Bethe-ansatz solution for ASEP with reflecting boundaries and its application to polymer dynamics

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Abstract

In this contribution, we show that the exact solution of Asymmetric Simple Exclusion Process (ASEP) with reflecting boundaries can be found using a generalised Bethe-ansatz method. The exact partition function is derived and thus the stationary density profile can be solved exactly. Moreover, we calculate the eigenvalues and eigenfunctions of the system analytically and discuss the slowest relaxation time. In addition, we show how to map the ASEP setting to the dynamics of a pinned polymer loop system. By using this mapping, we can get insights into the equilibrium statistics and dynamics of the polymer system. Furthermore, we show how the generalised Bethe-ansatz method can be applied to the continuous single-file diffusion with reflecting boundaries.