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Supervisor: Prof. Ioan Manolescu

Glauber Dynamics for the Ising Model

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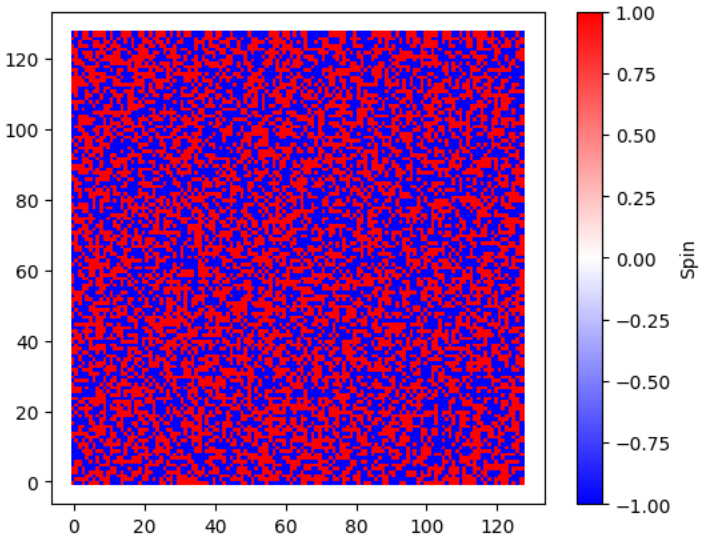

Abstract

Algorithms such as Metropolis-Hastings or Glauber Dynamics offer great insight for the Ising model on a graph $G = (V, E)$ and guarantee convergence to samples of a stationary distribution of the system for infinite runtime. However, a feasible implementation on a large graph with finite computer memory and finite runtime comes at the drawback of a non-exact sample with few means of estimating its runtime to produce a negligible error. With technical modifications of the Glauber Dynamics algorithm in the form of *Coupling from the Past* and *Sandwiching*, these algorithms can be rendered exact, decideable, and memory-efficient. This paper will discuss the algorithms based on a small introduction to Markov chains, demonstrate their convergence and show how Glauber dynamics can be improved for the Ising model, specifically.