Gradient flows, large deviations and hydrodynamic limits

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Abstract

In the 80s, De Giorgi introduced the notion of gradient flows to define ordinary differential equations in metric spaces. In 2005, Ambrosio, Gigli and Savaré used this notion to give an alternative formulation for Kokker-Planck equations as gradient flows in spaces of probability measures.

In this talk, I will show how we can use this notion to study large deviations for sequences of stochastic differential equations. The main result is that proving a large deviation principle for such sequences is equivalent to studying the limit of a sequence of functionals that appear in the gradient flow formulation of Fokker-Planck equations.

As an application, I will explain how to obtain large deviations from the hydrodynamic scaling limit for a system of interacting continuous spins in a random environment.

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