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1  program ising_model_calculations
2      implicit none
3      integer::n,nmc,m,i
4      real::kb, T, num
5      double precision::a, b, c, d, e, mag, e2, mag2
6      nmc = 500000; n = 1000; m = 200000; kb = 1.0; T = 0.7
7      e = 0; e2 = 0; mag = 0; mag2 = 0
8      num = real(nmc - m)
9      open(1, file = "result.dat", status = "old")
10     open(2, file = "Calculation.dat")
11
12     do i = 1,nmc
13         read(1,*)a,b,c,d
14         if(i > m) then
15             e = e + b; e2 = e2 + b**2.0
16             mag = mag + d; mag2 = mag2 + d**2.0
17         endif
18         a = 0.0; b = 0.0; c = 0.0; d = 0.0
19     enddo
20     e = e/num; mag = mag/num
21     e2 = e2/num; mag2 = mag2/num
22
23
24     write(2,*)"By Fluctuation Dissipation Theorem"
25     write(2,*)"Specific Heat Capacity, Cv = (<E^2> - <E>^2)/(kb*T**2)"
26     write(2,*)"Therefore,"
27     write(2,*)"Specific Heat Capacity (Cv):", real((e2 - e**2.0)/(kb*T**2.0))
28     write(2,*)"Similarly,"
29     write(2,*)"Magnetic Susceptibility, ? = (<M^2> - <M>^2)/(kb*T)"
30     write(2,*)"Susceptibility (?) :", real((mag2 - mag**2.0)/(kb*T))
31
32 end program
33
34
35 !OUTPUT
36 ! By Fluctuation Dissipation Theorem
37 ! Specific Heat Capacity, Cv = (<E^2> - <E>^2)/(kb*T**2)
38 ! Therefore,
39 ! Specific Heat Capacity (Cv): 4.22062527E-04
40 ! Similarly,
41 ! Magnetic Susceptibility, ? = (<M^2> - <M>^2)/(kb*T)
42 ! Susceptibility (?) : 2.41711568E-02
43

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