)*PO+R18(I)*P2+R21(I)*P4)+F(I1)
     1*(R14(I)*PO+R17(I)*P2+R20(I)*P4)))/(1.+ALAMZ*(R13(I)*PO+R16(I)*P2+
     2R19(I)*P4))
13    AMP=CABS(F(I))
      PHA=CANG(F(I))
      IGCD=1
      DO 30 IGC=1,NGC
      IF (X(I) .LE. DX(IGC)) GO TO 32
      IGCD=IGC+1
30    CONTINUE
32    CONTINUE
      FH=F(I)*GHA*GHR(IGCD)
      AMPH=CABS(FH)
      PHAH=CANG(FH)
      RR2=20.*ALOG10(WAVE*X(I)/AMPH)
      BTL=RR2
      FLDS(I)=139.37+20.*ALOG10(FREQ)-R**2
      DKM(I)=X(I)*.001
      TIME=SECOND(DUM)-TO
      GO TO 34
```

```
33    PRINT 24
      PRINT 26, (DX(IGC),SIGX(IGC),EPSX(IGC),T(IGC),SH(IGC),SV(IGC),
     CEH(IGC),EV(IGC),DELTAX(IGC),GHR(IGC), IGC=1,NGC)
      PRINT 23, GHA
      PRINT 21
      GO TO 14
34    CONTINUE
      PRINT 22, X(I),H,AMP,PHA,AMPH,PHAH,TIME,FLDS(I),BTL
      WRITE (2,*) X(I)/1000.,AMPH
14    CONTINUE
      GO TO 4
C
18    FORMAT (*ONUMBER OF DISTANCES < 4*)
19    FORMAT (4F10.5)
20    FORMAT (*OFREQUENCY =*,F10.2,10X,A8,*AL POLARIZATION*,8X,*EARTH RA
     CDIUS =*F10.0,* KM*/
     C1X,*TRANSMITTER ANTENNA HEIGHT =*F7.3,* METERS*,10X,*RECEIVER ANTE
     CNNA HEIGHT =*F7.3,* METERS*)
21    FORMAT (//9X,*X*,10X,*Z*,16X,*F(X)*,
     C24X,*FH(X)*,13X,*TIMING*,2X,*FIELD STR*,3X,*BTL*/
     C8X,*(M)*,8X,*(M)*,6X,*MAG*,
     C10X,*ARG*,12X,*MAG*,10X,*ARG*,12X,*(SEC)*,4X,*(DBU)*)
22    FORMAT (*0*,F12.2,F10.1,E15.5,E13.5,
     CE15.5,E13.5,F10.3,F10.2,F8.2)
23    FORMAT (/1X,*GHA=*2F8.4)
24    FORMAT (//1X,*DISTANCE SIGMA  EPSILON SLAB    SH      *,
     C*   SV          EH      EV          IMPEDANCE    *,
     C*         GHR*/)
26    FORMAT (1X,F7.0,F9.6,F7.2,F5.0,2X,2F9.6,2X,2F7.2,2X,2F8.4,
     C2X,2F8.4)
      END
```

```
      COMPLEX FUNCTION KERNL(XO)
      COMMON /1/ HA,HAR,AKM
      COMMON /2/ D,H,HP
      COMMON /3/ DELTAR,WAVE
      COMMON /4/ FREQ,ROL
      COMMON /5/ NG,AB(48),GH(48)
      COMMON /6/ NX,X(2001),I
      COMPLEX FEWH,DELTA,DELTAR,ETA,ETAR
      CALL TERRANE (XO,HO,HPO,ETA,DELTA,ETAR,DELTAR,COND,EPS)
      XMS=X(I)-XO
      HO=H-HO
      R1=SQRT(XO**2)
      RW=WAVE*(XO+((HO**2)/(2.*XO))+XMS+((HD**2)/(2.*XMS))-D)
      KERNL=CMPLX(COS (RW),-SIN (RW))*SQRT(X(I)/(R1*XMS))*((HPO+DELTA-DE
     1LTAR)*FEWH(HD,XMS)-(HD/XMS))
      RETURN
      END
```

```
      COMPLEX FUNCTIONWERF(ZZZ)
      COMPLEX Z,ZZZ,ZV,V,Z2,C,W,S
      DIMENSION C(12), W(5,4)
      EQUIVALENCE (S,C(12))
      LOGICAL LZ2
      DATA (C(1)=(.0,-.5641895835))
      DATA (((W(I,J),I=1,5),J=1,4)=(1.,.0),
     X (3.678794411714423E-01,6.071577058413937E-01),
     X (1.831563888873418E-02,3.400262170660662E-01),
     X (1.234098040866788E-04,2.011573170376004E-01),
     X (1.125351747192646E-07,1.459535899001528E-01),
     X (4.275835761558070E-01,0.000000000000000E+00),
     X (3.047442052569126E-01,2.082189382028316E-01),
     X (1.402395813662779E-01,2.222134401798991E-01),
     X (6.531777728904697E-02,1.739183154163490E-01),
     X (3.628145649998864E-02,1.358389510006551E-01),
     X (2.553956763105058E-01,0.000000000000000E+00),
     X (2.184926152748907E-01,9.299780939260186E-02),
     X (1.479527595120158E-01,1.311797170842178E-01),
     X (9.271076642644332E-02,1.283169622282615E-01),
     X (5.968692961044590E-02,1.132100561244882E-01),
     X (1.790011511813930E-01,0.000000000000000E+00),
     X (1.642611363929861E-01,5.019713513524966E-02),
     X (1.307574696698522E-01,8.111265047745472E-02),
     X (9.640250558304439E-02,9.123632600421258E-02),
     X (6.979096164964750E-02,8.934000024036461E-02))
      XX=REAL(ZZZ)
      YY=AIMAG(ZZZ)
      X=ABS (XX)
      Y=ABS (YY)
      Z=CMPLX(X,Y)
      LZ2=.FALSE.
      IF (X.GE.4.5.OR.Y.GE.3.5) GO TO 6
      I=X+.5
      J=Y+.5
      V=CMPLX(FLOAT(I),FLOAT(J))
      ZV=Z-V
      C(2)=W(I+1,J+1)
      AI=0.
      DO 1 I=3,12
      AI=AI-.5
      C(I)=(V*C(I-1)+C(I-2))/AI
1     CONTINUE
      J=12
      DO 2 I=2,11
      J=J-1
2     S=S*ZV+C(J)
3     IF (YY.GE.0.) GO TO 4
      IF (.NOT.LZ2) Z2=Z*Z
      S=2.*CEXP(-Z2)-S
      IF (XX.GT.0.) S=CONJG(S)
      GO TO 5
4     IF (XX.LT.0.) S=CONJG(S)
5     WERF=S
      RETURN
6     LZ2=.TRUE.
      Z2=Z*Z
      S=Z*((0.,0.4613135279)/(Z2-0.1901635092)+(0.,0.099992161681)/
     1(Z2-1.784492748 5)+(0.,0.0028938938748)/(Z2-5.525343743 9))
      GO TO 3
      END
```

```
      COMPLEX FUNCTIONFEWH(HD,XD)
      COMMON /3/ DELTAR,WAVE
      COMPLEX TEMP,Q,Z,Z2,ZZ,HWERF,WERFZ,WERF,ZWERF,DELTAR
      TEMP=(0.7071067812,-0.7071067812)*SQRT(.5*WAVE)
      XD2=SQRT(XD)
      Q=-TEMP*HD/XD2
      Z=TEMP*DELTAR*XD2+Q
      ZZ=-Z
      ZI=AIMAG(ZZ)
      IF (ZI.LT.0..OR.(ABS(REAL(ZZ)).LT.6..AND.ZI.LT.6.)) GO TO 1
      Z2=ZZ**2
      HWERF=(Z2-2.)/(ZZ*(Z2-3.5))
      GO TO 2
1     WERFZ=WERF(ZZ)
      HWERF=ZZ-0.5*WERFZ/(ZZ*WERFZ+(0.,-0.56418958))
2     ZWERF=Z+HWERF
      FEWH=(Q*ZWERF-0.5)/(Z*ZWERF-0.5)
      RETURN
      END
```

```
      SUBROUTINE TERRANE (X,H,HP,ETA,DELTA,ETAR,DELTAR,COND,EPS)
      COMMON/INPUT/ TD(5000),THT(5000)
      COMMON /GCX/ NGC,UX(50),ETAX(50),DELTAX(50),SIGX(50),EPSX(50),
     CT(50),SH(50),SV(50),EH(50),EV(50),GHA,GHR(50)
      COMMON /1/ HA,HAR,AKM
      COMPLEX ETAX,DELTAX,ETAR,DELTAR,ETA,DELTA
C
C     COMPUTE HEIGHT, SLOPE, CONDUCTIVITY AND DIELECTRIC CONSTANT AT X.
