

Assignment 3

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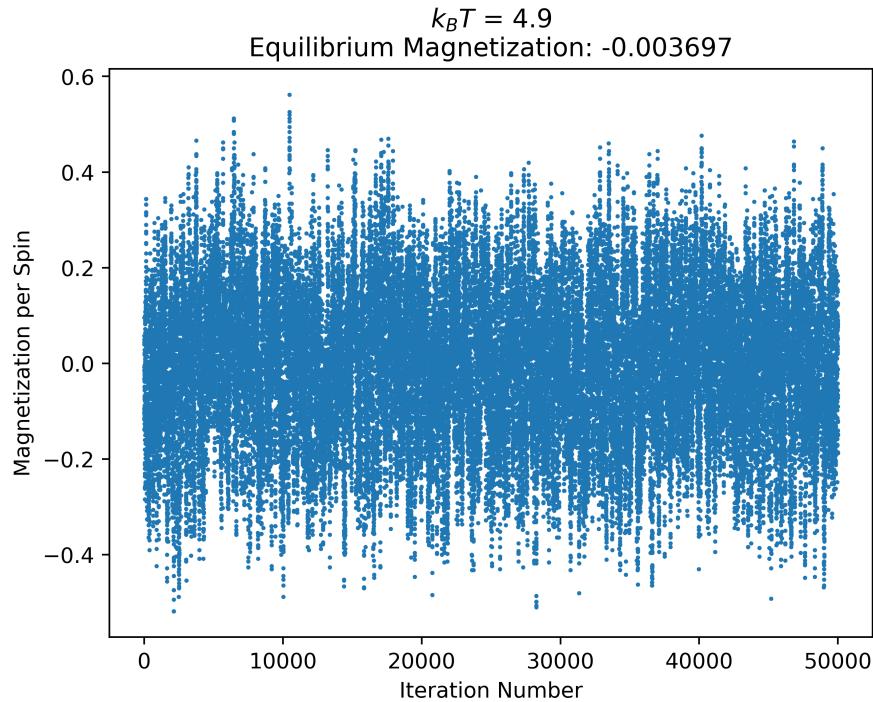
1

The total magnetic moment will be $-L^3$ or -8000 .

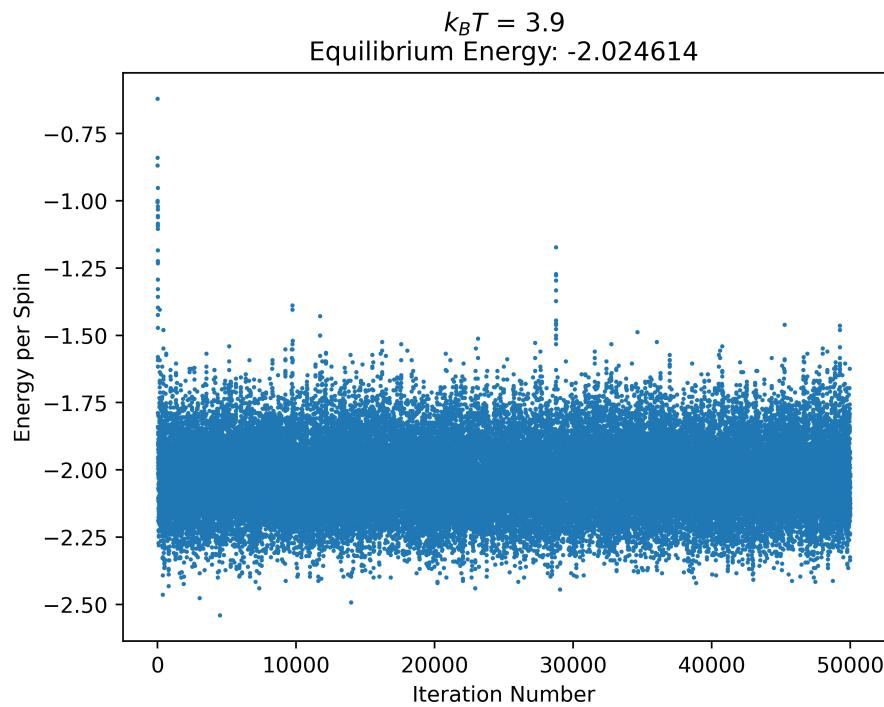
2

The number of interactions is 6 per spin and thus $6L^3/2 = 3L^3$. Since all interactions will contribute to $-J$ interaction energy, the total energy will be $-3JL^3 = -3000$.

