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Rigorous analysis of the complexity of the landscape of spin glass models

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The energy landscape of mean field spin glasses displays a large (exponential in the dimension of the problem) number of minima and saddles. The geometrical properties of such random functions in high dimensions are of fundamental importance to understand the behavior of local algorithms that try to find optima in such landscapes (for example gradient descent).

The aim of these lectures we will be to discuss how these properties can be analyzed adapting the Kac-Rice formula to disordered systems and how this brings Random Matrix Theory in the problem.

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