Future Work

There are several directions in the future. For example, on the scaling invariant property, RSW theory gave us a way to obtain the uniform probability bounds of crossing events, but we can also ask the question about the scaling limit of a crossing event, not only the uniform bounds. We'll try to apply the discrete analytic ideas developed by Simrnov[??] to extend the scaling problem on different types of lattice.

Abstract

We study the percolation phenomenon in planar statistical physics using probability theory tools. We especially focus on *Bernoulli percolation model*, and discuss the connecting property and phase transition behaviour on some regular lattice such as $\mathbb{Z}^2, \mathbb{T}_d$, triangular lattice or hexagon lattice. Further, we also run into interesting topics such as exponential decay near critical probability and scaling invariant property of the crossing events.

Reference

1. S. Smirnov, *Critical percolation in the plane: Conformal invariance, Cardy's formula, scaling limits, C. R. Acad. Sci. Paris* (2001).

2. Hugo Duminil-Copin, *Introduction to Bernoulli percolation*, (2018).

3. Geoffrey R. Grimmett, Ioan Manolescu, *Universality for bond percolation in two dimensions, Ann. Probab.* (2013).

4. R. Lyons, Y. Peres, *Probability on Trees and Networks.* (2016)