C
7     CONTINUE
      IF (X .GT. TD(N)) X=TD(N)
      A=1000.*AKM
      HP=-X/A
      H=.5*X*HP
      DO 6 I=2,N
      IF (X .GT. TD(I)) GO TO 6
      H=H+THT(I-1)+((X-TD(I-1))/(TD(I)-TD(I-1)))*(THT(I)-THT(I-1))
      HP=HP+(THT(I)-THT(I-1))/(TD(I)-TD(I-1))
      GO TO 9
6     CONTINUE
9     CONTINUE
      DO 2 I=1,50
      IF (X .LE. (DX(I)+.0001)) GO TO 4
2     CONTINUE
4     ETA=ETAX(I)
      DELTA=DELTAX(I)
      COND=SIGX(I)
      EPS=EPSX(I)
C
C     MODIFICATION OF H AND HP FOR PRESENCE OF SLAB.
C
      IF (I .EQ. 1) GO TO 10
      H=H+T(I-1)+((X-DX(I-1))/(DX(I)-DX(I-1)))*(T(I)-T(I-1))
      HP=HP+(T(I)-T(I-1))/(DX(I)-DX(I-1))
      GO TO 12
10    CONTINUE
      H=H+T(1)
12    CONTINUE
      RETURN
      ENTRY TERRAN2
      CALL IN(N)
      ETAR=ETAX(1)
      DELTAR=DELTAX(1)
      GO TO 7
      END
```

```
      SUBROUTINE DISTX
C
C     SUBROUTINE TO FILL DISTANCE ARRAY.  USE EITHER SPECIFIC
C     DISTANCES (KIND = 1) OR COMPUTE DISTANCES AT EQUIDISTANT
C     POINTS (KIND = 0).  A COMBINATION OF THE TWO KINDS CAN BE
C     USED.  ALL VARIABLES ARE READ IN IN KILOMETERS AND THE
C     DISTANCE ARRAY IS FILLED IN METERS.
C
      COMMON /6/ N,X(2001),INDEX
      DIMENSION DEP(50),FINT(50)
      N=2
      READ 100, KIND,TD
      IF (EOF(60)) 8,2
2     CONTINUE
      TDM=TD*1.E+3
      IF (KIND) 4,12
4     DO 6 L=N,2001,8
      K=L+7
      READ 101, (X(I), I=L,K)
      DO 6 J=1,8
      N=L+J-1
      IF (X(N) .LE. 0.) GO TO 10
      X(N)=X(N)*1.E+3
6     CONTINUE
7     PRINT 102
8     CALL EXIT
10    IF (X(N-1) .LT. TDM) GO TO 12
      N=N-1
      RETURN
12    READ 103, NED,(DEP(I),FINT(I), I=1,NED)
      DO 20 I=1,NED
      DEPM=DEP(I)*1.E+3
      FINTM=FINT(I)*1.E+3
      SV=.1*FINTM
      DO 14 J=N,2001
      JS=J
      X(J)=FINTM+X(J-1)
      IF (X(J) .GE. (TDM-SV)) GO TO 16
      IF (X(J) .GE. (DEPM-SV)) GO TO 18
14    CONTINUE
      GO TO 7
16    X(JS)=TDM
      N=JS
      RETURN
18    X(JS)=DEPM
      N=JS+1
20    CONTINUE
      GO TO 4
100   FORMAT (I10,F10.0)
101   FORMAT (8F10.5)
102   FORMAT (*ONUMBER OF DISTANCES EXCEEDS DIMENSION*)
103   FORMAT (I2/(8F10.0))
      END
```

```
      SUBROUTINE IN(N)
      COMMON /INPUT/X(5000), Z(5000), A(120), B(120), AA(40), AB(40), ID
     1(8),REFEL
      COMMON /CCX/ NGC,DX(50),ETAX(50),DELTAX(50),SIGX(50),EPSX(50),
     CT(50),SH(50),SV(50),EH(50),EV(50),GHA,GHR(50)
      COMMON /1/ HA,HAR,AKM
      COMMON /4/ FREQ,POL
      COMPLEX ETAX,EHC,EVC,AK,V,D1,D2,TVT,DELTAX,CTANH
      COMPLEX GHA,GHR,R,FH,FHT,EI
      DATA EI/(0.,1.)/
      FH(ANT)=1.+EI*WN*DELTAX(I)*(ANT-T(I))
      FHT(ANT)=(CEXP(-V*(T(I)-ANT))+R*CEXP(-V*(T(I)+ANT)))/
     C(EVC*(1.+R*CEXP(-2.*V*T(I))))
C
C     INPUT
C
C     ID = IDENTIFICATION
C     N = NUMBER OF DATA POINTS
C     IXUNITS =0, DISTANCES INPUT IN KILOMETERS
C     IXUNITS =1, DISTANCES INPUT IN MILES
C     IZUNITS = 0, HEIGHTS INPUT IN METERS
C     IZUNITS = 1, HEIGHTS INPUT IN FEET
C     REFEL = REFERENCE ELEVATION IN METERS
C
1502  FORMAT (8A10)
1503  FORMAT (2X,8A10)
1504  FORMAT  (4(F10.5,F10.1))
1505  FORMAT(4(F10.2,F10.0))
1506  FORMAT  (10X,I10,2F15.5)
1510  FORMAT (3I10,F10.1)
1511  FORMAT (2X,*NUMBER OF PROFILE DATA POINTS IS*I10/
     C2X,*REFERENCE ELEVATION IS*F10.2,* METERS*/
     C2X,*PATH PROFILE AS PUT IN FOLLOWS*/)
1512  FORMAT (//* THE NUMBER OF SCALED DATA POINTS HAS EXCEEDED 5000 OR
     1THE NUMBER OF GROUND CONSTANT PAIRS HAS EXCEEDED 50*)
1513  FORMAT (*0ADJUSTED PATH PROFILE FOLLOWS*/23X,* 0 IN METERS*,3X,
     1*HT IN METERS*)
1514  FORMAT  (1H1)
1515  FORMAT (*0*I2,* DISTANCE AND GROUND CONSTANT PAIRS FOLLOW*/
     111X,*0 IN KM*,3X,*SIGMA*,2X,*EPSILON*/
     C(10X,F8.3,F8.4,F9.0))
1516  FORMAT (F8.2,F8.6,F8.2,I2,3F8.2,2F8.6)
      FTOM = .3048
      READ 1502, ID
      PRINT 1514
      PRINT 1503, ID
      READ 1510, N,IXUNITS,IZUNITS,REFEL
      IF (IZUNITS .EQ. 1) REFEL=REFEL*FTOM
      IF (N .GT. 5000) GO TO 110
      PRINT 1511, N,REFEL
      READ 1505, (X(I),Z(I), I=1,N)
      PRINT 1504, (X(I), Z(I), I = 1, N)
      IF (N .LT. 1) GO TO 120
      PRINT 1513
      XCONST=1000.
      IF (IXUNITS .EQ. 1) XCONST=1609.3
      ZCONST=1.
