Data Science Seminar

Hosted by Department of Mathematical Sciences

- Date: Tuesday, April 25, 2017
- Time: 12:00-1:00
- Room: WH-100E
- Speaker: Lingzhou Xue (Pennsylvania State University)
- Title: Sufficient Forecasting Using Factor Models

Abstract

We consider forecasting a single time series using a large number of predictors when a nonlinear forecasting function is present. The linear forecasting is very appealing due to its simplicity. However, it only reveals one dimension of the predictive power in the underlying factors. This paper develops a new forecasting methodology called the sufficient forecasting, which provides several sufficient predictive indices to deliver additional predictive power. The sufficient forecasting correctly estimates projections of the underlying factors even in the presence of an arbitrary and unknown forecasting function. Our work identifies the effective factors that have impacts on the forecast target when the target and the cross-sectional predictors are driven by different sets of common factors. We derive asymptotic properties for the estimate of the central subspace spanned by these projection directions as well as the estimates of the sufficient predictive indices. We also prove that when the assumed linear forecasting function is violated, the simple linear estimate actually falls into this central subspace. Our method and theory allow the number of predictors to be larger than the number of observations. We finally demonstrate that the sufficient forecasting improves upon the linear forecasting in both simulation studies and an empirical study of forecasting macroeconomic variables.

More details about the Data Science seminar can be found at https://www2.math.binghamton.edu/p/seminars/sml