



Title	Verfinsterung des Sonnenscheindaurs durch Gebäude
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Verfinsterung des Sonnenscheindauers durch Gebäude

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Übersicht

In diesem Artikel betrifft es sich um eine beliebig geneigte d. h. gerichtete Ebene, die dann natürlich sowohl senkrecht als auch horizontal einschließt.

Wir können das Verhältnis der Verfinsterung des Sonnenscheindauers durch Gebäude auswerten, wenn wir nur die Richtung der Ebene und auch den Umriß und die Stellung des Gebäudes kennen.

Dafür hat der Verfasser Fortran-Programm für Rechenmaschine festgestellt, das aus einem Haupt und dreizehn Neben besteht.

1 Problemstellung

Was den betreffenden Sonnenscheindaueranlangt, so werden bereits vom Verfasser in Literatur ziemlich eingehend behandelt.

2 Erklärung des Programmes

Es ist zunächst bemerkt, daß in dieser Untersuchung das Azimut vom Südpunkt nach West positiv und wovon nach Osten negativ gezählt ist, folglich Süd : 0° , West : $+90^\circ$, Osten : -90° , Nord : $\pm 180^\circ$.

Man wird die Richtung der Ebene mit dem Azimut AZ und der Höhe KO darstellen.

Für den Umriß und die Stellung des verbergenden Gebäudes, muß man sie mit Zahlenwerte ausdrücken. Man bezeichnet mit GA und GE deren Azimuten von linken und rechten Seiten, in Einheit von Winkel-Grad ausgedrückt.

Man bezeichne $|GE-GA|$ mit L, wenn $0 \leq GE \leq 180^\circ$, Dagegen es wird $|360+GE-GA|$, wenn $0 \leq GA \leq 180^\circ$ und $0 > GE > -180^\circ$.

Wenn L größer als 180° ist, muß man das Gebäude in zwei Teile abteilen durch Nord oder Südpunkt, und dadurch für jeden Teil die Rechnung mit $L = |GE-GA|$ durchführen.

Man bezeichnet noch weiter die Breite auf der Erde und die Länge der Sonne mit F und R.

Für den Ausdruck der Höhe des Gebäudes hat der Verfasser das folgende Verfahren gewählt.

Bezeichnet man die Höhe des oberen Randes des Gebäudes für das Azimut AG (K)

$=GA+K-1$ mit $HG(K)$.

Daraus erhält man das nachstehende Programm.

(Unvollendet Fortsetzung folgt)

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      REAL STO(2)
      COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1  STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
      REAL KO
      S(X)=SIN(X)
      C(X)=COS(X)
      Q=3,141592/180,0
      READ(5,10002) KO,AZ
10002  FORMAT(2F8,3)
      READ(5,10003) F,R
10003  FORMAT(2F6,2)
      READ(5,10004) GA,GE
10004  FORMAT(2F7,2)
      IF(GA,GE,0.0.AND,GA,LE,180,0.AND,GE,LE,0,0.AND,GE,GE,-180,0)
1  GO TO 10012
      L=ABS(GE-GA)
      GO TO 10013
10012  L=ABS(360,0+GE-GA)
10013  READ(5,10001) (HG(K),K=1,L)
10001  FORMAT(10F6,2)
      DO 10007 K=1,L
10007  AG(K)=GA+K-1
      CONTINUE
      HGGA=HG(1)
      HGGE=HG(L)
      DEL= ARSIN(SIN(23,46*Q)*SIN(R*Q))/Q
10008  IF(DEL-F) 10008,10009,10009
      HSZO=90,0-F+DEL
      GO TO 10010
10009  HSZO=90+F-DEL
      HSZO=HSO
      IF(GA,GE,0.0.AND,GA,LE,180,0) GE=180,0-GA
      IF(GE,LT,0.0.AND,GE,GE,-180,0) GA=-180,0-GE
      IF(GE,GE,0.0.AND,GE,LE,180,0) GA=180,0-GE
      IF(GA,LT,0.0.AND,GA,GE,-180,0) GE=-180,0-GA
      DO 10011 K=1,L
10011  AG(K)=GA+K-1
      HG(K)=HG(L-K+1)
      CONTINUE
10010  IF(GA,LT,0.0.AND,GE,GT,0,0) GO TO 11301
      GO TO 11302
11301  DO 11305 K=1,L
      IF(AG(K)) 11305,11306,11306
11305  CONTINUE
11306  HGZO=HG(K-1)+(HG(K)-HG(K-1))*AG(K-1)/(AG(K-1)-AG(K))
11302  DO 10000 N=1,2
      CALL SUB1
      II=ZA(N)
      JJ=ZE(N)
      IJ=JJ-11+1
      IF(ZA(N),EQ,0.0.AND,ZE(N),EQ,0.0) GO TO 1000
      Z=ZA(N)*Q*0.25
      CALL SUB2
      ASZA= AS
      EA=ASZA
      HSZA=HS
      Z=ZE(N)*Q*0.25
      CALL SUB2

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HSZE=HS
ASZE= AS
EE=ASZE
EAE=EA-EE
EAGE=EA-GE
EAGA=EA-GA
GEEA=GE-EA
EEGE=EE-GE
GAEA=GA-EA
GEGA=GE-GA
EEGE=EE-GE
EEGA=EE-GA
GEEE=GE-EE
EEEE=EE-EA
GAE=GA-EE
GEEA=GE-EA
IF(GEGA,EQ,0,0) GO TO 1000
IF(EEEE,EQ,0,0) GO TO 1000
IF(EEEE,GT,0,0,AND,EEEE,LE,180,0,AND,GEGA,GT,0,0,AND,GEGA,LE,180,0
1,OR,GEGA,LT,-180,0) GO TO 120
IF(EEEE,GE,180,0) GO TO 340
120 IF(EA,GE,0,0,AND,EE,GE,0,0,AND,GA,GE,0,0,AND,GE,GE,0,0,AND,GA,GE,E
1E) GO TO 1000
IF(EA,GE,0,0,AND,EE,GE,0,0,AND,GA,GE,0,0,AND,GE,LE,0,0,AND,GA,GE,E
1E) GO TO 1000
IF(GE,GE,0,0,AND,EA,GE,0,0,AND,EE,GE,0,0,AND,GA,LE,0,0,AND,EA,GE,G
1E) GO TO 1000
IF(GE,LE,0,0,AND,EA,GE,0,0,AND,EE,GE,0,0,AND,GA,LE,0,0,AND,EA,GE,G
1E) GO TO 1000
IF(EA,LE,0,0,AND,EE,GE,0,0,AND,GA,GE,0,0,AND,GE,GE,0,0,AND,GA,GE,E
1E) GO TO 1000
IF(EA,LE,0,0,AND,EE,GE,0,0,AND,GA,GE,0,0,AND,GE,LE,0,0,AND,GA,GE,E
1E) GO TO 1000
IF(GA,LE,0,0,AND,GE,LE,0,0,AND,EA,LE,0,0,AND,EE,GE,0,0,AND,EA,GE,G
1E) GO TO 1000
IF(EA,LE,0,0,AND,EE,LE,0,0,AND,GA,GE,0,0,AND,GE,GE,0,0) GO TO 1000
IF(GE,LE,0,0,AND,EA,LE,0,0,AND,EE,LE,0,0,AND,GA,GE,0,0,AND,EA,GE,G
1E) GO TO 1000
IF(EA,LE,0,0,AND,EE,LE,0,0,AND,GA,LE,0,0,AND,GE,GE,0,0,AND,GA,GE,E
1E) GO TO 1000
IF(EA,LE,0,0,AND,EE,LE,0,0,AND,GA,LE,0,0,AND,GE,LE,0,0,AND,GA,GE,E
1E) GO TO 1000
IF(GA,GE,0,0,AND,GE,LE,0,0) GE=360,0+GE
IF(EE-EA,GE,GE-GA) GO TO 1
IF(EE-EA,LT,GE-GA) GO TO 2
340 IF(GA,GE,0,0,AND,GE,LT,0,0) GE=360,0+GE
IF(GE-GA,LE,360,0-EE+EA,AND,EE-EA,GE,180,0) GO TO 3
IF(GE-GA,GE,360,0-EE+EA,AND,EE-EA,GE,180,0) GO TO 4
1 IF(GA,GE,0,0,AND,GE,180,0) GE=GE-360,0
IF((EAGA,GE,0,0,OR,EAGA,LE,-180,0),AND,
1 (GEEA,GE,0,0,OR,GEEA,LE,-180,0),AND,
1 (EEGE,GE,0,0,OR,EEGE,LE,-180,0))GO TO 11
IF((GAEA,GE,0,0,OR,GAEA,LE,-180,0),AND,
1 (GEGA,GE,0,0,OR,GEGA,LE,-180,0),AND,
1 (EEGE,GE,0,0,OR,EEGE,LE,-180,0))GO TO 12
IF((GAEA,GE,0,0,OR,GAEA,LE,-180,0),AND,
1 (EEGA,GE,0,0,OR,EEGA,LE,-180,0),AND,
1 (GEEE,GE,0,0,OR,GEEE,LE,-180,0))GO TO 13
IF((EEEE,GE,0,0,OR,EEEE,LE,-180,0),AND,(GAE,GE,0,0,OR,GAE,LE,

