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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=NIFST
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=",1,/)
GO TO 502
END

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