

Lecture 5: Sampling from a chain

ACM 206, May 2, 2023

Metropolis sampler is slow

After $\mathcal{O}(10^6)$ iterations, Metropolis sampler still does not equilibrate.

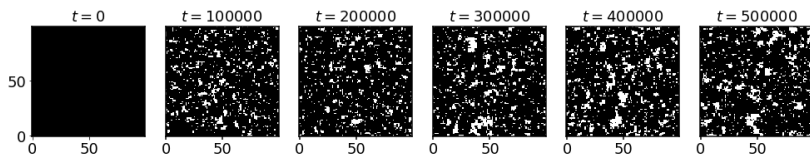


Figure: First 5×10^4 steps of Metropolis sampler

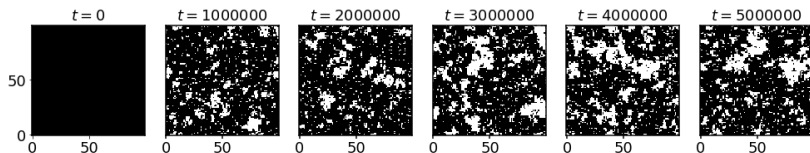


Figure: First 5×10^6 steps of Metropolis sampler

Metropolis sampler is slow

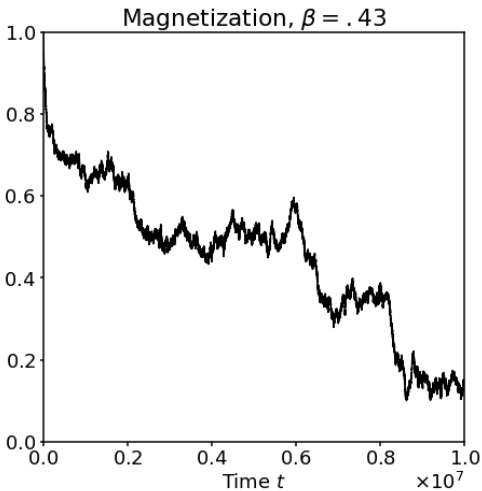


Figure: Time series of average magnetization

Swendsen-Wang sampler is fast

After $\mathcal{O}(10)$ iterations, Swendsen-Wang algorithm equilibrates.

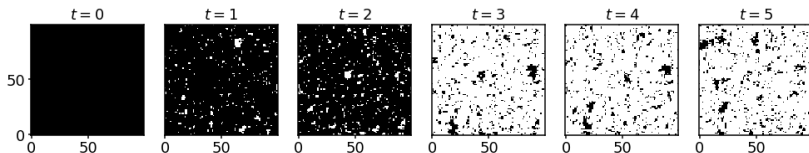


Figure: First 5 steps of Swendsen-Wang

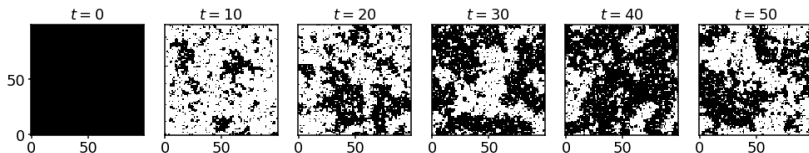


Figure: First 50 steps of Swendsen-Wang

Swendsen-Wang sampler is fast

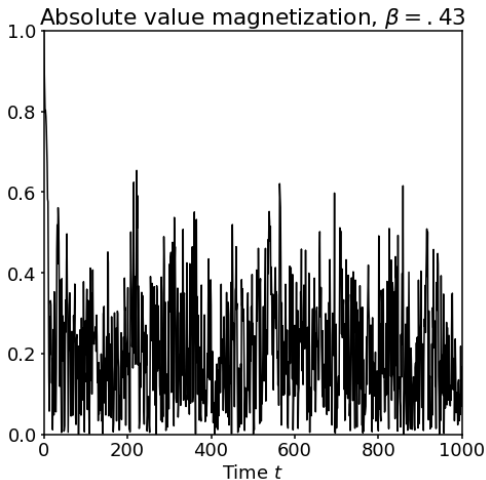


Figure: Time series of absolute value average magnetization

Near the critical temperature

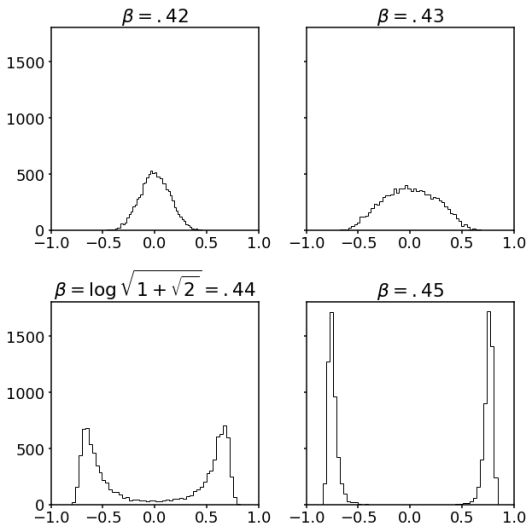


Figure: Near the critical temperature, magnetization emerges rapidly.

Near the critical temperature

