

SOME EXACTLY SOLVABLE VARIATIONAL PROBLEMS IN NON EQUILIBRIUM STATISTICAL MECHANICS

Non equilibrium thermodynamic systems exhibit a large and rich phenomenology. The understanding of the basic principles of non equilibrium thermodynamics is one of the main challenge of contemporary physics.

I will discuss some results in non equilibrium statistical mechanics concerning fluctuations of stochastic models. The models considered are diffusion processes and interacting particle systems.

The techniques involved are the variational ones typical of large deviations theory. The study of a stationary non equilibrium state is transformed into the study of an associated variational problem. I will illustrate with examples several phenomena like for example the appearance of long range correlations and the non differentiability and non convexity of the large deviations rate function.