Discrete Mathematics and Computer Science Seminars
Department of Mathematical Sciences, Sharif University of Technology

Dynamics on Unimodular Random Graphs

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Abstract

This talk is centered on *vertex-shifts* on random graphs and networks (i.e. marked graphs), which are maps from the set of vertices to itself. Each vertex-shift provides a new graph on the same vertices and two partitions named as connected components and *foils*, which are analogues of connected components and stable manifolds in (discrete) dynamical systems. The main random networks under study are *unimodular random networks*. This recent concept is of interest because of its origins in Cayley graphs, limits of finite random graphs, unimodular (quasi-) transitive graphs and stationary point processes.

The first result is a classification of the connected components in terms of the cardinality of its included foils. Unimodularity implies that there are only three types of components almost surely, with derived properties. As a result, when the component is infinite, it should be a tree. Here, such trees are named *eternal family trees* (`EFT`'s) and share similarities with critical branching processes. We provide an abstract way of obtaining general unimodular `EFT`'s by choosing the root sufficiently far in a random family tree. An important special case is the *eternal Galton-Watson tree*, which is studied in detail here. A cardinality classification of general eternal family trees is also derived. Finally, some applications and problems are addressed. This work is a join work with Joint work with Francois Baccelli and Mir-Omid Haji-Mirsadeghi.

Wednesday, **17 Azar 1395** (7 December 2016), **12:45-14:00**
Room **317,** Department of Mathematical Sciences