      IF (IZUNITS .EQ. 1) ZCONST=FTOM
      DO 105 I = 1, N
      Z(I)=Z(I)*ZCONST-REFEL
      X(I)=X(I)*XCONST
      PRINT 1506, I, X(I), Z(I)
  105 CONTINUE
  120 CONTINUE
      READ 1510, NGC
      IF (NGC .GT. 50) GO TO 110
      WN=2.*3.141592654*FREQ/299.7925
      DO 130 I=1,NGC
      READ 1516, DX(I),SIGX(I),EPSX(I),ISLAB,T(I),EH(I),EV(I),SH(I),
     CSV(I)
      ETAX(I)=CMPLX(EPSX(I),-17975.*SIGX(I)/FREQ)
      IF (ISLAB .NE. 0) GO TO 125
      DELTAX(I)=CSQRT(ETAX(I)-1.)
      DELTAX(I)=DELTAX(I)/ETAX(I)
      IF (I .EQ. 1) GHA=FH(HA)
      GHR(I)=FH(HAR)
```

```
      GO TO 130
125   CONTINUE
      EHC=CMPLX(EH(I),-17975.*SH(I)/FREQ)
      EVC=CMPLX(EV(I),-17975.*SV(I)/FREQ)
      AK=EHC/EVC
      V=CMPLX(0.,WN)*CSQRT(EHC-AK)
      D1=CSQRT(EHC-AK)/EHC
      D2=CSQRT(ETAX(I)-1.)/ETAX(I)
      TVT=CTANH(V*T(I))
      DELTAX(I)=D1*((D2+D1*TVT)/(D1+D2*TVT))
      IF (I .NE. 1) GO TO 127
      IF (T(I) .GT. HA) GO TO 126
      GHA=FH(HA)
      GO TO 127
126   CONTINUE
      R=(D1-D2)/(D1+D2)
      GHA=FHT(HA)
127   CONTINUE
      IF (T(I) .GT. HAR) GO TO 128
      GHR(I)=FH(HAR)
      GO TO 130
128   CONTINUE
      R=(D1-D2)/(D1+D2)
      GHR(I)=FHT(HAR)
130   DX(I)=DX(I)*1000.
      RETURN
110   CONTINUE
      PRINT 1512
      END



      COMPLEX FUNCTION CTANH(Z)
      COMPLEX Z,U
      U=CEXP(2.*Z)
      CTANH=(U-1.)/(U+1.)
      END
```

A sample output for program WAGSLAB is given below:

```
INNERINGEN TO SOBLINGEN
NUMBER OF PROFILE DATA POINTS IS      115
REFERENCE ELEVATION IS    810.00 METERS
PATH PROFILE AS PUT IN FOLLOWS

 0.00000     810.0     .53000     820.0     .80000     827.0    1.00000    820.0
 1.40000     800.0    2.55000     780.0    3.35000     760.0    3.60000    735.0
 3.80000     760.0    4.95000     760.0    5.80000     780.0    6.20000    780.0
 8.80000     780.0    9.00000     768.0   10.05000     780.0   11.30000    780.0
11.65000     740.0   11.75000     700.0   11.95000     700.0   13.10000    720.0
13.60000     730.0   14.10000     720.0   15.40000     740.0   16.20000    760.0
17.20000     780.0   17.80000     780.0   18.00000     790.0   18.75000    800.0
19.00000     800.0   19.40000     740.0   19.80000     770.0   20.20000    740.0
20.40000     740.0   20.80000     760.0   22.00000     760.0   22.70000    780.0
23.05000     800.0   23.20000     820.0   23.60000     820.0   24.08000    780.0
24.30000     820.0   24.85000     820.0   25.15000     800.0   25.90000    640.0
26.05000     640.0   26.20000     720.0   26.60000     670.0   26.80000    705.0
27.10000     620.0   27.30000     700.0   27.70000     600.0   28.30000    520.0
28.70000     500.0   29.00000     480.0   29.25000     480.0   29.35000    500.0
30.00000     500.0   30.20000     440.0   30.60000     440.0   30.85000    420.0
31.35000     400.0   32.30000     400.0   32.45000     380.0   33.75000    380.0
33.90000     360.0   35.20000     340.0   36.80000     340.0   36.90000    360.0
37.60000     360.0   37.85000     380.0   38.10000     380.0   38.50000    360.0
38.65000     340.0   38.75000     320.0   39.30000     320.0   39.50000    380.0
39.80000     420.0   41.00000     420.0   41.93000     440.0   43.75000    440.0
44.10000     460.0   44.40000     480.0   44.75000     480.0   45.00000    500.0
45.35000     500.0   45.65000     460.0   45.95000     400.0   46.10000    370.0
46.60000     440.0   47.05000     420.0   47.25000     440.0   47.55000    460.0
48.60000     460.0   48.65000     440.0   49.30000     380.0   49.50000    400.0
49.95000     415.0   50.30000     400.0   50.55000     380.0   50.75000    380.0
50.95000     400.0   51.65000     400.0   51.75000     380.0   52.20000    380.0
52.30000     400.0   52.55000     420.0   53.65000     420.0   54.00000    400.0
54.35000     400.0   54.85000     420.0   55.00000     440.0   55.55000    425.0
55.90000     440.0   56.15000     460.0   56.63000     465.0

ADJUSTED PATH PROFILE FOLLOWS
                    D IN METERS    HT IN METERS
                1       0.00000        0.00000
                2     530.00000       10.00000
                3     800.00000       17.00000
                4    1000.00000       10.00000
                5    1400.00000      -10.00000
                6    2550.00000      -30.00000
                7    3350.00000      -50.00000
                8    3600.00000      -75.00000
                9    3800.00000      -50.00000
               10    4950.00000      -50.00000
               11    5800.00000      -30.00000
               12    6200.00000      -30.00000
               13    8800.00000      -30.00000
               14    9000.00000      -42.00000
               15   10050.00000      -30.00000
               16   11300.00000      -30.00000
               17   11650.00000      -70.00000
               18   11750.00000     -110.00000
               19   11950.00000     -110.00000
               20   13100.00000      -90.00000
               21   13600.00000      -80.00000
               22   14100.00000      -90.00000
               23   15400.00000      -70.00000
               24   16200.00000      -50.00000
               25   17250.00000      -30.00000
               26   17300.00000      -30.00000
               27   19000.00000      -20.00000
               28   18750.00000      -10.00000
               29   19000.00000      -10.00000
               30   19400.00000      -70.00000
```

31	19800.00000	-40.00000
32	20200.00000	-70.00000
33	20400.00000	-70.00000
34	20800.00000	-50.00000
35	22000.00000	-50.00000
36	22700.00000	-30.00000
