

Data Science Seminar
Hosted by Department of Mathematical Sciences

- Date: Tuesday, Oct 20, 2020
- Time: 12:00pm – 1:00pm
- Room: Via Zoom
- Speaker: Sumanta Basu (Cornell University)
- Title: Measuring Systemic Risk with Graphical Models of Time Series Data

Abstract

After the 2007-09 financial crisis, there has been a growing interest in measuring systemic risk, broadly defined as the risk of widespread failure of the entire financial system. In a highly interlinked financial market, a large body of recent works have proposed to use network connectivity amongst financial institutions to assess their systemic importance. In this work, we will present some graphical modeling techniques for learning interactions among the components of a large dynamic system from multivariate time series data, where the core idea is to learn from lead-lag relationships (commonly known as Granger causality) between time series in addition to their co-movements. In the context of modeling networks of interactions amongst financial institutions and measuring systemic risk, we will demonstrate how linear and quantile-based Granger causality analyses using vector autoregressive (VAR) models can provide insight. We will present some non-asymptotic statistical theory for our proposed algorithms, estimate these graphical models using stock returns of large financial institutions in U.S. and India, and demonstrate their usefulness in detecting systemically risky periods and institutions.

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