The University of Chicago

Department of Statistics

Seminar

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"Granger-Causality and Graphical Time Series Models"

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ABSTRACT

Graphical models have become an important tool for analyzing multivariate data. While the theory originally has been developed for variables which are sampled with independent replications, graphical models recently have been applied also to stationary multivariate time series.

We present a new class of graphs which visualize the dynamic relationships between the components of a multivariate stationary process. In these graphs, the vertices, which represent the components of the process, are connected by arrows if the corresponding components are Granger causal. Further the contemporaneous dependence structure is represented by undirected lines between the vertices. We further introduce a pathwise global causal Markov property for these graphs. This property allows to derive general noncausality relations for the process from the graphs. With this property the graphs are a suitable tool for the discussion of spurious causality and the identification of causal effects.