37	23050.00000	-10.00000
38	23200.00000	10.00000
39	23600.00000	10.00000
40	24080.00000	-30.00000
41	24300.00000	10.00000
42	24850.00000	10.00000
43	25150.00000	-10.00000
44	25900.00000	-170.00000
45	26050.00000	-170.00000
46	26200.00000	-90.00000
47	26600.00000	-140.00000
48	26800.00000	-105.00000
49	27100.00000	-190.00000
50	27300.00000	-110.00000
51	27700.00000	-210.00000
52	28300.00000	-290.00000
53	28700.00000	-310.00000
54	29000.00000	-330.00000
55	29250.00000	-330.00000
56	29350.00000	-310.00000
57	30000.00000	-310.00000
58	30200.00000	-370.00000
59	30600.00000	-370.00000
60	30850.00000	-390.00000
61	31350.00000	-410.00000
62	32300.00000	-410.00000
63	32450.00000	-430.00000
64	33750.00000	-430.00000
65	33900.00000	-450.00000
66	35200.00000	-470.00000
67	35800.00000	-470.00000
68	36900.00000	-450.00000
69	37600.00000	-450.00000
70	37850.00000	-430.00000
71	38100.00000	-430.00000
72	38500.00000	-450.00000
73	38650.00000	-470.00000
74	38750.00000	-470.00000
75	39300.00000	-490.00000
76	39500.00000	-430.00000
77	39800.00000	-390.00000
78	41000.00000	-390.00000
79	41930.00000	-370.00000
80	43750.00000	-370.00000
81	44100.00000	-350.00000
82	44400.00000	-330.00000
83	44750.00000	-330.00000
84	45000.00000	-310.00000
85	45350.00000	-310.00000
86	45650.00000	-350.00000
87	45950.00000	-410.00000
88	46100.00000	-440.00000
89	46600.00000	-370.00000
90	47050.00000	-390.00000
91	47250.00000	-370.00000
92	47550.00000	-350.00000
93	48600.00000	-350.00000
94	48650.00000	-370.00000
95	49300.00000	-430.00000
96	49500.00000	-410.00000
97	49950.00000	-395.00000
98	50300.00000	-410.00000
99	50550.00000	-430.00000
100	50750.00000	-430.00000
101	50950.00000	-410.00000
102	51650.00000	-410.00000
103	51750.00000	-430.00000
104	52200.00000	-430.00000
105	52300.00000	-410.00000

106	52550.00000	-390.00000
107	53650.00000	-390.00000
108	54000.00000	-410.00000
109	54350.00000	-410.00000
110	54850.00000	-390.00000
111	55000.00000	-370.00000
112	55550.00000	-385.00000
113	55900.00000	-370.00000
114	56150.00000	-350.00000
115	56630.00000	-345.00000

FREQUENCY = 2.00 VERTICAL POLARIZATION EARTH RADIUS = 8500. KM
TRANSMITTER ANTENNA HEIGHT = 0.000 METERS RECEIVER ANTENNA HEIGHT = 0.000 METERS

DISTANCE	SIGMA	EPSILON	SLAB	SH	SV	EH	EV	IMPEDANCE		GHR	
500.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
1080.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
3510.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
5080.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
6750.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
7320.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
8400.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
9110.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
10770.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
11560.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
11980.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
12920.	.010000	10.00	10.	.000030	.000030	1.82	1.82	.1435	.2748	.6104	.0286
19460.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
20280.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
25030.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
28100.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
29540.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
30460.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
32630.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
33680.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
34550.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
35750.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
36920.	.010000	10.00	10.	.000030	.000030	1.82	1.82	.1435	.2748	.6104	.0286
37700.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
38750.	.010000	10.00	10.	.000030	.000030	1.82	1.82	.1435	.2748	.6104	.0286
39360.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
39920.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
41960.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
47500.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
48800.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
51670.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684
52080.	.010000	10.00	0.	0.000000	0.000000	0.00	0.00	.0787	.0697	1.0000	0.0000
56630.	.010000	10.00	20.	.000100	.000100	1.10	1.10	.5442	.2888	.6644	.1684

GHA= 1.0000 0.0000

X (M)	Z (M)	F(X) MAG	F(X) ARG	FH(X) MAG	FH(X) ARG	TIMING (SEC)	FIELD STR (DBU)	BTL
200.00	3.8	.96930E+00	-.38983E+00	.96930E+00	-.38983E+00	.180	126.65	18.74
400.00	7.5	.95300E+00	-.55580E+00	.95300E+00	-.55580E+00	.184	120.48	24.91
600.00	15.2	.95266E+00	-.69678E+00	.65300E+00	-.44850E+00	.185	113.68	31.71
800.00	27.3	.97126E+00	-.83019E+00	.66575E+00	-.58191E+00	.187	111.35	34.04
1000.00	27.2	.94560E+00	-.91492E+00	.64816E+00	-.66664E+00	.189	109.18	36.21

1200.00	18.9	.96455E+00	-.25896E+01	.96455E+00	-.25896E+01	.200	111.05	34.34
1400.00	7.3	.84870E+00	-.26652E+01	.84870E+00	-.26652E+01	.211	108.60	36.80
1600.00	2.1	.76305E+00	-.26492E+01	.76305E+00	-.26492E+01	.224	106.51	38.88
1800.00	-3.1	.69663E+00	-.26693E+01	.69663E+00	-.26693E+01	.237	104.70	40.69
2000.00	-8.2	.64871E+00	-.26960E+01	.64871E+00	-.26960E+01	.253	103.16	42.23
2200.00	-13.4	.61157E+00	-.27255E+01	.61157E+00	-.27255E+01	.269	101.82	43.57
2400.00	-18.6	.58130E+00	-.27562E+01	.58130E+00	-.27562E+01	.285	100.63	44.76
2600.00	-24.2	.55178E+00	-.27955E+01	.55178E+00	-.27955E+01	.304	99.48	45.91
2800.00	-30.9	.53034E+00	-.28323E+01	.53034E+00	-.28323E+01	.325	98.49	46.90
3000.00	-37.6	.51095E+00	-.28676E+01	.51095E+00	-.28676E+01	.345	97.57	47.82
