Institute for Applied Mathematics, Bonn University

Oberseminar Stochastik

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Noise sensitivity of percolation via differential inequalities

This talk is about noise sensitivity in critical planar percolation. Consider for instance a critical bond percolation configuration on $\mathbb{Z}^2$, that we denote by X (this means that each edge of the square lattice $\mathbb{Z}^2$ is erased with probability $1/2$, independently of the other edges), and resample the state of every edge with some small (fixed) probability. We thus obtain a "noisy configuration", that we denote by Y. Benjamini–Kalai–Schramm have shown that percolation is noise sensitive in the sense that the percolation properties of X are asymptotically independent of those of Y. Schramm–Steif and Garban–Pete–Schramm have then given a precise description of this phenomenon. All of these works are based on spectral tools, that are very rich and beautiful, but have some limitations that I will briefly explain. In this talk, I will present some results of the domain and then explain a new - non-spectral - approach that Vincent Tassion and I have proposed. This approach - in which we study how "pivotal" edges are affected by the noise - is inspired by the work of Kesten on near-critical percolation.