

SPECTRAL GAP FOR STOCHASTIC ENERGY EXCHANGE MODELS WITH DEGENERATE RATE FUNCTIONS

MAKIKO SASADA
KEIO UNIVERSITY

ABSTRACT. We consider a class of stochastic energy exchange models, which are pure jump Markov processes with a continuous state space. The model is introduced by A. Grigo, K. Khanin and D. Szasz as a generalization of mesoscopic dynamics of deterministic billiard lattice models. We study a lower bound estimate of the spectral gap in terms of the system size N . One of the main property that the jump Markov process inherits from the underlying mechanical model is that the rate of energy exchange between each neighboring pair of sites is proportional to the square root of the total energy of the two sites. Namely, the rate function does not have a uniform lower bound. In such a situation, we cannot expect an order N^{-2} bound to hold uniformly in the average energy e . Then, it is natural to ask whether such a bound holds if we incorporate the extra factor \sqrt{e} , and we show that this is indeed the case.