Metastability of Glauber dynamics with inhomogeneous coupling disorder

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March 22, 2023

I will first introduce a general class of mean-field-like spin systems with random couplings that comprises both the Ising model on inhomogeneous dense random graphs and the randomly diluted Hopfield model. I will then present quantitative estimates of metastability in large volumes at fixed temperatures when these systems evolve according to a Glauber dynamics, i.e. where spins flip with Metropolis rates at inverse temperature β. The main result identifies conditions ensuring that with high probability the system behaves like the corresponding system where the random couplings are replaced by their averages. More precisely, we prove that the metastability of the former system is implied with high probability by the metastability of the latter. Moreover, we consider relevant metastable hitting times of the two systems and find the asymptotic tail behaviour and the moments of their ratio. This result provides an extension of the results known for the Ising model on the the Erdos-Renyi random graph. Our proofs use the potential-theoretic approach to metastability in combination with concentration inequalities.

Based on a joint work in collaboration with Anton Bovier, Frank den Hollander, Saeda Marello and Martin Slowik.