

Metastability of reversible random walks in potential fields

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Abstract

We consider the metastable behavior of reversible random walks in force fields. This is an old problem whose origin can be traced back at least to Kramers. It has been addressed by Freidlin and Wentzell and by Galves, Olivieri and Vares in the context of small random perturbations of dynamical systems, and, more recently, by Bovier, Eckhoff, Gaynard and Klein in a series of papers through the potential theoretic approach. Our main result states that starting from a neighborhood of a local minimum of the force field, in an appropriate time-scale, the evolution of the random walk can be described by a reversible Markov chain in a finite graph, in which the vertices represent the wells of the force field and the edges the saddle points. (Joint work with Claudio Landim and Richardo Misturini.)