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1-180,0),AND,(GEGA,GE,0,0,OR,GEGA,LE,-180,0))GO TO 14
2 IF(GA,GE,0,0,AND,GE,GE,180,0) GE=GE-360,0
  IF((EAGA,GE,0,0,OR,EAGA,LE,-180,0),AND,
1 ( EEEA,GE,0,0,OR,EEEA,LE,-180,0 ),AND,
1 ( GEEE,GE,0,0,OR,GEEE,LE,-180,0))GO TO 21
  IF((GAEA,GE,0,0,OR,GAEA,LE,-180,0),AND,
1 ( EEGA,GE,0,0,OR,EEGA,LE,-180,0),AND,
1 ( GEEE,GE,0,0,OR,GEEE,LE,-180,0))GO TO 22
  IF((EAGA,GE,0,0,OR,EAGA,LE,-180,0),AND,
1 (GEEA,GE,0,0,OR,GEEA,LE,-180,0),AND,
1 (EEGE,GE,0,0,OR,EEGE,LE,-180,0))GO TO 23
  IF(( EEEA,GE,0,0,OR,EEEA,LE,-180,0),AND,(GAEE,GE,0,0,OR,GAEE,LE,
1-180,0),AND,(GEGA,GE,0,0,OR,GEGA,LE,-180,0)) GO TO 24
3 IF(GA,GE,0,0,AND,GE,GE,180,0) GE=GE-360,0
  IF(EE,GE,0,0,AND,GA,GE,0,0,AND,GE,GE,0,0,
1 AND,EA,LE,0,0,AND,GA,GE,EE) GO TO 1000
  IF(EE,GE,0,0,AND,GA,GE,0,0,AND,GE,LE,0,0,
1 AND,EA,LE,0,0,AND,GA,GE,EE,AND,EA,GE,GE) GO TO 1000
  IF(EE,GE,0,0,AND,GA,LE,0,0,AND,GE,LE,0,0,AND,
1 EA,LE,0,0,AND,EA,GE,GE) GO TO 1000
  IF((GEEA,GE,0,0,OR,GEEA,LE,-180,0),AND,
1 ( EEGE,GE,0,0,OR,EEGE,LE,-180,0),AND,
2 ( GAEE,GE,0,0,OR,GAEE,LE,-180,0) ) GO TO 31
  IF((GAEA,GE,0,0,OR,GAEA,LE,-180,0),AND,
1 (GEGA,GT,0,0,OR,GEGA,LT,-180,0),AND,
2 ( EEGE,GT,0,0,OR,EEGE,LT,-180,0) ) GO TO 32
  IF((GAEA,GE,0,0,OR,GAEA,LE,-180,0),AND,
1 ( EEGA,GE,0,0,OR,EEGA,LE,-180,0),AND,
2 ( GEEE,GT,0,0,OR,GEEE,LT,-180,0) ) GO TO 33
  IF((GAEE,GE,0,0,OR,GAEE,LE,-180,0),AND,
1 ( GEGA,GE,0,0,OR,GEGA,LE,-180,0),AND,
2 ( EAGE,GE,0,0,OR,EAGE,LE,-180,0) ) GO TO 34
  IF(GA,GE,0,0,AND,GE,GE,180,0) GE=GE-360,0
  IF((GEEA,GE,0,0,OR,GEEA,LE,-180,0),AND,
1 (EEGE,GE,0,0,OR,EEGE,LE,-180,0),AND,
2 ( GAEE,GE,0,0,OR,GAEE,LE,-180,0) ) GO TO 41
  IF((GAEA,GE,0,0,OR,GAEA,LE,-180,0),AND,
1 (GEGA,GE,0,0,OR,GEGA,LE,-180,0),AND,
2 ( EEGE,GE,0,0,OR,EEGE,LE,-180,0) ) GO TO 42
  IF((GAEA,GE,0,0,OR,GAEA,LE,-180,0),AND,
1 ( EEGA,GE,0,0,OR,EEGA,LE,-180,0),AND,
2 ( GEEE,GE,0,0,OR,GEEE,LE,-180,0) ) GO TO 43
  IF((EEGA,GE,0,0,OR,EEGA,LE,-180,0),AND,(EAEE,GE,0,0,OR,EAEE,LE,
1 -180,0),AND,(GEEA,GE,0,0,OR,GEEA,LE,-180,0)) GO TO 44
11 DO 11101 I=1,L
  IF(AG(I)=ASZA) 11101,11102,11102
11101 CONTINUE
11102 HGZA=HG(I-1)+(HG(I)-HG(I-1))*(ASZA -AG(I-1))/(AG(I)-AG(I-1))
  DO 11103 K=1,J
  I=K+ZA(N)-1
  Z=I*Q*0,25
  CALL SUB2
  HS1=HS
  AS1=AS
  IF(AS1 .GE) 11103,11104,11104
11103 CONTINUE
11104 Z=(I-1)*Q*0.25
  CALL SUB2
  HS0=HS

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      ASO=AS
      HSGE=HSO+(HS1-HSO)*(GE-ASO)/(AS1-ASO)
      IF(GA,LE,0,0,AND,EA,LE,0,0,AND,GE,LE,0,0,AND,EE,LE,0,0) GO TO 111
      IF(GA,LE,0,0,AND,EA,LE,0,0,AND,GE,LE,0,0,AND,EE,GE,0,0) GO TO 112
      IF(GA,LE,0,0,AND,EA,LE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 113
      IF(GA,LE,0,0,AND,EA,GE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 114
      IF(GA,GE,0,0,AND,EA,GE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 115
      IF(GA,GE,0,0,AND,EA,LE,0,0,AND,GE,LE,0,0,AND,EE,LE,0,0) GO TO 116
12    DO 1201 K=1,IJ
      I=K+I|-1
      Z=I*Q*0,25
      CALL SUB2
      AS1=AS
      HS1=HS
1201  IF(AS1-GA) 1201,1202,1202
1202  CONTINUE
      Z=(I-1)*Q*0,25
      CALL SUB2
      ASO=AS
      HSO=HS
      HSGA=HSO+(HS1-HSO)*(GA-ASO)/(AS1-ASO)
      DO 1203      K=1,IJ
      I=K+I|-1
      Z=I*Q*0,25
      CALL SUB2
      AS1=AS
      HS1=HS
1203  IF(AS1-GE) 1203,1204,1204
1204  CONTINUE
      Z=(I-1)*Q*0,25
      CALL SUB2
      ASO=AS
      HSO=HS
      HSGE=HSO+(HS1-HSO)*(GE-ASO)/(AS1-ASO)
      IF(EA,LE,0,0,AND,GA,LE,0,0,AND,GE,LE,0,0,AND,EE,LE,0,0) GO TO 121
      IF(EA,LE,0,0,AND,GA,LE,0,0,AND,GE,LE,0,0,AND,EE,GE,0,0) GO TO 122
      IF(EA,LE,0,0,AND,GA,LE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 123
      IF(EA,LE,0,0,AND,GA,GE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 124
      IF(EA,GE,0,0,AND,GA,GE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 125
13    DO 1301      K=1,IJ
      I=K+I|-1
      Z=I*Q*0,25
      CALL SUB2
      AS1=AS
      HS1=HS
1301  IF(AS1-GA) 1301,1302,1302
1302  CONTINUE
      Z=(I-1)*Q*0,25
      CALL SUB2
      ASO=AS
      HSO=HS
      HSGA=HSO+(HS1-HSO)*(GA-ASO)/(AS1-ASO)
      DO 1303      K=1,IJ
      I=K+I|-1
      Z=I*Q*0,25
      CALL SUB2
      AS1=AS
      HS1=HS
      IF(AS1-GE) 1303,1304,1304

