



THE UNIVERSITY OF GEORGIA
DEPARTMENT OF STATISTICS

Colloquium Series

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3:45 PM, Friday, Jan 22, 2021

Zoom link: <https://zoom.us/j/7979236528>

Autoregressive Networks

We propose a first-order autoregressive model for dynamic network processes in which edges change over time while nodes remain unchanged. The model depicts the dynamic changes explicitly. It also facilitates simple and efficient statistical inference such as the maximum likelihood estimators which are proved to be (uniformly) consistent and asymptotically normal. The model diagnostic checking can be carried out easily using a permutation test. The proposed model can apply to any Erdős-Renyi network processes with various underlying structures. As an illustration, an autoregressive stochastic block model has been investigated in depth, which characterizes the latent communities by the transition probabilities over time. This leads to a more effective spectral clustering algorithm for identifying the latent communities. Inference for a change-point is incorporated into the autoregressive stochastic block model to cater for possible structure changes. The developed asymptotic theory as well as the simulation study affirm the performance of the proposed methods. Application with three real data sets illustrates both relevance and usefulness of the proposed models.

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