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Anchored expansion in supercritical percolation on nonamenable graphs.

Abstract:

Let $G$ be a transitive nonamenable graph, and consider supercritical Bernoulli bond percolation on $G$. We prove that the probability that the origin lies in a finite cluster of size $n$ decays exponentially in $n$. We deduce that:

1. Every infinite cluster has anchored expansion almost surely. This answers positively a question of Benjamini, Lyons, and Schramm (1997).

2. Various observables, including the percolation probability and the truncated susceptibility are analytic functions of $p$ throughout the entire supercritical phase.

Joint work with Tom Hutchcroft.