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1303      CONTINUE
1304      Z=(I-1)*Q*0,25
          CALL SUB2
          AS0=AS
          HSO=HS
          HSGE=HSO+(HS1-HSO)*(GE-AS0)/(AS1-AS0)
          IF(EA,LE,0,0,AND,GA,LE,0,0,AND,EE,LE,0,0,AND,GE,LE,0,0) GO TO 131
          IF(EA,LE,0,0,AND,GA,LE,0,0,AND,EE,LE,0,0,AND,GE,GE,0,0) GO TO 132
          IF(EA,LE,0,0,AND,GA,LE,0,0,AND,EE,GE,0,0,AND,GE,GE,0,0) GO TO 133
          IF(EA,LE,0,0,AND,GA,GE,0,0,AND,EE,GE,0,0,AND,GE,GE,0,0) GO TO 134
          IF(EA,GE,0,0,AND,GA,GE,0,0,AND,EE,GE,0,0,AND,GE,GE,0,0) GO TO 135
          IF(EA,GE,0,0,AND,GA,GE,0,0,AND,EE,GE,0,0,AND,GE,LE,0,0) GO TO 136
14        GO TO 1000
21        GO TO 11
22        DO 2201 I=1,L
          IF(AG(I)-ASZA ) 2201,2202,2202
2201      CONTINUE
2202      HGZA=HG(I-1)+(HG(I)-HG(I-1))*(ASZA -AG(I-1))/(AG(I)-AG(I-1))
          DO 2203 I=1,L
          IF(AG(I)-ASZE ) 2203,2204,2204
2203      CONTINUE
2204      HGZE=HG(I-1)+(HG(I)-HG(I-1))*(ASZE -AG(I-1))/(AG(I)-AG(I-1))
          IF(EA,LE,0,0,AND,GA,LE,0,0,AND,GE,LE,0,0,AND,EE,LE,0,0) GO TO 221
          IF(EA,LE,0,0,AND,GA,LE,0,0,AND,GE,LE,0,0,AND,EE,GE,0,0) GO TO 222
          IF(EA,LE,0,0,AND,GA,LE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 223
          IF(EA,LE,0,0,AND,GA,GE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 224
          IF(EA,GE,0,0,AND,GA,GE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 225
          IF(EA,GE,0,0,AND,GA,GE,0,0,AND,GE,LE,0,0,AND,EE,GE,0,0) GO TO 226
          IF(EA,LE,0,0,AND,GA,GE,0,0,AND,GE,LE,0,0,AND,EE,LE,0,0) GO TO 227
23        GO TO 13
24        GO TO 14
31        DO 3101 I=1,L
          IF(AG(I)-ASZA ) 3101,3102,3102
3101      CONTINUE
3102      HGZA=HG(I-1)+(HG(I)-HG(I-1))*(ASZA -AG(I-1))/(AG(I)-AG(I-1))
          DO 3103 K=1,J
            I=K+I-1
            Z=I*Q*0,25
            CALL SUB2
            HS1=HS
            AS1=AS
            IF(AS1 -GE) 3103,3104,3104
3103      CONTINUE
3104      Z=(I-1)*Q*0,25
          CALL SUB2
          HSO=HS
          AS0=AS
          HSGE=HSO+(HS1-HSO)*(GE-AS0)/(AS1-AS0)
          IF(EE,GE,0,0,AND,GA,GE,0,0,AND,EA,LE,0,0,AND,GE,LE,0,0) GO TO 311
          IF(EE,GE,0,0,AND,GA,LE,0,0,AND,EA,LE,0,0,AND,GE,LE,0,0) GO TO 312
          IF(EE,GE,0,0,AND,GA,LE,0,0,AND,EA,LE,0,0,AND,GE,GE,0,0) GO TO 313
312      GO TO 111
313      GO TO 113
32      IF(EA,LE,0,0,AND,GA,GE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 321
          IF(EA,LE,0,0,AND,GA,LE,0,0,AND,GE,LE,0,0,AND,EE,GE,0,0) GO TO 322
          IF(EA,LE,0,0,AND,GA,LE,0,0,AND,GE,GE,0,0,AND,EE,GE,0,0) GO TO 323
33      IF(GA,GE,0,0,AND,EE,GE,0,0,AND,GE,GE,0,0,AND,EA,LE,0,0) GO TO 331
          IF(GA,GE,0,0,AND,EE,GE,0,0,AND,GE,LE,0,0,AND,EA,LE,0,0) GO TO 332
          IF(GA,LE,0,0,AND,EE,GE,0,0,AND,GE,GE,0,0,AND,EA,LE,0,0) GO TO 333

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34      GO TO 1000
41      GO TO 31
42      GO TO 32
43      GO TO 33
44      IF(GA,GE,0,0,AND,EE,GE,0,0,AND,EA,LE,0,0,AND,GE,LE,0,0) GO TO 441
111     IF(HSZA,GE,HGZA,AND,HSGE,GT,HGGE) GO TO 1111
        IF(HSZA,LT,HGZA,AND,HSGE,GE,HGGE) GO TO 1112
        IF(HSZA,LT,HGZA,AND,HSGE,LT,HGGE) GO TO 1113
112     GO TO 111
113     IF(HSZA,GE,HGZA,AND,HSGE,GE,HGGE) GO TO 1131
        IF(HSZA,GE,HGZA,AND,HSGE,LT,HGGE) GO TO 1132
        IF(HSZA,LT,HGZA,AND,HSGE,GE,HGGE) GO TO 1133
        IF(HSZA,LT,HGZA,AND,HSGE,LT,HGGE,AND,HGZO,GE,HSZO) GO TO 1134
        IF(HSZA,LT,HGZA,AND,HSGE,LT,HGGE,AND,HGZO,LT,HSZO) GO TO 1135
114     IF(HSZA,GT,HGZA,AND,HSGE,GE,HGGE) GO TO 1141
        IF(HSZA,GE,HGZA,AND,HSGE,LT,HGGE) GO TO 1142
        IF(HSZA,LT,HGZA,AND,HSGE,LT,HGGE) GO TO 1143
115     GO TO 114
116     IF(HSZA,GE,HGZA,AND,HSGE,GT,HGGE) GO TO 1161
        IF(HSZA,LT,HGZA,AND,HSGE,GE,HGGE) GO TO 1162
        IF(HSZA,LT,HGZA,AND,HSGE,LT,HGGE) GO TO 1163
121     IF(HSGA,GE,HGGA,AND,HSGE,GT,HGGE) GO TO 1211
        IF(HSGA,LT,HGGA,AND,HSGE,GE,HGGE) GO TO 1212
        IF(HSGA,LT,HGGA,AND,HSGE,LT,HGGE) GO TO 1213
122     GO TO 121
123     IF(HGZO=HSZO) 1230,1235,1235
124     IF(HSGA,GT,HGGA,AND,HSGE,GE,HGGE) GO TO 1241
        IF(HSGA,GE,HGGA,AND,HSGE,LT,HGGE) GO TO 1242
        IF(HSGA,LT,HGGA,AND,HSGE,LT,HGGE) GO TO 1243
125     GO TO 124
131     IF(HSGA,GE,HGGA,AND,HSZE,GT,HGZE) GO TO 1311
        IF(HSGA,LT,HGGA,AND,HSZE,GT,HGZE) GO TO 1312
        IF(HSGA,LT,HGGA,AND,HSZE,LT,HGZE) GO TO 1313
132     GO TO 131
133     IF(HSGA,GE,HGGA,AND,HSZE,GE,HGZE,AND,HSZO,GT,HGZO) GO TO 1331
        IF(HSGA,LT,HGGA,AND,HSZE,GE,HGZE,AND,HSZO,GT,HGZO) GO TO 1332
        IF(HSGA,GE,HGGA,AND,HSZE,LT,HGZE,AND,HSZO,GT,HGZO) GO TO 1333
        IF(HSGA,LT,HGGA,AND,HSZE,LT,HGZE,AND,HSZO,GT,HGZO) GO TO 1334
        IF(HSGA,LT,HGGA,AND,HSZE,LT,HGZE,AND,HSZO,LE,HGZO) GO TO 1335
134     IF(HSGA,GT,HGGA,AND,HSZE,GE,HGZE) GO TO 1341
        IF(HSGA,GT,HGGA,AND,HSZE,LT,HGZE) GO TO 1342
        IF(HSGA,LE,HGGA,AND,HSZE,LT,HGZE) GO TO 1343
135     GO TO 134
136     GO TO 134
221     IF(HSZA ,GE,HGZA,AND,HSZE ,GT,HGZE) GO TO 2211
        IF(HSZA ,LT,HGZA,AND,HSZE ,GE,HGZE) GO TO 2212
        IF(HSZA ,LT,HGZA,AND,HSZE ,LT,HGZE) GO TO 2213
222     GO TO 221
223     IF(HGZO=HSZO) 22301,22302,22302
22301   IF(HSZA ,GE,HGZA,AND,HSZE ,GE,HGZE) GO TO 2231
        IF(HSZA ,GE,HGZA,AND,HSZE ,LT,HGZE) GO TO 2232
        IF(HSZA ,LT,HGZA,AND,HSZE ,GE,HGZE) GO TO 2233
        IF(HSZA ,LT,HGZA,AND,HSZE ,LT,HGZE) GO TO 2234
22302   GO TO 2235
224     IF(HSZA ,GT,HGZA,AND,HSZE ,GE,HGZE) GO TO 2241
        IF(HSZA ,GE,HGZA,AND,HSZE ,LT,HGZE) GO TO 2242
        IF(HSZA ,LT,HGZA,AND,HSZE ,LT,HGZE) GO TO 2243
225     GO TO 224
226     IF(HSZA ,GT,HGZA,AND,HSZE ,GE,HGZE) GO TO 2261

