Metastability for General Dynamics with Rare Transitions: Escape Time and Critical Configurations

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Metastability is an ubiquitous physical phenomenon in first order phase transitions. A fruitful mathematical way to approach this phenomenon is the study of rare transitions for Markov chains. For Metropolis chains associated with statistical mechanical systems, this phenomenon has been described in an elegant way through a pathwise approach in terms of the energy landscape associated to the Hamiltonian of the system. In the seminar we will first explain the main results and ideas of this approach and compare it with other existing ones. Then we will provide a similar description in the general rare transitions setup that can be applied to irreversible systems as well.?Besides their theoretical content, we believe that our results are a useful tool to approach metastability for non-Metropolis systems such as Probabilistic Cellular Automata. Moreover, we will describe results pertaining to exponential hitting times which range of applicability includes irreversible systems, systems with exponentially growing volumes and systems with a general starting measure.?(joint work with Emilio N. M. Cirillo, R. Fernandez, F. Manzo, E. Scoppola and J. Sohier)