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DECUS NO.	8-96
TITLE	J BESSEL FUNCTION (FORTRAN)
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FORMAT	

J BESSEL FUNCTION (FORTRAN)

DECUS Program Library Write-up

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      C;      THIS PROGRAM COMPUTES THE J BESSEL FUNCTION
C;      FOR A GIVEN ARGUMENT AND ORDER
C;      ERROR CODE KEY:
C;      IER=0.....NO ERROR
C;      IER=1.....ORDER IS NEGATIVE
C;      IER=2.....ARGUMENT IS NEGATIVE OR ZERO
C;      IER=3.....REQ'D ACCURACY NOT OBTAINED
C;      IER=4.....RANGE OF N WRT. X NOT CORRECT
502;      CONTINUE
          TYPE 100
100;      FORMAT (/, "ENTER ORDER OF J BESSEL FUNCTION DESIRED", /)
          ACCEPT 200, N
200;      FORMAT(I)
          TYPE 300
300;      FORMAT("ENTER ARGUMENT OF J BESSEL FUNCTION DESIRED", /)
          ACCEPT 400, X
400;      FORMAT(E)
          TYPE 500
500;      FORMAT("ENTER ACCURACY DESIRED", /)
          ACCEPT 400, D
          BJ=0.
          IF(N)10,20,20
10;       IER=1
          GO TO 77
20;       IF(X)30,30,31
30;       IER=2
          GO TO 77
31;       IF(X-15.)32,32,34
32;       NTEST=20.+10.*X-X**2./3.
          GO TO 36
34;       NTEST=90.+X/2.
36;       IF(N-NTEST)40,38,38
38;       IER=4
          GO TO 77
40;       IER=0
          N1=N+1
          BPREV=.0
          IF(X-5.)50,60,60
50;       MA=X+6.
          GO TO 70
60;       MA=1.4*X+60./X
          IFIX=X
70;       MB=N+IFIX/4+2
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      IF(MB-MA)111,112,112
112;  MZERO=MB
      GO TO 113
111;  MZERO=MA
113;  CONTINUE
      MMAX=N|EST
      DO 190 M=MZERO,MMAX,3
      FM1=1.0E-28
      FM=ALPHA=0.
      IF(M-(M/2)*2)120,110,120
110;  JT=-1
      GO TO 130
120;  JT=1
130;  M2=M-2
      DO 160 K=1,M2
      MK=M-K
      FLOAT=MK
      BMK=2.*FLOAT*FM1/X-FM
      FM=FM1
      FM1=BMK
      IF(MK-N-1)150,140,150
140;  BJ=BMK
150;  JT=-JT
      S=1+JT
      ALPHA=ALPHA+BMK*S
160;  CONTINUE
      BMK=2.*FM1/X-FM
      IF(N)180,170,180
170;  BJ=BMK
180;  ALPHA=ALPHA+BMK
      BJ=BJ/ALPHA
      UU=BJ-BPREV
      IF(UU)191,191,192
191;  UU=-UU
192;  VV=D*BJ
      IF(VV)193,193,194
193;  VV=-VV
194;  IF(UU-VV)77,77,195
195;  BPREV=BJ
190;  CONTINUE
      IER=3
77;  TYPE 102,BJ,IER
102;  FORMAT(E," IER=",I,/)
      GO TO 502
      END

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