Joint Physics and MathCS Seminar

Dynamical Processes in Time-varying Networks

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Abstract: Network modeling plays a critical role in identifying statistical regularities and structural principles common to many systems. The large majority of recent modeling approaches however are connectivity driven and provide a time-aggregated representation that may fail to describe the instantaneous and fluctuating dynamics of many networks. I will present a generative model framework for time-varying network by defining the activity potential, a time invariant function characterizing the agents' interactions.

I will show the definition of the activity driven class of models, capable of encoding the instantaneous time description of the network dynamics. This class of models provides an explanation of structural features such as the presence of hubs, which simply originate from the heterogeneous activity of agents. Within this framework, highly dynamical networks can be described analytically, allowing a quantitative discussion of the biases induced by the time-aggregated representations in the analysis of dynamical processes. In particular I will consider diffusive and contagion processes and their control strategies and develop a block variable mean-field approach that allows the derivation of the equations describing the evolution of the contagion process concurrently to the network dynamic.

Thursday, October 17, 2013, 2:30 pm
MSC: E300

Refreshments will be served at 2:00 pm in MSC N235.

Mathematics and Computer Science
Emory University