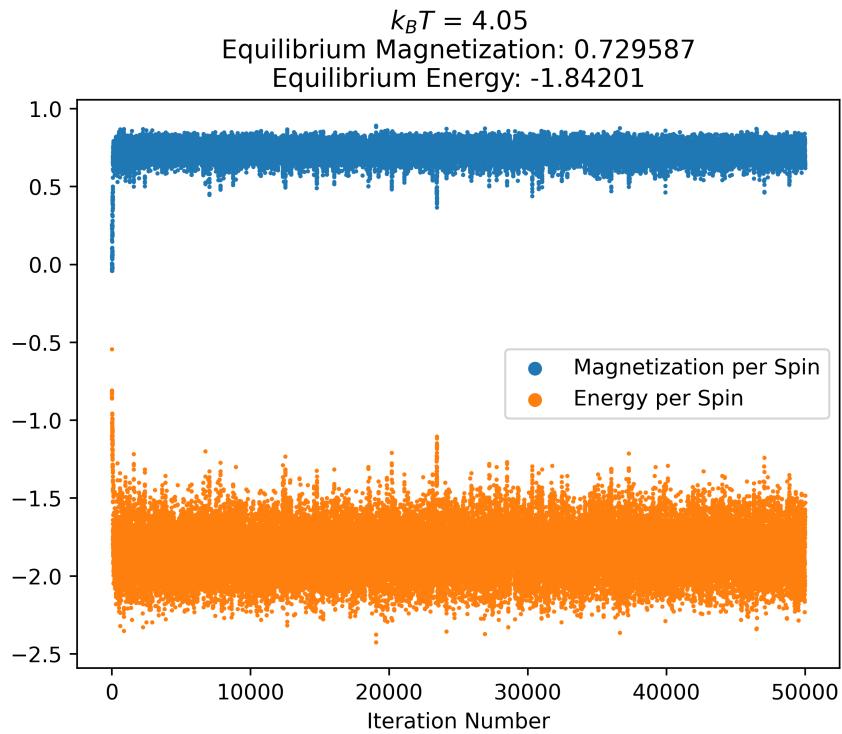
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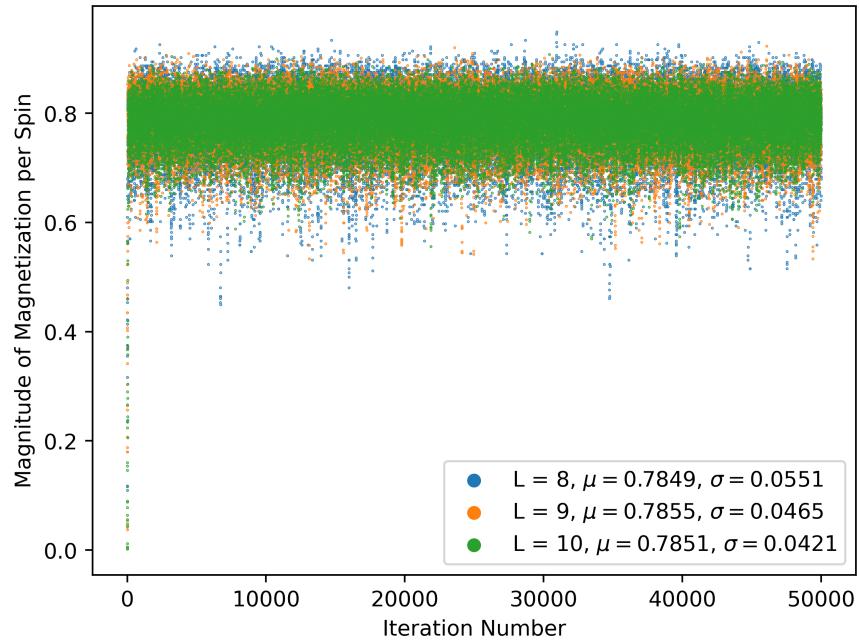
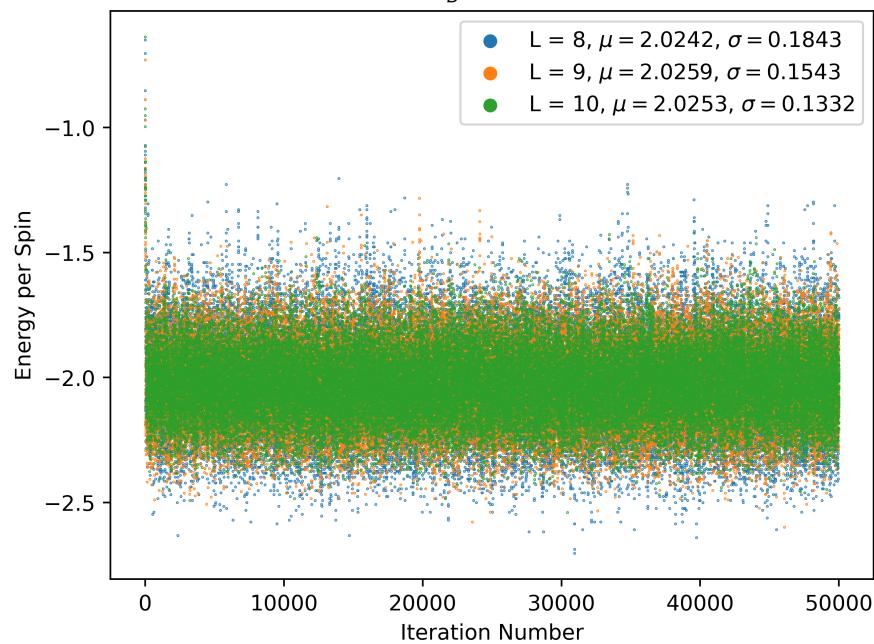


