Voronoi Percolation: Topological Stability and Giant Cycles

Morgan Shuman, George Mason University, Fairfax, VA – 22030

Abstract

We study the topological stability of Voronoi percolation in higher dimensions. We show that slightly increasing p allows a discretization that preserves increasing topological properties with high probability. This strengthens a theorem of Bollobás and Riordan and generalizes it to higher dimensions. As a consequence, we prove a sharp phase transition for the emergence of i-dimensional giant cycles in Voronoi percolation on the $2i$-dimensional torus.

Keywords: percolation, probability, topology.