3200.00	-44.3	.49379E+00	-.29009E+01	.49379E+00	-.29009E+01	.367	96.71	48.68
3400.00	-54.8	.44438E+00	-.30159E+01	.44438E+00	-.30159E+01	.391	95.27	50.12
3600.00	-74.6	.29656E+00	.26569E+01	.20328E+00	.29052E+01	.418	87.98	57.41
3800.00	-47.2	.22414E+00	.30071E+01	.15363E+00	-.30278E+01	.446	85.08	60.31
4000.00	-44.7	.16306E+00	.27201E+01	.11177E+00	.29684E+01	.474	81.87	63.52
4200.00	-42.2	.11980E+00	.27928E+01	.82119E-01	.30411E+01	.505	78.77	66.62
4400.00	-39.8	.10462E+00	.28246E+01	.71714E-01	.30729E+01	.536	77.19	68.20
4600.00	-37.4	.90031E-01	.28520E+01	.61712E-01	.31002E+01	.570	75.50	69.90
4800.00	-34.9	.80126E-01	.28926E+01	.54922E-01	.31409E+01	.605	74.11	71.28
5000.00	-31.3	.73901E-01	.29486E+01	.50655E-01	-.30863E+01	.641	73.06	72.33
5200.00	-27.1	.11860E+00	-.27635E+01	.11860E+00	-.27635E+01	.680	80.10	65.29
5400.00	-25.0	.13901E+00	-.26952E+01	.13901E+00	-.26952E+01	.721	81.16	64.23
5600.00	-22.8	.15515E+00	-.26678E+01	.15515E+00	-.26678E+01	.764	81.79	63.60
5800.00	-20.6	.16575E+00	-.26612E+01	.16575E+00	-.26612E+01	.807	82.06	63.33
6000.00	-23.1	.16872E+00	-.27086E+01	.16872E+00	-.27086E+01	.852	81.92	63.47
6200.00	-25.7	.17268E+00	-.27373E+01	.17268E+00	-.27373E+01	.896	81.84	63.55
6400.00	-28.2	.17547E+00	-.27638E+01	.17547E+00	-.27638E+01	.940	81.70	63.69
6600.00	-30.8	.17729E+00	-.27891E+01	.17729E+00	-.27891E+01	.991	81.53	63.87

6800.00	-31.0	.15216E+00	-.30967E+01	.10430E+00	-.28484E+01	1.040	76.66	68.73
7000.00	-24.1	.77416E-01	.26346E+01	.53064E-01	.28829E+01	1.095	70.54	74.85
7200.00	-17.3	.57140E-01	.29628E+01	.39166E-01	-.30721E+01	1.148	67.65	77.74
7400.00	-14.7	.77139E-01	-.29603E+01	.77139E-01	-.29603E+01	1.198	73.30	72.09
7600.00	-18.6	.94463E-01	-.28615E+01	.94463E-01	-.28615E+01	1.252	74.83	70.56
7800.00	-22.5	.10525E+00	-.28440E+01	.10525E+00	-.28440E+01	1.311	75.55	69.85
8000.00	-26.4	.11229E+00	-.28498E+01	.11229E+00	-.28498E+01	1.369	75.89	69.50
8200.00	-30.3	.11721E+00	-.28637E+01	.11721E+00	-.28637E+01	1.429	76.05	69.34
8400.00	-34.2	.12076E+00	-.28811E+01	.82772E-01	-.26328E+01	1.493	72.81	72.58
8600.00	-28.7	.70263E-01	.25926E+01	.48162E-01	.28408E+01	1.559	67.91	77.48
8800.00	-23.3	.42090E-01	.28495E+01	.28850E-01	.30977E+01	1.625	63.26	82.13
9000.00	-29.9	.39431E-01	.27085E+01	.27028E-01	.29568E+01	1.691	62.49	82.90
9200.00	-25.8	.52312E-01	-.30109E+01	.52312E-01	-.30109E+01	1.757	68.04	77.35
9400.00	-26.1	.67646E-01	-.28601E+01	.67646E-01	-.28601E+01	1.823	70.09	75.31
9600.00	-26.5	.77602E-01	-.28151E+01	.77602E-01	-.28151E+01	1.890	71.09	74.30
9800.00	-26.8	.84469E-01	-.28008E+01	.84469E-01	-.28008E+01	1.957	71.65	73.74
10000.00	-27.2	.89519E-01	-.27987E+01	.89519E-01	-.27987E+01	2.028	71.98	73.41
10200.00	-29.3	.92361E-01	-.28213E+01	.92361E-01	-.28213E+01	2.101	72.08	73.31
10400.00	-31.9	.94879E-01	-.28413E+01	.94879E-01	-.28413E+01	2.176	72.15	73.25
10600.00	-34.6	.97023E-01	-.28598E+01	.97023E-01	-.28598E+01	2.249	72.17	73.22
10800.00	-36.1	.82146E-01	.30995E+01	.56307E-01	-.29354E+01	2.328	67.29	78.11
11000.00	-31.3	.48113E-01	.27087E+01	.32979E-01	.29569E+01	2.405	62.48	82.91
11200.00	-26.5	.36071E-01	.28559E+01	.24725E-01	.31042E+01	2.485	59.82	85.57
11400.00	-33.1	.29497E-01	.26767E+01	.20218E-01	.29250E+01	2.566	57.92	87.47
11600.00	-54.1	.29257E-01	.26980E+01	.29257E-01	.26980E+01	2.651	60.98	84.41
11800.00	-107.6	.41025E-01	.28135E+01	.41025E-01	.28135E+01	2.736	63.77	81.62
12000.00	-117.4	.30508E-01	.27324E+01	.30863E-01	.27792E+01	2.829	61.15	84.24
12200.00	-111.8	.60090E-01	.25603E+01	.36718E-01	.26071E+01	2.917	62.51	82.88

12400.00	-106.2	.60312E-01	.24699E+01	.36854E-01	.25167E+01	3.010	62.40	82.99
12600.00	-100.7	.57596E-01	.24268E+01	.35194E-01	.24735E+01	3.104	61.86	83.53
12800.00	-95.1	.54015E-01	.24120E+01	.33006E-01	.24588E+01	3.199	61.17	84.22
13000.00	-92.0	.48090E-01	.28436E+01	.48090E-01	.28436E+01	3.290	64.31	81.09
13200.00	-88.8	.51298E-01	.30669E+01	.51298E-01	.30669E+01	3.388	64.73	80.66
13400.00	-85.4	.54421E-01	-.31002E+01	.54421E-01	-.31002E+01	3.485	65.12	80.27
13600.00	-82.1	.57395E-01	-.30231E+01	.57395E-01	-.30231E+01	3.582	65.45	79.94
13800.00	-86.7	.57735E-01	-.30421E+01	.57735E-01	-.30421E+01	3.680	65.37	80.02
14000.00	-91.3	.59633E-01	-.30404E+01	.59633E-01	-.30404E+01	3.780	65.53	79.86
14200.00	-92.4	.63549E-01	-.29966E+01	.63549E-01	-.29966E+01	3.881	65.96	79.43
14400.00	-90.0	.65927E-01	-.29654E+01	.65927E-01	-.29654E+01	3.984	66.16	79.23
14600.00	-87.5	.67604E-01	-.29451E+01	.67604E-01	-.29451E+01	4.089	66.26	79.14
14800.00	-85.1	.68990E-01	-.29299E+01	.68990E-01	-.29299E+01	4.195	66.31	79.08
15000.00	-82.7	.70156E-01	-.29181E+01	.70156E-01	-.29181E+01	4.309	66.34	79.05
15200.00	-80.3	.71142E-01	-.29090E+01	.71142E-01	-.29090E+01	4.420	66.35	79.04
15400.00	-77.8	.71975E-01	-.29021E+01	.71975E-01	-.29021E+01	4.533	66.34	79.05
15600.00	-73.5	.73454E-01	-.28798E+01	.73454E-01	-.28798E+01	4.647	66.40	78.99
15800.00	-69.2	.74194E-01	-.28677E+01	.74194E-01	-.28677E+01	4.763	66.38	79.01
16000.00	-64.8	.74749E-01	-.28582E+01	.74749E-01	-.28582E+01	4.881	66.33	79.06
16200.00	-60.5	.75178E-01	-.28503E+01	.75178E-01	-.28503E+01	5.002	66.27	79.12
16400.00	-57.4	.74993E-01	-.28543E+01	.74993E-01	-.28543E+01	5.125	66.15	79.24
16600.00	-54.3	.75126E-01	-.28539E+01	.75126E-01	-.28539E+01	5.248	66.06	79.33
16800.00	-51.2	.75237E-01	-.28536E+01	.75237E-01	-.28536E+01	5.381	65.97	79.43
17000.00	-48.1	.75303E-01	-.28536E+01	.75303E-01	-.28536E+01	5.520	65.87	79.52
17200.00	-45.0	.75321E-01	-.28541E+01	.75321E-01	-.28541E+01	5.655	65.77	79.62