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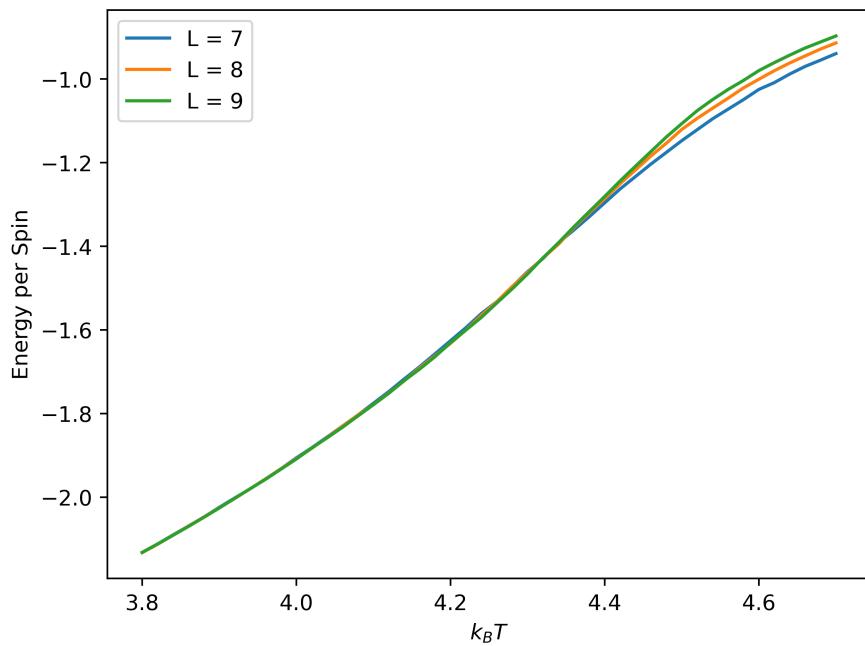
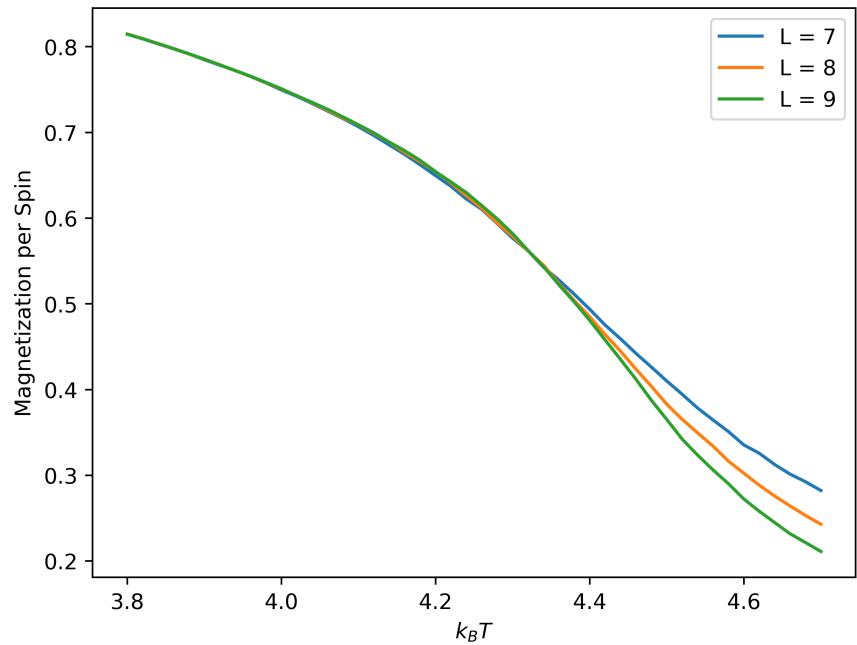


