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On an integrable version of the generalized totally asymmetric simple exclusion process on open chains

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We present here results from our study of a modified version of the generalized Totally Asymmetric Simple Exclusion process (gTASEP) on open tracks, which allows for analytic solution. We first note, that kinetics of protein synthesis is a process, which was first modeled by a variant of TASEP. Traffic-like collective motion on a single tracks are found in many non-equilibrium systems including many biological systems. Biological transport in cells and various other non-equilibrium systems are modeled by versions of TASEP.

In the gTASEP an extra interaction between the particles is included, besides the existing in the standard TASEP hard-core exclusion interaction. The additional interaction is modelled by the introduction of a second hopping probability p_m for particles, belonging to a cluster. The standard hopping probability p in the gTASEP applies only for single particles and the head (rightmost) particle of a cluster.

We explain concisely how one can arrive at the analytically solvable version of gTASEP through appropriate modification of the left (injection) boundary condition. We also give a short report of the main differences between the properties of the modified and the previously studied version of gTASEP on open tracks.