

First-passage percolation rates on width-two stretches with exponential link weights

Abstract: We consider the first-passage percolation problem on effectively one-dimensional graphs with vertex set $\{1, \dots, n\} \times \{0, 1\}$, translation-invariant edge-structure and independent exponential link weights. The percolation rate χ_n is defined as the length of the shortest path, the *first-passage time*, between $(0, 0)$ and $(n, 0)$ divided by n . The length of a path is the sum of the weights of its comprising edges.

We obtain exact expressions for the asymptotic percolation rate $\chi = \lim_{n \rightarrow \infty} \chi_n$ by solving certain recursive distributional equations and invoking results from ergodic theory to identify χ as the expected asymptotic one-step growth of the first-passage time from $(0, 0)$ to $(n, 0)$.

References

- [1] SCHLEMM, E. First-passage percolation rates on width-two stretches. *submitted to ECP*, (20..).