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      IF(HSZA ,GE,HGZA,AND,HSZE ,LT,HGZE) GO TO 2262
      IF(HSZA ,LT,HGZA,AND,HSZE ,LT,HGZE) GO TO 2263
227   IF(HSZA ,GE,HGZA,AND,HSZE ,GT,HGZE) GO TO 2271
      IF(HSZA ,LT,HGZA,AND,HSZE ,GE,HGZE) GO TO 2272
      IF(HSZA ,LT,HGZA,AND,HSZE ,LT,HGZE) GO TO 2273
311   IF(HSZA,GE,HGZA,AND,HSZE,GT,HGGE) GO TO 3111
      IF(HSZA,LT,HGZA,AND,HSZE,GE,HGGE) GO TO 3112
      IF(HSZA,LT,HGZA,AND,HSZE,LT,HGGE) GO TO 3113
321   GO TO 124
322   GO TO 121
323   GO TO 123
331   GO TO 125
332   GO TO 135
333   DO 3301 K=1,IJ
      Z=I*Q*0,25
      CALL SUB2
      AS1=AS
      HS1=HS
      IF(AS1-GA)3301,3302,3302
3301   CONTINUE
3302   Z=(I-1)*Q*0,25
      CALL SUB2
      AS0=AS
      HS0=HS
      HSGA=HS0+(HS1-HS0)*(GA-AS0)/(AS1-AS0)
      DO 3303 I=1,L
      IF(AG(I)-ASZE ) 3303,3304,3304
3303   CONTINUE
3304   HGZE=HG(I-1)+(HG(I)-HG(I-1))*(ASZE -AG(I-1))/(AG(I)-AG(I-1))
      IF(HGZ0=HSZ0) 3305,3306,3306
3305   IF(HSGA,GE,HGGA,AND,HSZE,GE,HGZE) GO TO 3331
      IF(HSGA,GE,HGGA,AND,HSZE,LT,HGZE) GO TO 3332
      IF(HSGA,LT,HGGA,AND,HSZE,LT,HGZE) GO TO 3333
      IF(HSGA,LT,HGGA,AND,HSZE,GE,HGZE) GO TO 3334
3306   GO TO 3335
441   DO 4401 I=1,L
      IF(AG(I)-ASZA) 4401,4402,4402
4401   CONTINUE
4402   HGZA=HG(I-1)+(HG(I)-HG(I-1))*(ASZA -AG(I-1))/(AG(I)-AG(I-1))
      DO 4403 I=1,L
      IF(AG(I)-ASZE) 4403,4404,4404
4403   CONTINUE
4404   HGZE=HG(I-1)+(HG(I)-HG(I-1))*(ASZE -AG(I-1))/(AG(I)-AG(I-1))
      DO 4405 K=1,IJ
      I=K+I-1
      Z=I*Q*0,25
      CALL SUB2
      AS1=AS
      HS1=HS
      IF(AS1-GA) 4405,4406,4406
4405   CONTINUE
4406   Z=(I-1)*Q*0,25
      CALL SUB2
      AS0=AS
      HS0=HS
      HSGA=HS0+(HS1-HS0)*(GA-AS0)/(AS1-AS0)
      DO 4407 K=1,IJ
      I=K+I-1
      Z=I*Q*0,25

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```

      CALL SUB2
      AS1=AS
      HS1=HS
      IF (AS1-GE) 4407,4408,4408
4407   CONTINUE
4408   Z=(I-1)*Q*0,25
      CALL SUB2
      AS0=AS
      HS0=HS
      HSGE=HS0+(HS1-HS0)*(GE-AS0)/(AS1-AS0)
      IF (HSZE,GE,HGZE,AND,HSZA,GE,HGGA) GO TO 4411
      IF (HSZE,LT,HGZE,AND,HSZA,GE,HGGA,AND,HSGA,GE,HGGA) GO TO 4412
      IF (HSZE,GE,HGZE,AND,HSZA,LT,HGGA,AND,HSGE,GE,HGGE) GO TO 4413
      IF (HSZE,GE,HGZE,AND,HSZA,LT,HGGA,AND,HSGE,LT,HGGE) GO TO 4414
      IF (HSZE,LT,HGZE,AND,HSZA,GE,HGGA,AND,HSGA,LT,HGGA) GO TO 4415
      IF (HSZE,LT,HGZE,AND,HSZA,LT,HGGA,AND,HSGE,GE,HGGE ,AND,
1HSGA,GE,HGGA) GO TO 4416
      IF (HSZE,LT,HGZE,AND,HSZA,LT,HGGA,AND,HSGE,LT,HGGE ,AND,
1HSGA,LT,HGGA) GO TO 4417
      IF (HSZE,LT,HGZE,AND,HSZA,LT,HGGA,AND,HSGE,LT,HGGE ,AND,
1HSGA,GE,HGGA) GO TO 4418
      IF (HSZE,LT,HGZE,AND,HSZA,LT,HGGA,AND,HSGE,GE,HGGE ,AND,
1HSGA,LT,HGGA) GO TO 4419
1111   WRITE(6,4111)
      GO TO 1000
1112   WRITE(6,4112)
      CALL AUF3
      STO(N)=STO3(N)
      GO TO 10000
1113   WRITE(6,4113)
      CALL AUF4
      STO(N)=STO4(N)
      GO TO 10000
1131   WRITE(6,41131)
      GO TO 1000
1132   WRITE(6,41132)
      CALL AUF5
      STO(N)=STO5(N)
      GO TO 10000
1133   WRITE(6,41133)
      CALL AUF3
      STO(N)=STO3(N)
      GO TO 10000
1134   WRITE(6,41134)
      CALL AUF3
      CALL AUF5
      STO(N)=STO3(N)+STO5(N)
      GO TO 10000
1135   WRITE(6,41135)
      CALL AUF6
      STO(N)=STO6(N)+ZA(N)
      GO TO 10000
1141   WRITE(6,41141)
      GO TO 1000
1142   WRITE(6,41142)
      CALL AUF5
      STO(N)=STO5(N)
      GO TO 10000
1143   WRITE(6,41143)

```

