

Colloquium
Michigan State University
Department of Statistics and Probability

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Large Spatial Covariance Matrix Estimation for High Dimensional Time Series with
Application to Semiparametric Model Construction

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10:20 a.m. - 11:10 a.m.
Refreshments 10:00am
C405 Wells Hall

Abstract

To better understand the spatial structure of large panels of time series and provide a data driven guideline for constructing semiparametric models, this paper investigates estimating a large spatial covariance matrix of the high dimensional generalized m -dependent and β -mixing time series by hard thresholding regularization. We quantify the interplay between the convergence rate of the spatial estimators and the temporal dependence level, and prove a cross-validation result justifying the resampling scheme for threshold selection. Given a consistently estimated covariance (rank correlation) matrix, we then propose a screening - clustering - sign constrained estimation (SCE) approach for modeling high dimensional data with complex spatial structure. This method is then applied to study the spatial structure of large panels of economic and financial time series. This study reveals proper semiparametric structures for several key economic measures: CPI, EMPI and FFR, which shows the superiorities over the linear models. We also evaluate the performance of the SCE approach in finite samples through a Monte Carlo experiment.