The Bohman-Frieze process near criticality.

Mihyun Kang
Freie Universitt Berlin

Abstract

The Erdős-Rényi random graph process begins with an empty graph on n vertices and edges are added randomly one at a time to a graph. A classical result of Erdős and Rényi states that the Erdős-Rényi process undergoes a phase transition, which takes place when the number of edges reaches n/2 and a giant component emerges. In this talk we discuss the so-called Bohman-Frieze process, a simple modification of the Erdős-Rényi process. The Bohman-Frieze process begins with an empty graph on n vertices. At each step two random edges are present and if the first edge would join two isolated vertices, it is added to a graph; otherwise the second edge is added. We show that the Bohman-Frieze process has a qualitatively similar phase transition to the Erdős-Rényi process in terms of the size and structure of the components near the critical point. Proof techniques include combinatorial arguments and a combination of the differential equations method with singularity analysis of generating functions which satisfy a quasi-linear partial differential equation.

(based on joint work with Perkins and Spencer)