```

CALL AUF7
  STO(N)=STO7(N)
  GO TO 10000
1161   WRITE(6,41161)
      GO TO 1000
1162   WRITE(6,41162)
      CALL AUF3
      STO(N)=STO3(N)
      GO TO 10000
1163   WRITE(6,41163)
      CALL AUF4
      STO(N)=STO4(N)
      GO TO 10000
1211   WRITE(6,41211)
      GO TO 1000
1212   WRITE(6,41212)
      CALL AUF8
      STO(N)=STO8(N)
      GO TO 10000
1213   WRITE(6,41213)
      CALL AUF9
      GO TO 10000
1230   WRITE(6,41230)
      IF(HSGA,GE,HGGA,AND,HSGE,GE,HGGE) GO TO 1231
      IF(HSGA,GE,HGGA,AND,HSGE,LT,HGGE) GO TO 1232
      IF(HSGA,LT,HGGA,AND,HSGE,GE,HGGE) GO TO 1233
      IF(HSGA,LT,HGGA,AND,HSGE,LT,HGGE) GO TO 1234
1231   WRITE(6,41231)
      GO TO 1000
1232   WRITE(6,41232)
      CALL AUF5
      STO(N)=STO5(N)
      GO TO 10000
1233   WRITE(6,41233)
      CALL AUF8
      STO(N)=STO8(N)
      GO TO 10000
1234   WRITE(6,41234)
      CALL AUF8
      CALL AUF5
      STO(N)=STO5(N)+STO8(N)
      GO TO 10000
1235   WRITE(6,41235)
      CALL AUF6
      CALL AUF12
      STO(N)=STO6(N)+STO12(N)
      GO TO 10000
1241   WRITE(6,41241)
      GO TO 1000
1242   WRITE(6,41242)
      CALL AUF5
      STO(N)=STO5(N)
      GO TO 10000
1243   WRITE(6,41243)
      CALL AUF9
      STO(N)=STO9(N)
      GO TO 10000
1311   WRITE(6,41311)
      GO TO 1000

```

```
1312     WRITE(6,41312)
        CALL AUF8
        STO(N)=STO8(N)
        GO TO 10000
1313     WRITE(6,41313)
        CALL AUF10
        STO(N)=STO10(N)
        GO TO 10000
1331     WRITE(6,41331)
        GO TO 1000
1332     WRITE(6,41332)
        CALL AUF8
        STO(N)=STO8(N)
        GO TO 10000
1333     WRITE(6,41333)
        CALL AUF11
        STO(N)=STO11(N)
        GO TO 10000
1334     WRITE(6,41334)
        CALL AUF8
        STO(N)=STO11(N) +STO8(N)
        GO TO 10000
1335     WRITE(6,41335)
        CALL AUF8
        STO(N)=STO8(N) +ZE(N)
        GO TO 10000
1341     WRITE(6,41341)
        GO TO 1000
1342     WRITE(6,41342)
        CALL AUF11
        STO(N)=STO11(N)
        GO TO 10000
1343     WRITE(6,41343)
        CALL AUF10
        STO(N)=STO10(N)
        GO TO 10000
2211     WRITE(6,42211)
        GO TO 1000
2212     WRITE(6,42212)
        CALL AUF3
        STO(N)=STO3(N)
        GO TO 10000
2213     WRITE(6,42213)
        STO(N)=ZE(N)-ZA(N)
        GO TO 10000
2231     WRITE(6,42231)
        GO TO 1000
2232     WRITE(6,42232)
        CALL AUF11
        STO(N)=STO11(N)
        GO TO 10000
2233     WRITE(6,42233)
        CALL AUF3
        STO(N)=STO3(N)
        GO TO 10000
2234     WRITE(6,42234)
        CALL AUF3
        CALL AUF11
        STO(N)=STO3(N)+STO11(N)
```

```
2235 GO TO 10000
      WRITE(6,42235)
      STO(N)=ZE(N)-ZA(N)
      GO TO 10000
2241 WRITE(6,42241)
      GO TO 1000
2242 WRITE(6,42242)
      CALL AUF11
      STO(N)=STO11(N)
      GO TO 10000
2243 WRITE(6,42243)
      STO(N)=ZE(N)-ZA(N)
      GO TO 10000
2261 WRITE(6,42261)
      GO TO 1000
2262 WRITE(6,42262)
      CALL AUF11
      STO(N)=STO11(N)
      GO TO 10000
2263 WRITE(6,42263)
      STO(N)=ZE(N)-ZA(N)
      GO TO 10000
2271 WRITE(6,42271)
      GO TO 1000
2272 WRITE(6,42272)
      CALL AUF3
      STO(N)=STO3(N)
      GO TO 10000
2273 WRITE(6,42273)
      STO(N)=ZE(N)-ZA(N)
      GO TO 10000
3111 WRITE(6,43111)
      GO TO 1000
3112 WRITE(6,43112)
      CALL AUF3
      STO(N)=STO3(N)
      GO TO 10000
3113 WRITE(6,43113)
      CALL AUF4
      STO(N)=STO4(N)
      GO TO 10000
3331 WRITE(6,43331)
      GO TO 1000
3332 WRITE(6,43332)
      CALL AUF11
      STO(N)=STO11(N)
      GO TO 10000
3333 WRITE(6,43333)
      CALL AUF8
      CALL AUF11
      STO(N)=STO8(N)+STO11(N)
      GO TO 10000
3334 WRITE(6,43334)
      CALL AUF8
      STO(N)=STO8(N)
      GO TO 10000
3335 WRITE(6,43335)
      CALL AUF12
      STO(N)=STO12(N)+ZE(N)
```

```

      GO TO 10000
4411  WRITE(6,44411)
      GO TO 1000
4412  WRITE(6,44412)
      CALL AUF11
      STO(N)=STO11(N)
      GO TO 10000
4413  WRITE(6,44413)
      CALL AUF3
      STO(N)=STO3(N)
      GO TO 10000
4414  WRITE(6,44414)
      CALL AUF4
      STO(N)=STO4(N)
      GO TO 10000
4415  WRITE(6,44415)
      CALL AUF5
      STO(N)=STO5(N)
      GO TO 10000
4416  WRITE(6,44416)
      CALL AUF11
      CALL AUF3
      STO(N)=STO11(N) +STO3(N)
      GO TO 10000
4417  WRITE(6,44417)
      CALL AUF4
      CALL AUF13
      STO(N)=STO4(N)+STO13(N)
      GO TO 10000
4418  WRITE(6,44418)
      CALL AUF4
      CALL AUF11
      STO(N)=STO11(N)+STO4(N)
      GO TO 10000
4419  WRITE(6,44419)
      CALL AUF13
      CALL AUF3
      STO(N)=STO3(N)+STO13(N)
      GO TO 10000
1000  STO(N)=0,0
10000 CONTINUE
      STORP=(STO(1)+STO(2))/ (ZE(1)-ZA(1)+ZE(2)-ZA(2))
      WRITE(6,770) GA,GE
      WRITE(6,771) (HG(K),K=1,L)
      WRITE(6,772) STO(1),STO(2)
      WRITE(6,777) R,KO,AZ,F,ZE(1),ZA(1),ZE(2),ZA(2),STORP
      WRITE(6,4500)
770   FORMAT(1H0,2HGA,F7,2,2HGE,F7,2)
771   FORMAT(1H0,2HHG,10F6.2)
772   FORMAT(1H0,5HSTO1=,F7,2,5HSTO2=,F7,2)
777   FORMAT(1H0,4F10,2,4F6,1,F8,4)
4500  FORMAT(1H0,9X,1HR,8X,2HKO,8X,2HAZ,9X,1HF,6H   ZE1,6H   ZA1,6H   ZE
12,6H   ZA2,8H STORUNG)
41111 FORMAT(1H0,8HPASS1111)
41112 FORMAT(1H0,8HPASS1112)
41113 FORMAT(1H0,8HPASS1113)
41131 FORMAT(1H0,8HPASS1131)
41132 FORMAT(1H0,8HPASS1132)
41133 FORMAT(1H0,8HPASS1133)

