Chapter 48 Outline

Network-Analysis: Estimation and Inference

Bruce Desmarais[1] **and John P. Schoeneman**[1]

[1]Penn State, Political Science, University Park, Pond Lab

Overview

In the first section we will give an overview of the most common models used for estimation in network analysis and the underlying inference framework for each model. In the second section we will discuss the advantages and disadvantages of each model to give practitioners guidance in selecting a model given their data and inference goals. In the last section we will conduct simulation studies with the goal of evaluating the effectiveness of out of sample predictions for selecting among these models.

Models

- LSM (Bilinear and Euclidean), mixed membership stochastic blockmodel, SOAM/Siena, ERGM (including TERGM and GERGM)

Inference Frameworks

- ML vs Bayesian estimation

Model Selection

- Directed vs Undirected
- Edge Types: Binary, Ordinal ,Count, Continuous
- Parameters
- Network vs Actor Inference

- Longitudinal variations
  - Discrete time, Autoregressive
  - Continuous time, process based
- Missingness

Simulation Study

-