

# Asymptotic Profiles of The Exclusion Process With Slow Boundary

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**Abstract:** We study the hydrodynamic behavior of the simple symmetric exclusion process with slow open boundary. In this process, particles describe independent random walks in the space  $\{1, \dots, N - 1\}$ , using the exclusion rule (which says that two particles cannot occupy the same site at the same time). Particles can also be born or die on the sites 1 and  $N - 1$  with rates proportional to  $N^{-\theta}$ , where  $\theta$  is a non-negative parameter. In the diffusive scaling, the density of particles converges to the weak solution of a heat equation with boundary conditions that depend on  $\theta$ : if  $\theta \in (0, 1)$ , we get Dirichlet boundary condition; if  $\theta = 1$ , we get Robin boundary condition; if  $\theta > 1$ , we get Neumann boundary condition. Moreover, the asymptotic profile of stationary measure is proven to be the stationary solution of the hydrodynamic equation.

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