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Verfisterung des Sonnenscheindaurs durch Gebäude

```
41134 FORMAT(1HO,8HPASS1134)
41135 FORMAT(1HO,8HPASS1135)
41141 FORMAT(1HO,8HPASS1141)
41142 FORMAT(1HO,8HPASS1142)
41143 FORMAT(1HO,8HPASS1143)
41161 FORMAT(1HO,8HPASS1161)
41162 FORMAT(1HO,8HPASS1162)
41163 FORMAT(1HO,8HPASS1163)
41211 FORMAT(1HO,8HPASS1211)
41212 FORMAT(1HO,8HPASS1212)
41213 FORMAT(1HO,8HPASS1213)
41230 FORMAT(1HO,8HPASS1230)
41231 FORMAT(1HO,8HPASS1231)
41232 FORMAT(1HO,8HPASS1232)
41233 FORMAT(1HO,8HPASS1233)
41234 FORMAT(1HO,8HPASS1234)
41235 FORMAT(1HO,8HPASS1235)
41241 FORMAT(1HO,8HPASS1241)
41242 FORMAT(1HO,8HPASS1242)
41243 FORMAT(1HO,8HPASS1243)
41311 FORMAT(1HO,8HPASS1311)
41312 FORMAT(1HO,8HPASS1312)
41313 FORMAT(1HO,8HPASS1313)
41331 FORMAT(1HO,8HPASS1331)
41332 FORMAT(1HO,8HPASS1332)
41333 FORMAT(1HO,8HPASS1333)
41334 FORMAT(1HO,8HPASS1334)
41335 FORMAT(1HO,8HPASS1335)
41341 FORMAT(1HO,8HPASS1341)
41342 FORMAT(1HO,8HPASS1342)
41343 FORMAT(1HO,8HPASS1343)
42211 FORMAT(1HO,8HPASS2211)
42212 FORMAT(1HO,8HPASS2212)
42213 FORMAT(1HO,8HPASS2213)
42231 FORMAT(1HO,8HPASS2231)
42232 FORMAT(1HO,8HPASS2232)
42233 FORMAT(1HO,8HPASS2233)
42234 FORMAT(1HO,8HPASS2234)
42235 FORMAT(1HO,8HPASS2235)
42241 FORMAT(1HO,8HPASS2241)
42242 FORMAT(1HO,8HPASS2242)
42243 FORMAT(1HO,8HPASS2243)
42261 FORMAT(1HO,8HPASS2261)
42262 FORMAT(1HO,8HPASS2262)
42263 FORMAT(1HO,8HPASS2263)
42271 FORMAT(1HO,8HPASS2271)
42272 FORMAT(1HO,8HPASS2272)
42273 FORMAT(1HO,8HPASS2273)
43111 FORMAT(1HO,8HPASS3111)
43112 FORMAT(1HO,8HPASS3112)
43113 FORMAT(1HO,8HPASS3113)
43331 FORMAT(1HO,8HPASS3331)
43332 FORMAT(1HO,8HPASS3332)
43333 FORMAT(1HO,8HPASS3333)
43334 FORMAT(1HO,8HPASS3334)
43335 FORMAT(1HO,8HPASS3335)
44411 FORMAT(1HO,8HPASS4411)
44412 FORMAT(1HO,8HPASS4412)
44413 FORMAT(1HO,8HPASS4413)
44414 FORMAT(1HO,8HPASS4414)
44415 FORMAT(1HO,8HPASS4415)
44416 FORMAT(1HO,8HPASS4416)
44417 FORMAT(1HO,8HPASS4417)
44418 FORMAT(1HO,8HPASS4418)
44419 FORMAT(1HO,8HPASS4419)
STOP
END
```



```

      SUBROUTINE SUB1
      COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II, JJ, IJ,
1  STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
      REAL KO
      PZ=66.55
      Q=3,14159/180.0
      PAI=3,14159
      DO 4 N=1,2
      SD=SIN(R*Q)*SIN(23,45*Q)
      TD=SD/SQRT(1,0-SD**2)
      D=ATAN(TD)
      D=D/Q
      IF(R) 2222,3333,4445
2222 IF(F) 200,200,300
200 ZIKA=PAI/2,0
      GO TO 480
300 IF(F=90,0) 400,410,410
3333 ZIKA=PAI/2,0
      GO TO 480
4445 IF(F) 200,200,333
333 IF(F=90,0) 420,430,430
400 B=-TAN(F*Q)*TD
      IF(ABS(B),LT,1,0E-5) GO TO 200
      IF(B=1,0) 440,450,450
410 ZIKA=0,0
      GO TO 480
420 B=-TAN(F*Q)*TD
      IF(ABS(B),LT,1,0E-5) GO TO 200
      IF(B=1,0) 460,460,470
430 ZIKA=PAI
      GO TO 480
440 ZIKA=ABS(ATAN(SQRT(1,0-B**2)/B))
      GO TO 480
450 ZIKA=0,0
      GO TO 480
460 ZIKA=PAI
      GO TO 480
470 ZIKA=PAI-ABS(ATAN(SQRT(1,0-B**2)/B))
480 U=KO*Q
      V=F*Q
      W=AZ*Q
      SAL=SIN(U)*SIN(V)-COS(U)*COS(V)*COS(W)
      XX=SAL
      IF(XX) 302,303,304
302 IF(XX+0.99999) 305,305,306
304 IF(XX=0.99999) 307,308,308
303 AAL=0,0
      GO TO 310
305 AAL=-90,0*Q
      GO TO 309
306 AAL=-ABS(ARSIN(XX) )
      GO TO 310
307 AAL=ABS(ARSIN(XX))
      GO TO 310
308 AAL=90,0*Q
309 AA=0,0
      GO TO 330
310 CA=(SIN(U)*COS(V)+COS(U)*SIN(V)*COS(W))/SQRT(1,0-XX**2)

