



istanbul matematiksel bilimler merkezi
istanbul center for mathematical sciences

TWO-DAY MINI-COURSE ON PROBABILITY

THE PHASE TRANSITION OF THE ERDŐS-RÉNYI RANDOM GRAPH

Balázs Ráth

Budapest University of Technology

Abstract

The mathematical theory of random graphs aims to model large complex networks (e.g., the web-graph or social networks) in order to understand phenomena related to the connectivity properties of the network (e.g., the emergence of epidemics).

The Erdős-Rényi random graph $G(n, p)$ is the simplest of all random graph models: we draw an edge independently with probability p between any pair of n nodes. Despite its simple definition, $G(n, p)$ already captures an interesting property of complex networks: the size distribution of connected clusters undergoes abrupt change as we increase p . This phenomenon is called a *phase transition* or the *emergence of the giant component*.

This two-day ($2 + 2 = 4$ hour-long) mini-course aims to present how (a) probability theory, (b) differential equations and (c) algorithmic graph theory can be used to understand the phase transition of $G(n, p)$. **It will be at a level accessible to undergraduate students with some background in probability.**

Lecture I : Monday, November 16, 2015, from 17:00-19:00

Lecture II : Wednesday, November 18, 2015, from 17:00-19:00

Place : IMBM Seminar Room, Boğaziçi University South Campus



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