Student Seminar

Pi Mu Epsilon
& Gamecock Math Club

Cliff Graddy

Analysis of Randomly Generated Networks

by Cliff Gaddy
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Large Network science attempts to capture real-world phenomenon through mathematical models. The underlying model of a network relies on a mathematical structure called a graph. Having seen its early beginnings in the 1950's, the field has seen a surge of interest over the last two decades, attracting interest from a range of scientists including computer scientists, sociologists, biologists, physicists, and mathematicians. The field requires a delicate interplay between real-world modeling and theory, as it must develop accurate probabilistic models and then study these models from a mathematical perspective. In my talk, I speak about a project in which I generate random network samples with fixed graph parameters and then study properties of these samples. To generate these models, I use a well-known graph algorithm to produce an initial sample which is not random. I then run a Monte Carlo Markov Chain (MCMC) on a sample space of graphs beginning at this initial sample to achieve "randomness". Lastly, I analyze the eigenvalues of the Laplacian matrix of the last graph in the MCMC, as these eigenvalues are intricately connected with the structure of the graph. The programming of this project is done in Python and Matlab, having an object-oriented aspect as well as a computationally intensive aspect.

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6:30 pm
LeConte 303B

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