Long paths 1-independent percolation

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Let Λ be a infinite connected graph. Suppose I randomly assign states open/closed to edges of Λ according to a probability measure μ, such that each edge has μ-probability at least $p > 0$ of being open. How long an open path can I be sure to find?

If the states of distinct edges are independent, then almost surely there exist arbitrarily long open paths. However the question becomes both harder and more interesting when the state of an edge is allowed to depend on the states of neighbouring edges. In this talk I will present some results in the case where μ is a 1-independent probability measure, i.e. where events supported on disjoint vertex-sets are independent. This case is motivated by some problems in percolation, and turns out to be related to some intriguing (and open) problems in extremal combinatorics.

Joint work with Robert Hancock (Masaryk) and A. Nicholas Day (Umeå).

References

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