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Optimization and Sampling from Random Quadratic Potentials

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ABSTRACT

Optimizing non-convex functions and sampling from non-log-concave distributions in high dimension are two computationally challenging yet fundamental tasks with a large number of applications. While these problems are intractable from a worst case perspective, they are routinely solved in practice with a variety of heuristics. Seeking to understand the difficulty of these tasks on typical instances, I will focus on the simple case of a random quadratic potential on the hypercube, famously known in probability theory and statistical physics as the Sherrington-Kirkpatrick model. I will describe some recent advances for computing approximate optima and sampling from the associated Boltzmann at high temperature.

This talk is based on joint work with Andrea Montanari and Mark Sellke.