

A coupling between Sinai's random walk and Brox diffusion

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Sinai's random walk is a standard model of 1-dimensional random walk in random environment. Brox diffusion is its continuous counterpart, that is a Brownian diffusion in a Brownian environment. The convergence in law of a properly rescaled version of Sinai's walk to Brox diffusion has been established 20 years ago. In this talk, I will explain a strategy which yields the convergence of Sinai's walk to Brox diffusion thanks to an explicit coupling. This method, based on rough paths techniques, opens the way to rates of convergence in this demanding context. Notice that I'll try to give a maximum of background about the objects I'm manipulating, and will keep technical considerations to a minimum.