Nonequilibrium phenomena: response to perturbations and metastable behaviour

Part II

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Metastability is a ubiquitous phenomenon in nature, occurring when a system remains trapped for a long time in a state distinct from thermodynamic equilibrium, before unpredictably transitioning away. Given its significant applications, this phenomenon has been extensively studied from both physical and mathematical perspectives. Mathematically, metastability presents considerable challenges, and only in recent decades has a fairly comprehensive theory emerged, primarily through a dynamical approach and the tools of stochastic modeling. This course aims to provide an introduction to the problem, discuss the key mathematical techniques, and present detailed results for selected fundamental models.