17400.00	-44.7	.73846E-01	-.28844E+01	.73846E-01	-.28844E+01	5.790	65.50	79.89
17600.00	-45.4	.73163E-01	-.29049E+01	.73163E-01	-.29049E+01	5.927	65.32	80.07
17800.00	-46.1	.72862E-01	-.29205E+01	.72862E-01	-.29205E+01	6.068	65.18	80.21

18000.00	-36.9	.76974E-01	-.28453E+01	.76974E-01	-.28453E+01	6.213	65.56	79.83
18200.00	-34.9	.74429E-01	-.28794E+01	.74429E-01	-.28794E+01	6.358	65.18	80.21
18400.00	-33.0	.73960E-01	-.28877E+01	.73960E-01	-.28877E+01	6.503	65.03	80.36
18600.00	-31.1	.73614E-01	-.28943E+01	.73614E-01	-.28943E+01	6.650	64.89	80.50
18800.00	-29.8	.72319E-01	-.29149E+01	.72319E-01	-.29149E+01	6.799	64.64	80.75
19000.00	-30.5	.71841E-01	-.29336E+01	.71841E-01	-.29336E+01	6.946	64.50	80.90
19200.00	-61.3	.59964E-01	.30042E+01	.59964E-01	.30042E+01	7.097	62.83	82.56
19400.00	-92.0	.56632E-01	.28244E+01	.56632E-01	.28244E+01	7.248	62.25	83.14
19600.00	-74.2	.39896E-01	.25546E+01	.27347E-01	.28029E+01	7.397	55.84	89.55
19800.00	-54.8	.30739E-01	.27634E+01	.21070E-01	.30117E+01	7.549	53.48	91.91
20000.00	-65.4	.22500E-01	.24181E+01	.15423E-01	.26664E+01	7.702	50.69	94.71
20200.00	-76.0	.17484E-01	.24390E+01	.11985E-01	.26873E+01	7.859	48.41	96.98
20400.00	-75.0	.30223E-01	.31044E+01	.30223E-01	.31044E+01	8.015	56.36	89.03
20600.00	-66.3	.37819E-01	-.29864E+01	.37819E-01	-.29864E+01	8.174	58.22	87.17
20800.00	-57.6	.43304E-01	-.28921E+01	.43304E-01	-.28921E+01	8.332	59.31	86.08
21000.00	-59.0	.44663E-01	-.29266E+01	.44663E-01	-.29266E+01	8.495	59.50	85.89
21200.00	-60.3	.46822E-01	-.29335E+01	.46822E-01	-.29335E+01	8.663	59.83	85.57
21400.00	-61.7	.48567E-01	-.29418E+01	.48567E-01	-.29418E+01	8.831	60.06	85.33
21600.00	-63.0	.49968E-01	-.29512E+01	.49968E-01	-.29512E+01	8.998	60.23	85.16
21800.00	-64.4	.51097E-01	-.29614E+01	.51097E-01	-.29614E+01	9.171	60.34	85.05
22000.00	-65.7	.52013E-01	-.29720E+01	.52013E-01	-.29720E+01	9.343	60.42	84.97
22200.00	-61.4	.54526E-01	-.29304E+01	.54526E-01	-.29304E+01	9.519	60.75	84.64
22400.00	-57.0	.55575E-01	-.29157E+01	.55575E-01	-.29157E+01	9.697	60.84	84.56
22600.00	-52.7	.56334E-01	-.29055E+01	.56334E-01	-.29055E+01	9.879	60.88	84.51
22800.00	-45.5	.58617E-01	-.28621E+01	.58617E-01	-.28621E+01	10.060	61.14	84.25
23000.00	-35.4	.59792E-01	-.28291E+01	.59792E-01	-.28291E+01	10.246	61.24	84.15
23200.00	-14.0	.65409E-01	-.27069E+01	.65409E-01	-.27069E+01	10.437	61.95	83.44
23400.00	-15.3	.58231E-01	-.28381E+01	.58231E-01	-.28381E+01	10.625	60.86	84.53
23600.00	-16.7	.57064E-01	-.28754E+01	.57064E-01	-.28754E+01	10.819	60.61	84.78

23800.00	-34.8	.51270E-01	-.30799E+01	.51270E-01	-.30799E+01	11.008	59.61	85.78
24000.00	-52.9	.49700E-01	.30913E+01	.49700E-01	.30913E+01	11.193	59.27	86.12
24200.00	-39.1	.59676E-01	-.29300E+01	.59676E-01	-.29300E+01	11.382	60.78	84.61
24400.00	-22.4	.56104E-01	-.29510E+01	.56104E-01	-.29510E+01	11.582	60.17	85.22
24600.00	-23.8	.56769E-01	-.29637E+01	.56769E-01	-.29637E+01	11.783	60.21	85.18
24800.00	-25.2	.55907E-01	-.29871E+01	.55907E-01	-.29871E+01	11.989	60.00	85.39
25000.00	-36.6	.51712E-01	-.31181E+01	.51712E-01	-.31181E+01	12.189	59.26	86.13
25200.00	-56.9	.27254E-01	.21424E+01	.18681E-01	.23906E+01	12.391	50.34	95.05
25400.00	-98.9	.13637E-01	.16686E+01	.93474E-02	.19169E+01	12.597	44.26	101.13
25600.00	-140.8	.93912E-02	.16489E+01	.64372E-02	.18972E+01	12.805	40.95	104.44
25800.00	-182.8	.67559E-02	.15510E+01	.46308E-02	.17993E+01	13.018	38.02	107.37
26000.00	-203.4	.83452E-02	.18302E+01	.57202E-02	.20785E+01	13.229	39.79	105.60
26200.00	-122.8	.17777E-01	.29274E+01	.12185E-01	-.31075E+01	13.441	46.29	99.10
26400.00	-147.1	.13684E-01	.20048E+01	.93795E-02	.22530E+01	13.657	43.95	101.44
26600.00	-171.4	.86718E-02	.20497E+01	.59441E-02	.22979E+01	13.875	39.93	105.46
26800.00	-135.7	.13566E-01	.27915E+01	.92988E-02	.30397E+01	14.095	43.75	101.64
27000.00	-191.7	.89612E-02	.17616E+01	.61425E-02	.20098E+01	14.318	40.08	105.31
27200.00	-179.4	.11855E-01	.25377E+01	.81260E-02	.27860E+01	14.547	42.45	102.94
27400.00	-163.7	.77466E-02	.24867E+01	.53099E-02	.27349E+01	14.774	38.69	106.70
27600.00	-213.1	.77114E-02	.21376E+01	.52858E-02	.23858E+01	15.003	38.59	106.80
27800.00	-250.7	.63031E-02	.20770E+01	.43205E-02	.23253E+01	15.237	36.77	108.62
28000.00	-276.8	.59706E-02	.21557E+01	.40925E-02	.24040E+01	15.470	36.24	109.15
28200.00	-304.8	.79709E-02	.26066E+01	.79709E-02	.26066E+01	15.707	41.97	103.42
28400.00	-326.6	.11526E-01	.28127E+01	.11526E-01	.28127E+01	15.946	45.11	100.28
28600.00	-340.1	.14183E-01	.28515E+01	.14183E-01	.28515E+01	16.187	46.85	98.54
28800.00	-355.2	.15929E-01	.28586E+01	.15929E-01	.28586E+01	16.428	47.80	97.59
29000.00	-372.0	.17266E-01	.28654E+01	.17266E-01	.28654E+01	16.684	48.44	96.95
29200.00	-375.4	.20393E-01	.29207E+01	.20393E-01	.29207E+01	16.941	49.82	95.57
29400.00	-358.9	.22641E-01	.29387E+01	.22641E-01	.29387E+01	17.199	50.67	94.72

29600.00	-360.2	.17763E-01	.24697E+01	.12176E-01	.27180E+01	17.461	45.23	100.16
29800.00	-356.6	.11842E-01	.23492E+01	.81173E-02	.25974E+01	17.725	41.65	103.74
30000.00	-352.9	.10303E-01	.24282E+01	.70619E-02	.26765E+01	18.000	40.38	105.01
30200.00	-409.3	.48429E-02	.18389E+01	.33195E-02	.20872E+01	18.280	33.76	111.63
30400.00	-405.7	.81564E-02	.24272E+01	.55908E-02	.26755E+01	18.552	38.23	107.16
30600.00	-406.4	.13789E-01	.29139E+01	.13785E-01	.29139E+01	18.831	46.02	99.37
30800.00	-424.9	.15103E-01	.29110E+01	.15103E-01	.29110E+01	19.108	46.75	98.64
31000.00	-437.5	.17637E-01	.29658E+01	.17637E-01	.29658E+01	19.383	48.04	97.35
31200.00	-448.1	.19509E-01	.29816E+01	.19509E-01	.29816E+01	19.658	48.86	96.53