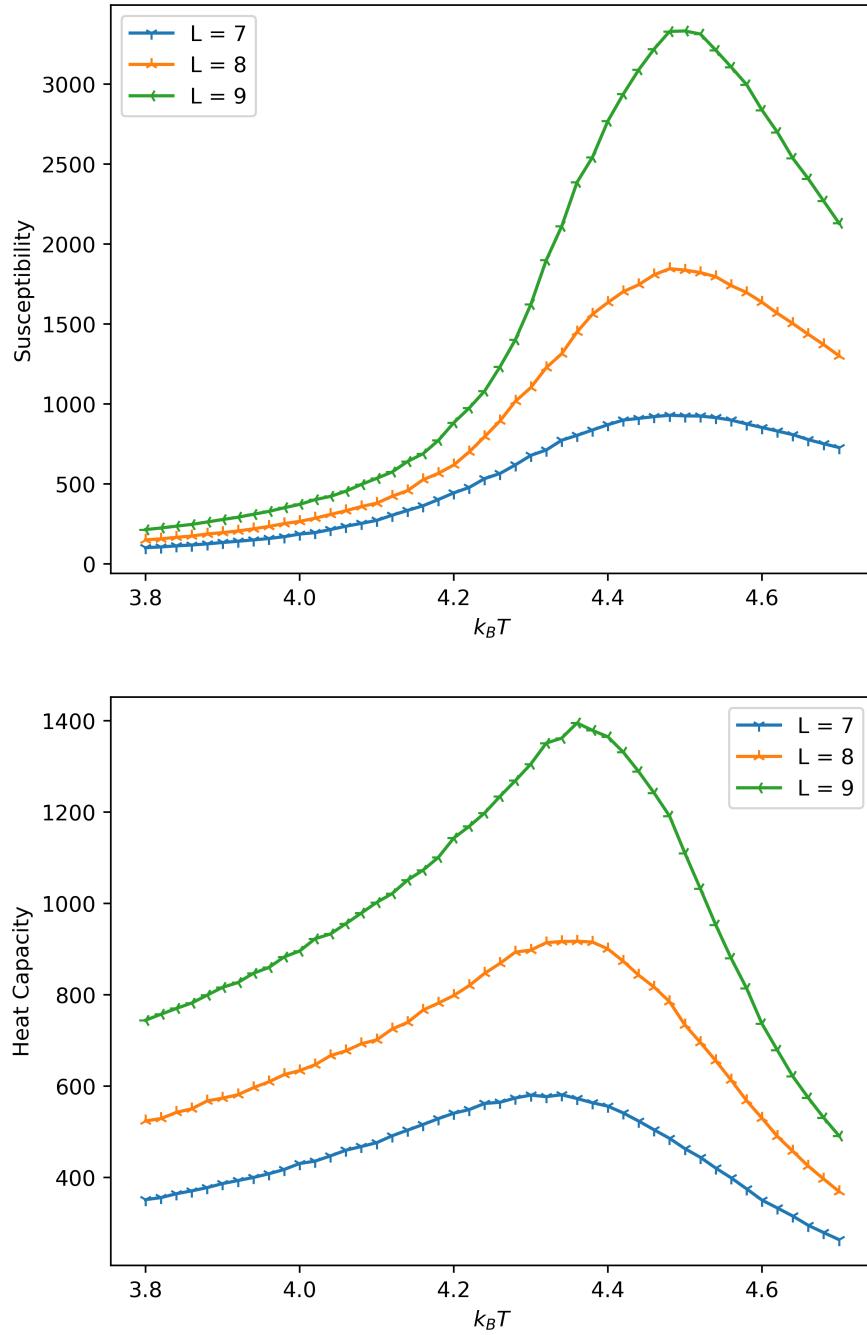
5



$k_B T = 3.9$

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Figures





7

The value of χ at $T = 4.5$ for $L = 7, 8, 9$ respectively are 925.88, 1837.58, 3332.47 .

