Ferrari, P. A.; **Galves, A.**; **Liggett, T. M.**
Exponential waiting time for filling a large interval in the symmetric simple exclusion process. (English) ⟨Zbl 0819.60095⟩
Ann. Inst. Henri Poincaré, Probab. Stat. 31, No. 1, 155-175 (1995).

The one-dimensional Markovian process with the nearest neighbor interaction is considered, i.e. the state space of the process is a collection of subsets in $\mathbb{Z}$. Probabilistic measure of the process is defined by means of the following condition. Let $\mathbb{A} \subseteq \mathbb{Z}$ be the random state at time t and $\mathbb{A}' \subseteq \mathbb{Z}$ be a state at time $t + \Delta$. Then the conditional probabilities of the transitions $\mathbb{A} \to \mathbb{A}'$ are equal to each other if $\mathbb{A}'$ differs from $\mathbb{A}$ by the variation of the $\mathbb{A}$-neighbors. Namely, if both nearest neighbors x, y are contained in $\mathbb{A}$, then $x, y \in \mathbb{A}'$; if x, y are not contained in $\mathbb{A}$, then $x, y \notin \mathbb{A}'$ and if $x \in \mathbb{A}, y \notin \mathbb{A}$, then $x \notin \mathbb{A}'$, $y \in \mathbb{A}'$. In other cases the variation rate is equal to zero. Such random process is called a symmetric simple exclusion one. The extremal invariant measures for this process are the product measure $(\nu_\rho)^{\mathbb{Z}}$, $\rho \in [0, 1]$, and ν_ρ is such that the site $x \in \mathbb{Z}$ is occupied with the probability ρ. Let T_N be the first time that the sites $\{1, 2, \ldots, N\}$ get occupied, i.e. $\{1, 2, \ldots, N\} \subset \mathbb{A}$. The following statement is proved: There exist $0 < \alpha' \leq \alpha_N \leq \alpha'' < \infty$ and positive A and A' such that

$$\sup_{t \geq 0} \left| \mathbb{P}\{\alpha_N \rho^N T_N > t\} < e^{-t} \right| < A\rho^{A'N}.$$

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MSC:

60K35	Interacting random processes; statistical mechanics type models; percolation theory
82C22	Interacting particle systems in time-dependent statistical mechanics
60F10	Large deviations

Cited in **3** Documents

Keywords:

symmetric exclusion process; occurrence time of a rare event; large deviations

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