31400.00	-456.7	.21809E-01	.30202E+01	.21809E-01	.30202E+01	19.935	49.78	95.61
31600.00	-459.2	.23330E-01	.30310E+01	.23330E-01	.30310E+01	20.219	50.31	95.08
31800.00	-461.8	.24786E-01	.30411E+01	.24786E-01	.30411E+01	20.509	50.78	94.61
32000.00	-464.4	.26024E-01	.30472E+01	.26024E-01	.30472E+01	20.793	51.15	94.24
32200.00	-467.0	.27110E-01	.30513E+01	.27110E-01	.30513E+01	21.083	51.45	93.94
32400.00	-483.0	.24299E-01	.28990E+01	.24299E-01	.28990E+01	21.382	50.44	94.95
32600.00	-492.2	.27830E-01	.29945E+01	.27830E-01	.29945E+01	21.671	51.57	93.82
32800.00	-490.0	.17844E-01	.23092E+01	.12231E-01	.25575E+01	21.963	44.37	101.02
33000.00	-487.0	.10583E-01	.23618E+01	.72538E-02	.26101E+01	22.259	39.78	105.61
33200.00	-484.0	.10253E-01	.24901E+01	.70281E-02	.27383E+01	22.556	39.46	105.93
33400.00	-481.0	.93677E-02	.25273E+01	.64211E-02	.27756E+01	22.858	38.62	106.77
33600.00	-477.9	.89150E-02	.26018E+01	.61107E-02	.28501E+01	23.165	38.14	107.25
33800.00	-486.6	.13038E-01	.30128E+01	.13038E-01	.30128E+01	23.470	44.67	100.72
34000.00	-506.9	.16906E-01	.30725E+01	.16906E-01	.30725E+01	23.777	46.87	98.52
34200.00	-515.4	.19460E-01	.30990E+01	.19460E-01	.30990E+01	24.087	48.05	97.35
34400.00	-523.9	.21253E-01	.31025E+01	.21253E-01	.31025E+01	24.412	48.76	96.63
34600.00	-530.4	.19207E-01	.28049E+01	.13165E-01	.30531E+01	24.742	44.55	100.84
34800.00	-530.9	.10767E-01	.22847E+01	.73800E-02	.25329E+01	25.070	39.47	105.92
35000.00	-531.5	.86496E-02	.25662E+01	.59289E-02	.28145E+01	25.394	37.52	107.87
35200.00	-532.1	.86171E-02	.25710E+01	.59066E-02	.28193E+01	25.719	37.44	107.95

35400.00	-529.5	.81962E-02	.26559E+01	.56181E-02	.29042E+01	26.052	36.95	108.44
35600.00	-527.1	.81033E-02	.27115E+01	.55544E-02	.29598E+01	26.379	36.81	108.58
35800.00	-525.8	.98853E-02	.28194E+01	.60404E-02	.28662E+01	26.727	37.49	107.90
36000.00	-528.4	.16204E-01	.28456E+01	.99017E-02	.28924E+01	27.069	41.73	103.66
36200.00	-530.9	.18553E-01	.27014E+01	.11337E-01	.27482E+01	27.407	42.86	102.53
36400.00	-533.5	.19348E-01	.25896E+01	.11822E-01	.26363E+01	27.745	43.17	102.22
36600.00	-536.1	.19463E-01	.25038E+01	.11893E-01	.25498E+01	28.097	43.18	102.21
36800.00	-538.6	.19194E-01	.24364E+01	.11729E-01	.24832E+01	28.453	43.01	102.38
37000.00	-521.6	.15678E-01	.28537E+01	.15678E-01	.28537E+01	28.806	46.02	99.37
37200.00	-525.6	.17671E-01	.30541E+01	.17671E-01	.30541E+01	29.157	46.48	98.91
37400.00	-528.4	.19355E-01	-.31317E+01	.19355E-01	-.31317E+01	29.510	47.22	98.17
37600.00	-531.9	.20922E-01	-.30813E+01	.20922E-01	-.30813E+01	29.869	47.85	97.54
37800.00	-517.1	.26615E-01	.30745E+01	.16263E-01	.31213E+01	30.237	45.62	99.77
38000.00	-512.1	.26217E-01	.27941E+01	.16020E-01	.28409E+01	30.607	45.44	99.95
38200.00	-516.1	.23695E-01	.25565E+01	.14479E-01	.26032E+01	30.979	44.52	100.87
38400.00	-525.1	.22495E-01	.24032E+01	.13746E-01	.24500E+01	31.360	44.02	101.37
38600.00	-542.4	.19490E-01	.21641E+01	.11910E-01	.22109E+01	31.744	42.73	102.66
38800.00	-569.4	.19279E-01	.22233E+01	.19279E-01	.22233E+01	32.133	46.87	98.52
39000.00	-573.6	.18124E-01	.26169E+01	.18124E-01	.26169E+01	32.529	46.29	99.10
39200.00	-577.8	.19172E-01	.27734E+01	.19172E-01	.27734E+01	32.924	46.73	98.66
39400.00	-549.9	.22825E-01	.28221E+01	.15646E-01	.30704E+01	33.314	44.92	100.47
39600.00	-509.3	.86163E-02	.28301E+01	.59060E-02	.30784E+01	33.709	36.41	108.98
39800.00	-467.5	.10286E-01	-.28503E+01	.70504E-02	-.26021E+01	34.110	37.91	107.48
40000.00	-464.9	.12820E-01	-.27125E+01	.12820E-01	-.27125E+01	34.513	43.06	102.33
40200.00	-467.8	.16334E-01	-.26283E+01	.16334E-01	-.26283E+01	34.924	45.12	100.27
40400.00	-470.7	.18970E-01	-.26236E+01	.18970E-01	-.26236E+01	35.331	46.38	99.01
40600.00	-473.6	.21022E-01	-.26387E+01	.21022E-01	-.26387E+01	35.742	47.23	98.16
40800.00	-476.5	.22709E-01	-.26589E+01	.22709E-01	-.26589E+01	36.161	47.85	97.54
41000.00	-479.5	.24138E-01	-.26806E+01	.24138E-01	-.26806E+01	36.584	48.34	97.05

41200.00	-478.1	.26013E-01	-.26595E+01	.26013E-01	-.26595E+01	37.001	48.95	96.44
41400.00	-476.7	.27315E-01	-.26586E+01	.27315E-01	-.26586E+01	37.429	49.33	96.06
41600.00	-475.4	.28446E-01	-.26610E+01	.28446E-01	-.26610E+01	37.854	49.64	95.75
41800.00	-474.0	.29451E-01	-.26649E+01	.29451E-01	-.26649E+01	38.283	49.90	95.49
42000.00	-473.6	.24631E-01	-.30076E+01	.16883E-01	-.27594E+01	38.713	45.03	100.36
42200.00	-473.9	.14484E-01	.28155E+01	.99278E-02	.30638E+01	39.153	40.37	105.02
42400.00	-474.2	.10807E-01	.29277E+01	.74074E-02	-.31072E+01	39.592	37.79	107.60
42600.00	-474.4	.99962E-02	.29261E+01	.68518E-02	-.31088E+01	40.033	37.07	108.32
42800.00	-474.7	.90377E-02	.29486E+01	.61948E-02	-.30863E+01	40.474	36.15	109.24
43000.00	-475.0	.85773E-02	.29811E+01	.58793E-02	-.30539E+01	40.918	35.66	109.73
43200.00	-475.3	.82490E-02	.30025E+01	.56542E-02	-.30324E+01	41.370	35.28	110.11
43400.00	-475.6	.80050E-02	.30227E+01	.54870E-02	-.30122E+01	41.818	34.98	110.41
43600.00	-475.9	.78234E-02	.30396E+01	.53626E-02	-.29953E+01	42.277	34.74	110.65
43800.00	-473.3	.80599E-02	.31154E+01	.55246E-02	-.29195E+01	42.733	34.96	110.43
44000.00	-462.2	.81053E-02	-.30090E+01	.55557E-02	-.27607E+01	43.203	34.97	110.42
44200.00	-450.2	.86204E-02	-.29027E+01	.59089E-02	-.26544E+01	43.675	35.46	109.93
44400.00	-437.2	.89364E-02	-.28186E+01	.61254E-02	-.25703E+01	44.156	35.74	109.65
44600.00	-437.5	.84127E-02	-.29897E+01	.57665E-02	-.27414E+01	44.636	35.17	110.22
44800.00	-433.8	.85747E-02	-.29154E+01	.58775E-02	-.26671E+01	45.123	35.30	110.09
45000.00	-418.1	.98609E-02	-.27268E+01	.60737E-02	-.24785E+01	45.601	35.55	109.84