8

The peak value of C_V for $L = 8$ is 917.16 .

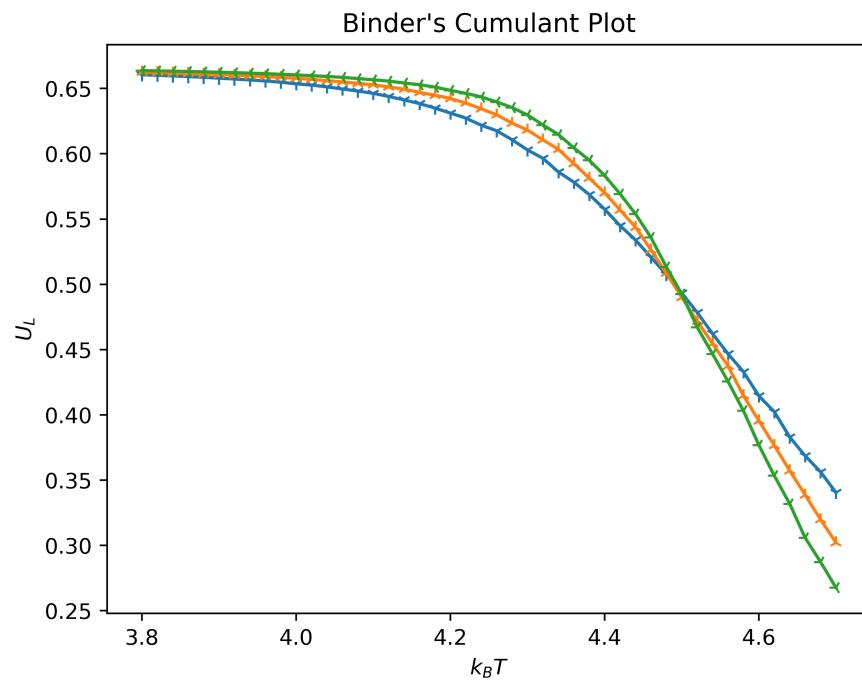
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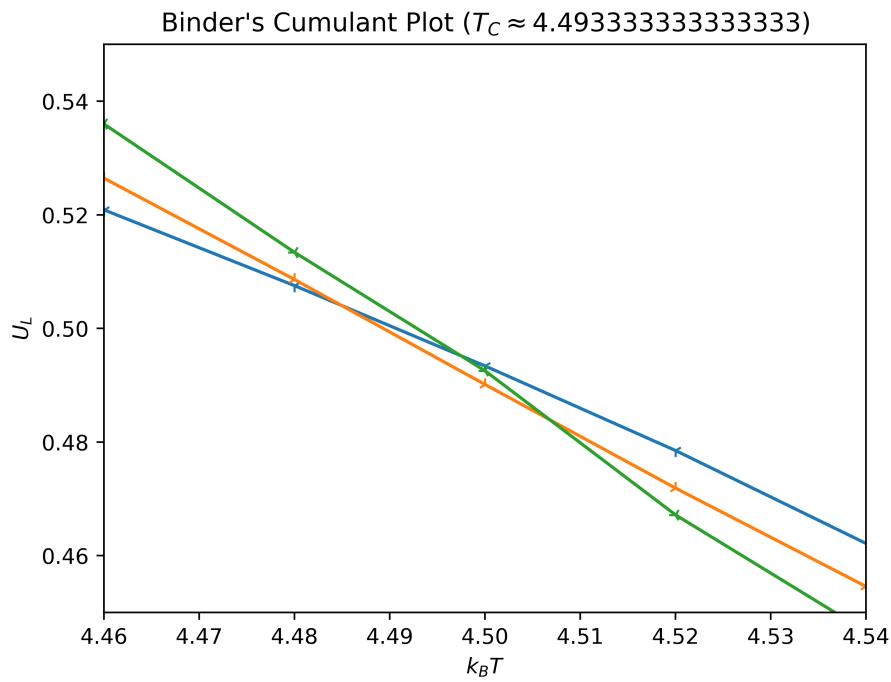
The peak value of C_V for $L = 9$ is 1395.11 .

10

The value of magnetization per spin for $L = 7$ at $T = 3.8$ is 0.81 .

11





12

By detailed balance, we must have 10 particles jumping from E_{10} to E_5 .