

Spin system dynamics from random initializations

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Glauber dynamics for spin systems like the Ising and Potts models are Markov chains that model their physical time-evolutions in statistical physics, and also serve as natural MCMC sampling algorithms from complex high-dimensional distributions. Classical Markov chain analysis is focused on mixing times (times to approximate stationarity) from worst-case initialization, but tools for understanding mixing times from natural (e.g., uniform-at-random, or higher temperature) initializations are far more limited. We describe some recent results on low-temperature regimes where spin system dynamics are exponentially slow to equilibrate from worst-case, but where mixing from random or special initializations can be analyzed and shown to be significantly faster.

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