
Random graphs
Graphes aléatoires

(Organizer and Chair / Responsable et président: **Pawel Pralat** (Ryerson University, Canada))

TOM BOHMAN, Carnegie Mellon University

Dynamic concentration in random greedy processes

Let \mathcal{H} be a D -regular, r -uniform hypergraph on n vertices, where r is fixed and $D \rightarrow \infty$ as $n \rightarrow \infty$. In this talk we survey some recent results on the random greedy matching algorithm and the random greedy independent set algorithm applied to \mathcal{H} . These random processes have implications for some classical questions in combinatorics. In this talk we focus on the questions that remain open.

ANDRZEJ DUDEK, Western Michigan University

On Hamilton Cycles in Random Hypergraphs

In this talk, we present both old and new developments concerning the Hamiltonicity of random hypergraphs. First, we consider random k -uniform hypergraphs of order n (each possible k -tuple appears independently with probability p) and determine the thresholds for the existence of different types of Hamilton cycles (including loose and tight cycles). Next, we discuss some very recent results about Hamiltonicity of random regular hypergraphs (joint work with Alan Frieze, Andrzej Ruciński, and Matas Šileikis). In doing so, we partially answer a question of Kim and Vu about “sandwiching random graphs”.

LINCOLN LU, University of South Carolina

Subgraphs in Random Non-uniform Hypergraphs

For a given set of positive integers $R := \{k_1, k_2, \dots, k_r\}$ and probabilities $\mathbf{p} = (p_1, p_2, \dots, p_r) \in [0, 1]^r$, let $G^R(n, \mathbf{p})$ be the random hypergraph G on n vertices so that for $1 \leq i \leq r$ each k_i -subset of vertices appears as an edge of G with probability p_i independently. We ask for what probability vector \mathbf{p} , $G^R(n, \mathbf{p})$ almost surely contains a given subhypergraph H . Those \mathbf{p} for which $G^R(n, \mathbf{p})$ almost surely contains H , form a convex region (depending on H) in a log-scale drawing. We also consider the associated extension problems. (Joint work with Edward Boehnlein.)

ABBAS MEHRABIAN, Pacific Institute for the Mathematical Sciences

Why complex networks have logarithmic diameters?

We present a new technique for proving logarithmic upper bounds for diameters of evolving random graph models, which is based on defining a coupling between random graphs and variants of random recursive trees. This technique is quite simple and provides short proofs, is applicable to a broad variety of models including those incorporating preferential attachment, and provides bounds with small constants. We illustrate this by proving logarithmic upper bounds for diameters of the following well-known models: forest fire model, copying model, PageRank-based selection model, Aiello-Chung-Lu models, generalized linear preference model, directed scale-free graphs, Cooper-Frieze model, and random unordered increasing k -trees.

TOBIAS MULLER, Utrecht University

Connectivity and the largest component in a hyperbolic model for complex networks

In this talk, I will discuss some recent and ongoing work on a model for complex networks that was introduced recently by Krioukov et al. In this model, N points are chosen randomly on the hyperbolic plane and any two of them are joined by an edge if they are within a certain hyperbolic distance. The model exhibits a power-law degree sequence, small distances

and clustering. I will present some results on the component structure of the graph model, and on the probability that it is connected.

(based on joint work with Michel Bode and Nikolaos Fountoulakis)