Current fluctuations for the boundary driven zero range process: a macroscopic and a microscopic viewpoint.

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Abstract

Zero range process is one os the simplest model of stochastic interacting particle systems. In this model each particle performs a simple random walk on a lattice with a speed that depends on the number of particles sharing the same position. We revisit an old problem with a different perspective. We consider the one dimensional boundary driven zero range process and study the fluctuations of the current flowing through the system. First we consider the system in the diffusive hydrodynamic scale. Large deviations for the current are obtained solving a dynamic variational problem and the result is in agreement with the additivity principle. Then we study fluctuations of the current through the finite system keeping the number of lattice sites finite. This is done solving a variational problem in the configuration space. Also in this case the variational problem can be exactly solved. In the limit of large number of lattice sites the two results coincide. Based on results in collaboration with L. Bertini, A. Faggionato and R.J. Harris.

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