
The semi-infinite asymmetric exclusion process: large deviations via matrix products

Johannes Zimmer*¹

¹University of Bath [Bath] – Claverton Down, Bath, North East Somerset BA2 7AY, United Kingdom

Abstract

We study the totally asymmetric exclusion process on the positive integers with a single particle source at the origin. Liggett (1975) has shown that the long term behaviour of this process has a phase transition: If the particle production rate at the source is below a critical value, the stationary measure is a product measure, otherwise the stationary measure is spatially correlated. Following the approach of Derrida et al. (1993) it was shown by Großkinsky (2004) that these correlations can be described by means of a matrix product representation. In this paper we derive a large deviation principle with explicit rate function for the particle density in a macroscopic box based on this representation. The technique we develop for this problem combines spectral theoretical and combinatorial ideas. This is joint work with Horacio González Duhart and Peter Mörters.

*Speaker