Project 3. Continuous-Time Monte Carlo

Javier Castillo Uviña

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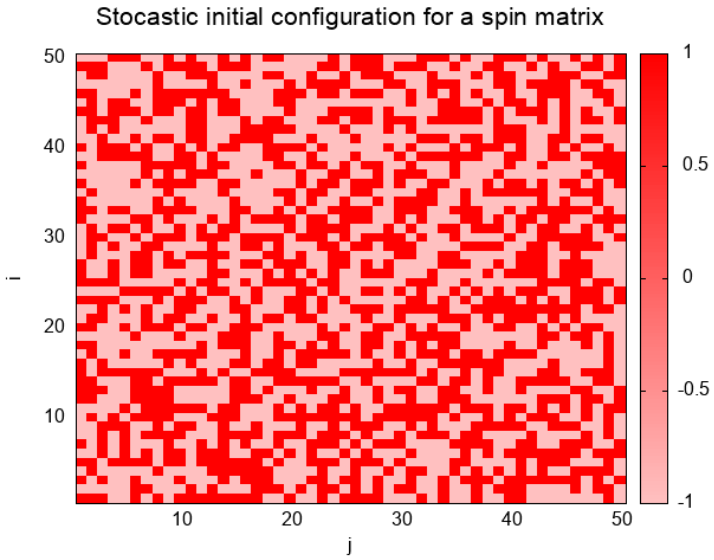

Figure 1: Initial random configuration for a Spin-Matrix of $L \times L = 50 \times 50$ spins

Since we have equilibrium configurations for a closed system, we know there is no matter exchange between the system and the thermal bath. That fact implies there is no energy transfer either, besides, there is no performed work. Due to the fact there isn't heat, this finally implies $T_{System} = T_{Thermal\ bath}$

2

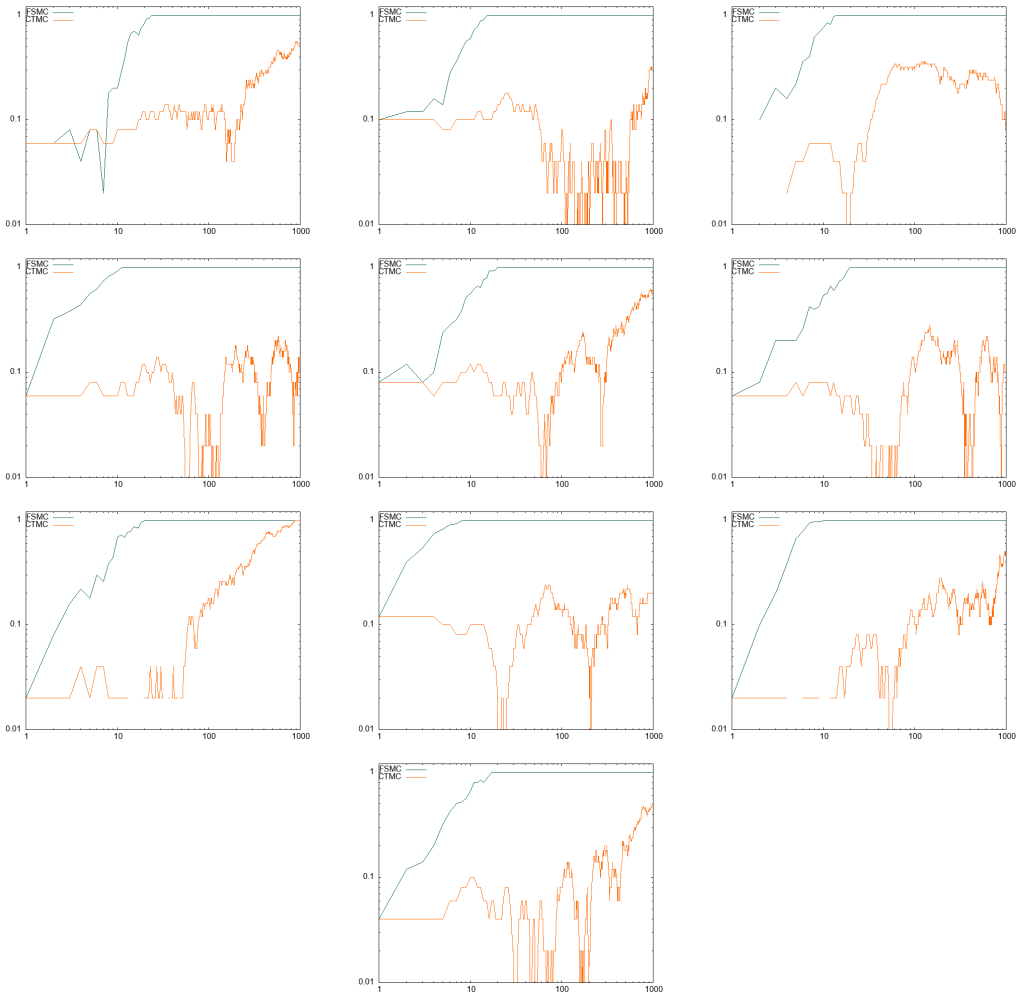

Figure 2: This figure shows the normalized magnetization m vs MonteCarlo steps in a log-log representation

It's been computed the absolute of magnetization in order to be seen in a log-log representation.

3

For the final figure it is plotted the mean value of the magnetization, computing the mean magnetization for each MC step over the 10 different seeds. The firsts steps for the Continuous-Time Monte Carlo don't appear because are identically 0. For the Δt bigger than a MC step we have supposed the magnetization remains constant until a spin flips. This is how magnetization can be averaged all over the steps.

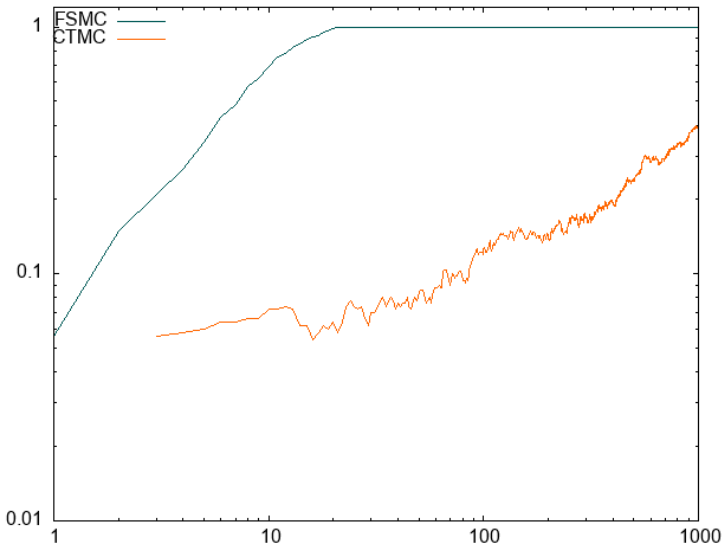

Figure 3: It is plotted the mean magnetization value vs MonteCarlo step in a log-log representation