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
```