



Mathematical Physics

Stochastic treatment of finite-N effects in mean-field systems and its application to the lifetimes of coherent structures

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A stochastic treatment yielding to the derivation of a general Fokker-Planck equation is presented to model the slow convergence towards equilibrium of mean-field systems due to finite-N effects. The thermalization process involves notably the disintegration of coherent structures that may sustain out-of-equilibrium quasistationary states. The time evolution of the fraction of particles remaining close to a mean-field potential trough is analytically computed. This indicator enables to estimate the lifetime of coherent structures and thermalization timescale in mean-field systems.

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