PERCOLATION OF THE PLANAR LATTICE TWO-NEIGHBOR GRAPH

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ABSTRACT. The two-neighbor graph is an oriented percolation model on a lattice in which each vertex independently picks two of its nearest neighbors at random and we open a directed edge towards those. We prove that on the two-dimensional square lattice, the origin is connected to infinity with positive probability. The proof rests on duality, exploration algorithm and enhancement arguments, as well as a comparison to iid bond percolation under constraints. As a byproduct, we show that an iid bond percolation constrained to avoid a given pattern has a strictly larger percolation threshold than 1/2.

[Joint work with D. Coupier, B. Jahnel, J. Köppl]

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