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Title:

Gibbs systems on Wiener paths with many-body potentials and infinite-dimensional gradient stochastic differental equations

Abstract:

Particle and lattice oscillator Gibbs correlation functions on wiener paths with many-body interaction potentials are constructed in the thermodynamic limit. As a result time-dependent correlation functions of systems of Brownian particles and lattice linear oscillators interacting via pair potentials are determined in the thermodynamic limit for initial Gibbsian correlation functions. It is shown that they are generalized solutions of the gradient diffusion hierarchies of the BBGKY-type that describe evolution of states of infinite-dimensional gradient stochastic differential equations having Gibbsian stationary states. The considered Gibbsian systems on wiener paths coincide with equilibrium quantum systems of particle and lattice oscillators interacting via many-body potentials and Maxwell-Boltzmann statistics in a partial case. Evolution operators of the hierarchies are constructed on a finite-time interval in Banach spaces which contain Gibbsian correlation functions. Long-range order is proved for lattice Brownian oscillators interacting via the guadratic pair nearestneighbor potential with a help of a new version of the Peierls argument.