
Properties of continuous-space metastable Markov chains

Manon Baudel*¹

¹Mathématiques - Analyse, Probabilités, Modélisation - Orléans (MAPMO) – Université d’Orléans, Centre National de la Recherche Scientifique : UMR7349 – Fédération Denis Poisson, Bâtiment de Mathématiques, B.P. 6759, 45067 Orléans cedex 2, France

Résumé

Metastable Markov chains are characterized by the existence of at least two time scales. On short time-scale, the process looks like a stationary Markov process exploring only a small subset of its state space. On longer time scales, it performs fast and rare transitions between different such subsets called metastable states. We show the connection between the dynamical behavior of (non-reversible) Markov processes and spectral properties of the corresponding transition kernel. Under a non-degeneracy assumption, to each metastable set corresponds a real simple eigenvalue which is connected to the inverse of the mean exit time from this metastable set up to small errors. We also give a graph-algorithm for computing the eigenvalues of the transition kernel in a more general case. We discuss applications to population dynamics. Joint work with Nils Berglund.

*Intervenant