```

```

      YY=CA
      IF(ABS(YY),LT,1.0E-5)          GO TO 312
      IF(YY,LE,-1.00000)             GO TO 321
      IF(YY,GT,-1.0,AND,YY,LT,-1.0E-5) GO TO 322
      IF(YY,GT,1.0E-5,AND,YY,LT,1.0) GO TO 323
      IF(YY,GE,1.0)                  GO TO 324
312  AA=90.0*Q
      GO TO 330
321  AA=180.0*Q
      GO TO 330
322  AA=180.0*Q-ARCOS(ABS(YY))
      GO TO 330
323  AA=+ARCOS(ABS(YY))
      GO TO 330
324  AA=0.0
330  A=AA/Q
      AL=AAL/Q
      IF(R)                          490,500,510
490  IF(AL)                          520,530,540
500  PSI=PAI/2.0
      GO TO 740
510  IF(AL)                          630,640,650
520  IF(AL+90.0)                    550,550,560
530  PSI=PAI/2.0
      GO TO 740
540  IF(AL-90.0)                    590,600,600
550  PSI=PAI
      GO TO 740
560  C=-TAN(AL*Q)*TD
      IF(ABS(C),LT,1.0E-5)          GO TO 640
      IF(C+1.0)                    570,570,580
570  PSI=PAI
      GO TO 740
580  PSI=PAI-ABS(ATAN(SQRT(1.0-C**2)/C))
      GO TO 740
590  C=-TAN(AL*Q)*TD
      IF(ABS(C),LT,1.0E-5)          GO TO 640
      IF(C-1.0)                    610,620,620
600  PSI=0.0
      GO TO 740
610  PSI=ABS(ATAN(SQRT(1.0-C**2)/C))
      GO TO 740
620  PSI=0.0
      GO TO 740
630  IF(AL+90.0)                    660,660,670
640  PSI=PAI/2.0
      GO TO 740
650  IF(AL-90.0)                    700,710,710
660  PSI=0.0
      GO TO 740
670  C=-TAN(AL*Q)*TD
      IF(ABS(C),LT,1.0E-5)          GO TO 640
      IF(C-1.0)                    680,690,690
680  PSI=ABS(ATAN(SQRT(1.0-C**2)/C))
      GO TO 740
690  PSI=0.0
      GO TO 740
700  C=-TAN(AL*Q)*TD
      IF(ABS(C),LT,1.0E-5)          GO TO 640

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```

IF(C+1,0)                                720,720,730
710 PSI=PAI
GO TO 740
720 PSI=PAI
GO TO 740
730 PSI=PAI-ABS(ATAN(SQRT(1,0-C**2)/C))
740 T=ZIKA/Q
      P=PSI/Q
      IF(AL,EQ,-90,0)                       GO TO 5
      IF(AL,EQ,-F)                           GO TO 6
      IF(AL,LT,-F,AND,AL,GT,-90,0)          GO TO 7
      IF(AL,LT,0,0,AND,AL,GT,-F)           GO TO 8
      IF(AL,LT,F,AND,AL,GT,0,0)             GO TO 9
      IF(AL,EQ,0,0)                           GO TO 100
      IF(AL,EQ,F)                              GO TO 11
      IF(AL,GT,F,AND,AL,LT,90,0)            GO TO 12
      IF(AL,EQ,90,0)                          GO TO 13
5      IF(ABS(D),LT,1.0E-5)                  GO TO 10
      IF(D)                                    19,10,10
6      IF(ABS(D),LT,1.0E-5)                  GO TO 15
      IF(D)                                    17,15,18
7      IF(ABS(D),LT,1.0E-5)                  GO TO 15
      IF(D)                                    24,15,25
8      IF(ABS(D),LT,1.0E-5)                  GO TO 15
      IF(D)                                    34,15,35
9      IF(ABS(D),LT,1.0E-5)                  GO TO 15
      IF(D)                                    43,15,44
10     IF(N,EQ,1)   GO TO 10010
      IF(N,EQ,1)   GO TO 20010
10010  ZA(N)=0,0
      ZE(N)=0,0
GO TO 4
20010  ZA(N)=0,0
      ZE(N)=0,0
GO TO 4
11     IF(ABS(D),LT,1.0E-5)                  GO TO 15
      IF(D)                                    59,15,60
12     IF(ABS(D),LT,1.0E-5)                  GO TO 15
      IF(D)                                    67,15,68
13     IF(ABS(D),LT,1.0E-5)                  GO TO 19
      IF(D)                                    10,19,19
14     IF(N,EQ,1)   GO TO 10014
      IF(N,EQ,2)   GO TO 20014
10014  ZA(N)=4,0*(A-P)
      ZE(N)=4,0*(A+P)
GO TO 4
20014  ZA(N)=0,0
      ZE(N)=0,0
GO TO 4
15     IF(N,EQ,1)   GO TO 10015
      IF(N,EQ,2)   GO TO 20015
10015  ZA(N)=4,0*(A-P)
      ZE(N)=4,0*T
GO TO 4
20015  ZA(N)=0,0
      ZE(N)=0,0
GO TO 4
16     IF(N,EQ,1)   GO TO 10016
      IF(N,EQ,2)   GO TO 20016

```

```

10016      ZA(N)=4,0*(-T)
           ZE(N)=4,0*(A+P)
           GO TO 4
20016      ZA(N)=4,0*(A-P)
           ZE(N)=4,0*T
           GO TO 4
17  IF(F=PZ)                20,21,21
18  IF(F=PZ)                22,23,23
19      IF(N,E0,1) GO TO 10019
           IF(N,E0,2) GO TO 20019
10019      ZA(N)=4,0*(-T)
           ZE(N)=4,0*T
           GO TO 4
20019      ZA(N)=0,0
           ZE(N)=0,0
           GO TO 4
20  IF(A-P+T)                19,19,15
21  IF(F-90,0=D)            20,10,10
22  IF(A-T+P)                14,14,15
23  IF(F-90,0=D)            22,10,10
24  IF(F=PZ)                 26,27,27
25  IF(F=PZ)                 30,31,31
26  IF(AL+90,0=D)           19,19,28
27  IF(F-90,0=D)            26,10,10
28  IF(A-P+T)                19,19,29
29  IF(A+T+P-360,0)          15,15,16
30  IF(AL+90,0=D)            10,10,32
31  IF(F-90,0=D)            30,10,10
32  IF(A-T+P)                14,14,33
33  IF(A-T-P)                15,10,10
34  IF(F=PZ)                 36,37,37
35  IF(F=PZ)                 39,40,40
36  IF(A-P+T)                19,19,38
37  IF(F-90,0=D)            36,10,10
38  IF(A-T-P)                15,10,10
39  IF(A-T+P)                14,14,41
40  IF(F-90,0=D)            39,42,42
41  IF(A+T+P-360,0)          15,15,16
42  IF(AL+90,0=D)            10,10,14
43  IF(F=PZ)                 45,46,46
44  IF(F=PZ)                 48,49,49
45  IF(A-P+T)                19,19,47
46  IF(F-90,0=D)            45,10,10
47  IF(A-T-P)                15,10,10
48  IF(A-T+P)                14,14,50
49  IF(F-90,0=D)            48,14,14
50  IF(A+T+P-360,0)          15,15,16
51  IF(F=PZ)                 53,54,54
52  IF(F=PZ)                 56,57,57
53  IF(A-90,0+T)            19,19,55
54  IF(F-90,0=D)            53,10,10
55  IF(A-90,0-T)            15,10,10
56  IF(A-T+90,0)            14,14,58
57  IF(F-90,0=D)            56,14,14
58  IF(A-270,0+T)            15,15,16
59  IF(F=PZ)                 61,62,62
60  IF(F=PZ)                 64,65,65
61  IF(A-P+T)                19,19,63
62  IF(F-90,0=D)            61,10,10
63  IF(A-T-P)                15,10,10
64  IF(A-T+P)                14,14,66
65  IF(F-90,0=D)            64,19,19
66  IF(A+T+P-360,0)          15,15,16
67  IF(F=PZ)                 69,70,70
68  IF(F=PZ)                 73,74,74
69  IF(AL-90,0=D)            71,10,10
70  IF(F-90,0=D)            69,10,10
71  IF(A-T+P)                14,14,72
72  IF(A-T-P)                15,10,10
73  IF(AL-90,0=D)            75,19,19
74  IF(F-90,0=D)            73,19,19
75  IF(A-P+T)                19,19,76
76  IF(A+T+P-360,0)          15,15,16
100  IF(ABS(D),LT.1,0E=5)   GO TO 15
           IF(D)              51,15,52
4  CONTINUE
   RETURN
END

