

```

1: program MonteCarlo
2: open(15, file="Monte_Carlo.txt")
3:   idum = -1
4:   N = 10**8
5:   PI = ACOS(-1.0)
6:   EXATO = PI/4.
7:   SUMF = 0.
8:   SUMF2 = 0.
9:   DO 20 IX = 1, N
10:    FX = FUNC(ran3(idum))
11:    SUMF = SUMF + FX
12:    SUMF2 = SUMF2 + FX**2
13:  20 CONTINUE
14:  FAVE = SUMF/N
15:  F2AVE = SUMF2/N
16:  SIGMA = SQRT((F2AVE - FAVE**2)/N)
17:  ERRO = ABS(FAVE - EXATO)
18:  write(15,*) "Integral =", FAVE, "Exato =", EXATO
19:  write(15,*) "Erro estimado:", SIGMA,"Erro obtido:", ERRO
20:  write(15,*) "N =",N
21: end
22:
23: function FUNC(X)
24:   FUNC = 1.d0/(1.d0 + X**2)
25: return
26: end
27:
28: FUNCTION ran3(idum)
29:   INTEGER idum
30:   INTEGER MBIG,MSEED,MZ
31:   REAL ran3,FAC
32:   PARAMETER (MBIG=1000000000,MSEED=161803398,MZ=0,FAC=1./MBIG)
33:   INTEGER i,iff,ii,inext,inextp,k
34:   INTEGER mj,mk,ma(55)
35:   SAVE iff,inext,inextp,ma
36:   DATA iff /0/
37:   if(idum.lt.0.or.iff.eq.0) then
38:     iff=1
39:     mj=abs(MSEED-abs(idum))
40:     mj=mod(mj,MBIG)
41:     ma(55)=mj
42:     mk=1
43:     do 11 i=1,54
44:       ii=mod(21*i,55)
45:       ma(ii)=mk
46:       mk=mj-mk
47:       if(mk.lt.MZ) mk=mk+MBIG
48:       mj=ma(ii)
49: 11  continue
50:     do 13 k=1,4
51:       do 12 i=1,55
52:         ma(i)=ma(i)-ma(1+mod(i+30,55))
53:         if(ma(i).lt.MZ) ma(i)=ma(i)+MBIG
54: 12  continue
55: 13  continue
56:     inext=0
57:     inextp=31
58:     idum=1
59:   endif
60:   inext=inext+1
61:   if(inext.eq.56) inext=1
62:   inextp=inextp+1
63:   if(inextp.eq.56) inextp=1
64:   mj=ma(inext)-ma(inextp)
65:   if(mj.lt.MZ) mj=mj+MBIG
66:   ma(inext)=mj
67:   ran3=mj*FAC
68:   return
69: END
70:

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