45200.00	-418.5	.84711E-02	-.29240E+01	.58065E-02	-.26757E+01	46.092	35.12	110.27
45400.00	-425.5	.70369E-02	-.30998E+01	.48234E-02	-.28515E+01	46.578	33.47	111.92
45600.00	-452.5	.68037E-02	.28180E+01	.46636E-02	.30662E+01	47.061	33.14	112.25
45800.00	-489.5	.56022E-02	.24319E+01	.38400E-02	.26802E+01	47.542	31.41	113.98
46000.00	-529.9	.47198E-02	.22652E+01	.32351E-02	.25135E+01	48.022	29.89	115.51
46200.00	-536.2	.61546E-02	.25801E+01	.42186E-02	.28283E+01	48.509	32.15	113.24
46400.00	-508.6	.63192E-02	.31038E+01	.43315E-02	-.29311E+01	48.997	32.35	113.05
46600.00	-481.0	.76039E-02	-.28813E+01	.52121E-02	-.26330E+01	49.502	33.92	111.48
46800.00	-490.3	.68306E-02	.29794E+01	.46820E-02	-.30555E+01	50.012	32.95	112.44

47000.00	-499.5	.60995E-02	.29446E+01	.41809E-02	-.30903E+01	50.519	31.93	113.46
47200.00	-487.1	.69749E-02	-.30069E+01	.47809E-02	-.27587E+01	51.026	33.05	112.34
47400.00	-472.5	.74183E-02	-.29032E+01	.50849E-02	-.26550E+01	51.527	33.55	111.84
47600.00	-464.8	.10588E-01	-.25033E+01	.10588E-01	-.25033E+01	52.045	39.89	105.50
47800.00	-469.0	.14304E-01	-.24566E+01	.14304E-01	-.24566E+01	52.560	42.46	102.93
48000.00	-473.2	.16729E-01	-.24773E+01	.16729E-01	-.24773E+01	53.077	43.79	101.60
48200.00	-477.4	.18576E-01	-.25088E+01	.18576E-01	-.25088E+01	53.601	44.66	100.73
48400.00	-481.6	.20073E-01	-.25417E+01	.20073E-01	-.25417E+01	54.133	45.30	100.09
48600.00	-485.9	.21328E-01	-.25737E+01	.21328E-01	-.25737E+01	54.672	45.79	99.60
48800.00	-523.9	.19467E-01	-.29310E+01	.13344E-01	-.26827E+01	55.206	41.68	103.71
49000.00	-542.1	.11726E-01	.24653E+01	.80376E-02	.27135E+01	55.747	37.24	108.15
49200.00	-560.4	.71305E-02	.25131E+01	.48876E-02	.27613E+01	56.293	32.89	112.51
49400.00	-559.4	.82806E-02	.27917E+01	.56760E-02	.30399E+01	56.835	34.15	111.24
49600.00	-545.8	.73072E-02	.29994E+01	.50087E-02	-.30355E+01	57.386	33.03	112.36
49800.00	-538.9	.75413E-02	.30802E+01	.51692E-02	-.29547E+01	57.938	33.27	112.12
50000.00	-535.8	.69509E-02	.30608E+01	.47645E-02	-.29741E+01	58.488	32.52	112.87
50200.00	-544.2	.68220E-02	.29416E+01	.46761E-02	-.30933E+01	59.044	32.33	113.06
50400.00	-556.3	.61536E-02	.28169E+01	.42180E-02	.30651E+01	59.604	31.40	113.99
50600.00	-568.1	.62598E-02	.28045E+01	.42907E-02	.30527E+01	60.168	31.51	113.88
50800.00	-562.9	.64888E-02	.30162E+01	.44477E-02	-.30187E+01	60.737	31.79	113.60
51000.00	-547.7	.62678E-02	-.30613E+01	.42963E-02	-.28130E+01	61.312	31.45	113.94
51200.00	-547.5	.67368E-02	-.31389E+01	.46177E-02	-.28906E+01	61.883	32.05	113.34
51400.00	-547.3	.64555E-02	.31291E+01	.44249E-02	-.29058E+01	62.459	31.64	113.75
51600.00	-547.1	.64212E-02	.31408E+01	.44014E-02	-.28941E+01	63.040	31.56	113.83
51800.00	-574.2	.10582E-01	-.29091E+01	.10582E-01	-.29091E+01	63.641	39.15	106.24
52000.00	-585.2	.11940E-01	-.29123E+01	.11940E-01	-.29123E+01	64.243	40.16	105.23
52200.00	-589.8	.84068E-02	.27481E+01	.57624E-02	.29964E+01	64.842	33.80	111.59
52400.00	-562.1	.78770E-02	-.29239E+01	.53993E-02	-.26757E+01	65.445	33.20	112.19
52600.00	-550.5	.76233E-02	-.30599E+01	.52254E-02	-.28116E+01	66.068	32.89	112.51

52800.00	-550.8	.69808E-02	-.31102E+01	.47850E-02	-.28620E+01	66.680	32.09	113.30
53000.00	-551.2	.66578E-02	-.31169E+01	.45636E-02	-.28686E+01	67.298	31.64	113.75
53200.00	-551.6	.64807E-02	-.31169E+01	.44422E-02	-.28687E+01	67.916	31.38	114.01
53400.00	-551.9	.63608E-02	-.31130E+01	.43600E-02	-.28647E+01	68.539	31.18	114.21
53600.00	-552.3	.62785E-02	-.31079E+01	.43036E-02	-.28596E+01	69.152	31.04	114.35
53800.00	-561.3	.59005E-02	.30246E+01	.40445E-02	-.30103E+01	69.772	30.46	114.93
54000.00	-573.1	.55647E-02	.29382E+01	.38143E-02	-.30967E+01	70.391	29.92	115.47
54200.00	-573.5	.57237E-02	.30724E+01	.39233E-02	-.29625E+01	71.011	30.14	115.25
54400.00	-571.9	.59913E-02	.31302E+01	.41068E-02	-.29047E+01	71.650	30.50	114.89
54600.00	-564.3	.60340E-02	-.30252E+01	.41360E-02	-.27769E+01	72.290	30.53	114.86
54800.00	-556.7	.63213E-02	-.29506E+01	.43329E-02	-.27023E+01	72.930	30.90	114.49
55000.00	-535.1	.72965E-02	-.26513E+01	.50014E-02	-.24030E+01	73.570	32.12	113.27
55200.00	-541.0	.66970E-02	-.30257E+01	.45904E-02	-.27775E+01	74.202	31.34	114.05
55400.00	-546.9	.60005E-02	-.30678E+01	.41130E-02	-.28195E+01	74.837	30.36	115.03
55600.00	-549.2	.62957E-02	-.30385E+01	.43153E-02	-.27902E+01	75.483	30.74	114.65
55800.00	-541.1	.62499E-02	-.28748E+01	.42840E-02	-.26465E+01	76.136	30.65	114.74
56000.00	-529.2	.63740E-02	-.27521E+01	.47118E-02	-.25038E+01	76.791	31.44	113.95
56200.00	-517.2	.68867E-02	-.27053E+01	.47205E-02	-.24570E+01	77.444	31.43	113.96
56400.00	-515.5	.70053E-02	-.27980E+01	.48017E-02	-.25498E+01	78.100	31.55	113.85
56600.00	-513.9	.67364E-02	-.28272E+01	.45174E-02	-.25789E+01	78.768	31.17	114.22
56630.00	-513.6	.67268E-02	-.29281E+01	.46109E-02	-.25798E+01	79.437	31.16	114.23

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15. ABSTRACT *(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)*

An integral equation method is presented for computing the vertically polarized field strength over irregular terrain which is covered with forest, buildings, or snow. The terrain cover is modeled as an equivalent slab, and a general computer code, WAGSLAB, is developed. Numerous special cases are treated analytically, and comparisons are made with numerical results from WAGSLAB.

16. Key Words *(Alphabetical order, separated by semicolons)*

flat earth; HF ground wave propagation; irregular terrain; mixed path; lateral wave, slab model; spherical earth; vertical polarization

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