```

```

SUBROUTINE SUB2
COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
REAL KO
S(W)=SIN(W)
C(W)=COS(W)
SH(X,Y,Z)=S(X)*S(Y)+C(X)*C(Y)*C(Z)
CH(X,Y,Z)=SQRT(1,0-SH(X,Y,Z)**2)
SA(X,Y,Z)=C(Y)*S(Z)/CH(X,Y,Z)
A(X,Y,Z)=ARSIN(ABS(SA(X,Y,Z)))*180,0/3,141592
TP(X,Y)=ARCOS(ABS(TAN(Y)/TAN(X)))
H(X,Y,Z)=ARSIN(SH(X,Y,Z))
TT(X,Y)=-TAN(X)*TAN(Y)
Q=3.141592/180,0
X=F*Q
SD=SIN((23,0+27,0/60,0)*Q)*SIN(R*Q)
TD=SD/SQRT(1,0-SD**2)
D=ATAN(TD)
Y=D
D=D/Q
IF(F, EQ, 90, 0) GO TO 6
IF(TT(X,Y), LE, -1, 0) TZO =180, 0*Q
IF(TT(X,Y), GE, +1, 0) TZO =0, 0
IF(TT(X,Y), GT, -1, 0, AND, TT(X,Y), LT, +1, 0) TZO =ARCOS(TT(X,Y))
GO TO 9
6 IF(Y) 7, 7, 8
7 TZO=0, 0
GO TO 9
8 TZO=180, 0*Q
9 TO=TZO/Q
IF(SH(X,Y,Z), LE, -0, 999998) GO TO 31
IF(SH(X,Y,Z), GE, +0, 999998) GO TO 32
HS =H(X,Y,Z)/Q
IF(Y) 10, 10, 11
10 IF(Z, LT, 0, 0) AS=-A(X,Y,Z)
IF(Z, EQ, 0, 0) AS=0, 0
IF(Z, GT, 0, 0) AS=A(X,Y,Z)
TPV=0, 0
GO TO 30
11 IF(X-Y) 12, 12, 13
12 IF(Z, LT, 0, 0) AS=-A(X,Y,Z)
IF(Z, EQ, 0, 0) AS=0, 0
IF(Z, GT, 0, 0) AS=A(X,Y,Z)
TPV=0, 0
GO TO 30
13 TPV=TP(X,Y)
IF(Z, LT, -TPV) AS=-180, 0+A(X,Y,Z)
IF(Z, EQ, -TPV) AS=-90, 0
IF(Z, GT, -TPV, AND, Z, LT, 0, 0) AS=-A(X,Y,Z)
IF(Z, EQ, 0, 0) AS=0, 0
IF(Z, GT, 0, 0, AND, Z, LT, TPV) AS=A(X,Y,Z)
IF(Z, EQ, TPV) AS=90, 0
IF(Z, GT, TPV) AS=180, 0-A(X,Y,Z)
GO TO 30
31 HS =-90, 0
TPV=180, 0
AS=0, 0
GO TO 30
32 HS=90, 0
TPV=0, 0
AS=0, 0
30 RETURN
END

```

```

SUBROUTINE AUF3
COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
REAL KO
DO 50 N=1,2
L=100
Q=3,141592/180,0
II=ZA(N)
JJ=ZE(N)
IJ=JJ-II+1
DO 1 KK=1,IJ
I=KK+II-1
Z=FLOAT(I)*Q*0,25
CALL SUB2
AS1=AS
HS1=HS
DO 2 K=1,L
IF(AG(K)-AS1 ) 2,3,3
CONTINUE
2
3 HGI=HG(K-1)+(HG(K)-HG(K-1))*(AS1 -AG(K-1))/(AG(K)-AG(K-1))
IF(HS1 -HGI) 1,4,4
1
4 CONTINUE
Z=FLOAT(I-1)*Q*0,25
CALL SUB2
ASO=AS
HSO=HS
DO 5 M=1,L
IF(AG(M)-ASO ) 5,6,6
5
6 HGM=HG(M-1)+(HG(M)-HG(M-1))*(ASO -AG(M-1))/(AG(M)-AG(M-1))
ZO(N)= (HGM-HSO)/(HGM-HSO+HS1-HGI) +FLOAT(I-1)
STO3(N)=ZO(N)-ZA(N)
50 CONTINUE
RETURN
END

```

```

SUBROUTINE AUF4
COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
REAL KO
DO 50 N=1,2
Q=3,141592/180,0
II=ZA(N)
JJ=ZE(N)
IJ=JJ-II+1
DO 1 KK=1,IJ
I=KK+II-1
Z=FLOAT(I)*Q*0,25
CALL SUB2
IF(AS -GE) 1,2,2
1
2 CONTINUE
AS1=AS
Z=FLOAT(I-1)*Q*0,25
CALL SUB2
ASO=AS
ZGE(N)= (GE-ASO)/(AS1-ASO) +FLOAT(I-1)
STO4(N)=ZGE(N)-ZA(N)
50 CONTINUE
RETURN
END

```

```

SUBROUTINE AUF5
COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
REAL KO
DO 50 N=1,2
Q=3,141592/180.0
II=ZA(N)
JJ=ZE(N)
IJ=JJ-II+1
DO 1 KK=1,IJ
I=KK+II-1
L=100
Z=FLOAT(I)*Q*0,25
CALL SUB2
AS1=AS
HS1=HS
DO 2 K=1,L
IF(AG(K)-AS1 ) 2,3,3
CONTINUE
2
3 HGI=HG(K-1)+(HG(K)-HG(K-1))*(AS1 -AG(K-1))/(AG(K)-AG(K-1))
IF(HS1 -HGI) 4,4,1
1
4 Z=FLOAT(I-1)*Q*0,25
CALL SUB2
AS0=AS
HS0=HS
DO 5 M=1,L
IF(AG(M)-AS0 ) 5,6,6
CONTINUE
5
6 HGM=HG(M-1)+(HG(M)-HG(M-1))*(AS0 -AG(M-1))/(AG(M)-AG(M-1))
ZO(N)= (HGM-HS0)/(HGM-HS0+HS1-HGI) +FLOAT(I-1)
CALL AUF3
CALL AUF4
STO5(N)=ZGE(N)-ZO(N)
50 CONTINUE
RETURN
END

```

```

SUBROUTINE AUF6
COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
REAL KO
DO 50 N=1,2
CALL AUF4
STO6(N)=ZGE(N)
50 CONTINUE
RETURN
END

```

```

SUBROUTINE AUF7
COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
REAL KO
DO 50 N=1,2
CALL AUF5
STO7(N)=ZGE(N)-ZA(N)
50 CONTINUE
RETURN
END

```

```

SUBROUTINE AUF8
COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
REAL KO
DO 50 N=1,2
Q=3.141592/180,0
II=ZA(N)
JJ=ZE(N)
IJ=JJ-II+1
DO 1 KK=1,IJ
I=KK+II-1
Z=FLOAT(I)*Q*0,25
CALL SUB2
HS1=HS
AS1=AS
IF(AS1-GA) 1,2,2
1 CONTINUE
2 Z=FLOAT(I-1)*Q*0,25
CALL SUB2
AS0=AS
HS0=HS
ZGA(N)=(GA-AS0)/(AS1-AS0)+FLOAT(I-1)
CALL AUF3
STO8(N)=ZO(N)-ZGA(N)
50 CONTINUE
RETURN
END

```

```

SUBROUTINE AUF9
COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
REAL KO
DO 50 N=1,2
CALL AUF8
CALL AUF4
STO9(N)=ZGE(N)-ZGA(N)
50 CONTINUE
RETURN
END

```

```

SUBROUTINE AUF10
COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
REAL KO
DO 50 N=1,2
CALL AUF8
STO10(N)=ZE(N)-ZGA(N)
50 CONTINUE
RETURN
END

```



```

      SUBROUTINE AUF11
      COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
      1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
      2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
      REAL KO
      DO 50 N=1,2
      CALL AUF5
      STO11(N)=ZE(N)-ZO(N)
50    CONTINUE
      RETURN
      END

      SUBROUTINE AUF12
      COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
      1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
      2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
      REAL KO
      DO 50 N=1,2
      CALL AUF8
      STO12(N)=-ZGA(N)
50    CONTINUE
      RETURN
      END

      SUBROUTINE AUF13
      COMMON/STOR/ZA(2),ZE(2),X,Y,Z,GE,GA,ZO(2),ZGA(2),ZGE(2),II,JJ,IJ,
      1 STO3(2),STO4(2),STO5(2),STO6(2),STO7(2),STO8(2),STO9(2),STO10(2)
      2,STO11(2),STO12(2),STO13(2),AS,HS,R,F,Q,KO,AZ,AG(200),HG(200)
      REAL KO
      DO 50 N=1,2
      CALL AUF8
      STO13(N)=ZE(N)-ZGA(N)
50    CONTINUE
      RETURN
      END

```

***** LIED=60 FINIS *****

PASS1343

GA 35,00GE 105,00

HG 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00

HG 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00

HG 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00

HG 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00

HG 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00

HG 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00

HG 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00 70,00

STO1= 148,35STO2= 0,0

-90,00 0,0 0,0 35,00 289,3=289,3 0,0 0,0 0,2564

R KO AZ F ZE1 ZA1 ZE2 ZA2 STORUNG

* END OF FORTRAN *