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NOTE

COMMENTS ON FORTRAN ROUTINE FOR CALCULATING *d*-SPACINGS

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In Vol. 24, pp. 208–210, a program for calculating *d*-spacings at 0.01° (2θ) intervals was published. This program was specifically written to run on a large machine and required large amounts (approx. 250 K) of core storage. The program also used a constant increment for the calculation. Since pi is irrational, this constant could lead to an accumulative error in the calculations.

The two programs below read the radiating wave length, starting angle and the number of pages from the input keyboard (or other input device), and calculate and print one line at a time. This results in very low core storage requirements, allowing the routines to run in mini-computer type machines. The routines also recalculate the index at the beginning of each line, avoiding the possible accumulative error.

Users should be cautioned that all FORTRAN compilers and Basic executors have some peculiarities that may require some rewriting, particularly in input/output.

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BASIC

```
10   OPEN #0, "$LPT"
20   DIM S1$[20]
30   DIM 4%,D1[10]
40   LET K=360/(2*3.14159265)
50   INPUT "/215/RADIATING WAVE LENGTH ? "W2
60   INPUT "/215/STARTING 2 THETA (IN DEGREES) ? "T4
70   INPUT "/215/NUMBER OF PAGES ? "J6
80   PRINT
90   PRINT #0, "/214/"
100  LET W1=W2/2
110  LET D0=T4
120  FOR J1=1 TO J6
130    PRINT #0; "/214/"
140    PRINT #0; " RADIATING WAVE LENGTH "; TAB (30); W2
150    LET S1$=" ##"
160    LET J8=19
170    FOR D9=0 TO 9E-02 STEP 1E-02
180      PRINT #0; USING S1$; (J8); D9;
190      LET J8=J8+10
200    NEXT D9
210    PRINT #0; " "
220    PRINT #0; " "
230    LET S1 $="## #####"
240    FOR J9=1 TO 5
250      FOR J2=1 TO 10
260        LET D2=D0
270        FOR J3=1 TO 10
280          LET T1=(D2/2)/K
290          LET D1[J3]=W1 / SIN (T1)
300          LET D2=D2+1E-02
310        NEXT J3
320        PRINT #0; D0;
330        LET J5=17
340        FOR J4=1 TO 10
350          PRINT #0; USING S1$; TAB (J5); D1[J4];
360          LET J5=J5+10
370        NEXT J4
380        PRINT #0; " "
390        LET D0=D0+.1
400      NEXT J2
410      PRINT #0; " "
420    NEXT J9
430  Next J1
```

FORTRAN

```
      COMPILER DOUBLE PRECISION
C     THIS ROUTINE CALCULATES D SPACING AT .01 DEGREE
C     (2 THETA) INCREMENTS FROM THE RADIATING
C     WAVELENGTH INPUT FROM THE KEYBOARD
C     FROM A SPECIFIED STARTING THETA FOR A SPECIFIED
C     NUMBER OF PAGES
C     THERE ARE 50 LINES TO A PAGE SEPARATED
C     BY SPACES EVERY 10 LINES (FOR EASE IN READING)
C
      DIMENSION D1 (10)
      RK=360 / (2.*3. 14159265)
      ACCEPT "RADIATING WAVE LENGTH ? ", W2
      ACCEPT "STARTING 2 THETA (IN DEGREES) ? ",T4
      ACCEPT "NUMBER OF PAGES ",J6
      W1=W2/2
      D0=T4
      DO 50 J1=1 , J6
      WRITE (12, 100)
      WRITE (12, 101), W2
      DO 10 J=1 , 10
   10 D1 (J)=(J-1) /100.
      WRITE (12,102)(D1(J)J=1,10)
      WRITE (12,103)
      DO 20 J9=1,5
      DO 30 J2=1,10
      D2=D0
      DO 40 J3=1, 10
      T1=(D2/2.)/ RK
      D1(J3)=W1 /DSIN(T1)
      D2=D2+ .01
   40 CONTINUE
      WRITE (12,104)D0,(D1(J)J=1,10)
      D0=D0+.1
   30 CONTINUE
      WRITE (12,105)
   20 CONTINUE
   50 CONTINUE
  100 FORMAT (1H1)
  101 FORMAT (" RADIATING WAVE LENGTH ",F10.6)
  102 FORMAT (" ",17X,F5.2,9(5X,F5.2))
  103 FORMAT ( // )
  104 FORMAT (" ",F5.1,10X,10(F9.5,1X))
  105 FORMAT (" ")
      END
```


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