Bidirectional Non-Markovian Exclusion Processes

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The totally asymmetric simple exclusion process (TASEP) is a basic tool to examine transport properties of molecular motors along a filament in a cell, which is one of the most fundamental interacting particle systems on a lattice. Usually it is a Markov process, i.e. the distribution of waiting time between two adjacent stochastic events is of exponential, but recently a TASEP with non-Markovian waiting times was introduced [1]. In our presentation, we introduce some generalizations of the non-Markovian TASEP to two-species of particles moving in opposite directions. We show simulation results of the models, and discuss a phase transition between flowing and condensation states.

[1] R. J. Concannon and R. A. Blythe, Phys. Rev. Lett. 112, 050603 (2014)