DOCTORAL PROGRAM
DISCRETE MATHEMATICS
TU & KFU GRAZ · MU LEOBEN
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Institut für Optimierung und Diskrete Mathematik

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Bootstrap percolation in $G(n,p)$

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Bootstrap percolation on a graph $G = G(V;E)$ with activation threshold an integer $r \geq 1$ is a deterministic process which evolves in rounds. Every vertex is in one of two possible states: it is either infected or uninfected. The set of initially infected vertices is given by $\mathcal{A}(0)$. In each round of the process every uninfected vertex v which has at least r infected neighbours becomes infected. Once a vertex has become infected it remains infected forever. The process stops once no more vertices become infected.

We consider the case when the graph G is a binomial random graph and $\mathcal{A}(0)$ consists of a given number of vertices chosen uniformly at random.

Janson, Łuczak, Turova and Vallier (2012) determined a threshold a_c such that for any $\omega(n) \gg \sqrt{a_c}$ if $|\mathcal{A}(0)| < a_c - \omega(n)$ then w.h.p. only a few additional vertices become infected. However if $|\mathcal{A}(0)| > a_c + \omega(n)$ then almost every vertex becomes infected. We show that this not only holds with high probability but with probability $1 - \exp(-\Omega(\omega^2/a_c))$.

This talk is based on joint work with Mihyun Kang.

Mihyun Kang