Worksheet 6: Finite-Size Scaling and the Ising Model

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Contents

1 Finite Size Scaling

1.1 Determinig T_C

In this task the Binder parameter $U = 1 - \frac{1}{3} < \mu^4 > / < \mu^2 >^2$ was implemented. The resulting plot of the Binder parameter over the Temperature for different L can be seen below:

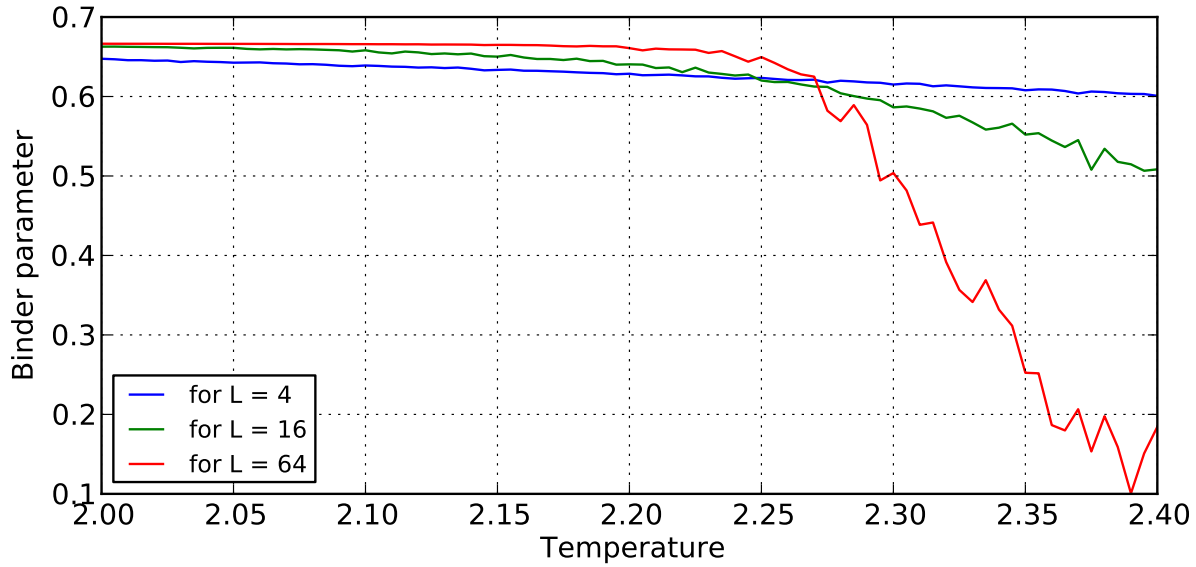

Figure 1: Plot of the Binder parameter for different lattice sizes L. From the intersection point of the different curves the critical Temperature can be determined as $T_C = 2.27K$. In order to get a good result a 100000 sweeps and a temperature step size of $\Delta t = 0.005$ K were used.

1.2 Estimating β_m

Here we performed different simulations at $T_C = 2.27K$ were performed for $L \in \{8, 16, 32, 64, 128\}$. The resulting plot of the magnetization M over L is as follows:

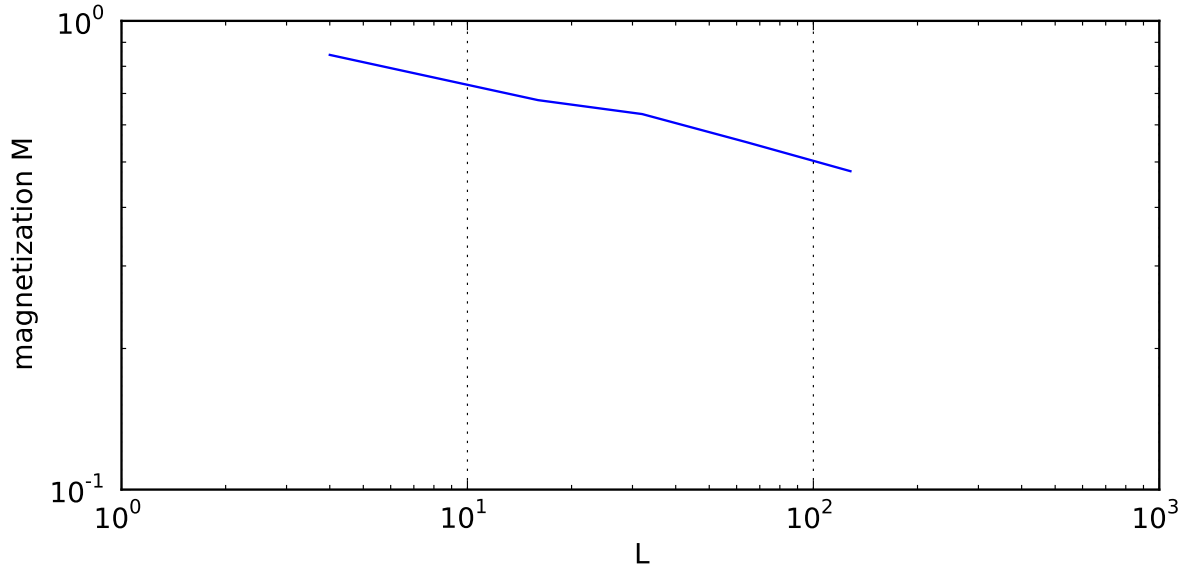

Figure 2: Plot of the magnetization M over L with double logarithmic scale. The resulting curve is almost linear.