Quasipotential bifurcations and the order of non-equilibrium phase transitions for the stochastic Vlasov equation

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Abstract

For the stochastic Vlasov equation with slighty non equilibrium forces, discontinuous phase transitions have been observed, while the equilibrium phase diagram shows a continuous phase transition. We will show that these phase transitions can be studied as properties of the Freidlin-Wentzell quasi potentiel for systems with small noises. The following question arises about the bifurcations of the quasi potential: can a small non-equilibrium noise change the nature of the bifurcation for the quasipotential. We will explain that the answer is negative. In order to answer this quesion we will study properties of the quasipotential in the neighborhood of attractors, both for non degenerate and degenerate noises.

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