

The Strange Logic of Random Graphs

Paul Erdős and Alfred Rényi were the first to consider the evolution of the random graph $G(n, p)$ [n vertices, edge probability p] as $p = p(n)$ evolved from zero to one and saw that for many natural properties A there was a threshold function [today we might refer to a percolation] near which the probability of A went quickly from near zero to near one. Their threshold functions were always of the form $p(n) = n^{-\alpha+o(1)}$ with α rational. We blend logic to this brew, making statements for any first order property A . For α irrational with Saharon Shelah we have a Zero-One Law. This leads to a complete theory and then to countable graphs that model the asymptotic properties in an intriguing though nondirect way. These graphs [and their automorphism groups] are quite interesting by themselves.