BI-CO MATHEMATICS COLLOQUIUM

David Burstein

Swarthmore College

"Analyzing Network Dynamics Through Random Graph Models"

Monday, February 27, 2017

Talk at 4:00 – Park 338
Tea at 3:30 – Park 355, Math Lounge

Abstract:
Real world (neuronal, epidemiological, genetic) networks can be conveniently represented in terms of graphs, consisting of nodes (neurons, people, genes) and the connections between them. Furthermore, past work has emphasized how structural features of the network, such as the spectral radius, can influence the underlying dynamics. To better understand how network structure impacts the dynamics, we use random graph models to construct networks that emulate many of the features found in their real world counterparts, as observations from real world networks are often limited. And even though a substantial amount of literature has focused on the distribution of the spectral radius for random graph models with undirected connections, without the analogous results for graph models with directed (or weighted) connections, we cannot make reliable predictions about the dynamical processes that occur on such networks. Consequently, we address this gap by providing novel bounds on the distribution of the spectral radius for a special directed random graph model. In an effort to determine if analogous results hold for a larger collection of random graph models, we must construct realizations of these random graphs as many random graph models are not easily amenable to analysis. We will consider some of the challenges that arise in constructing realizations from these random graph models and present novel results that help us address these challenges.

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