



Kolloquium über Mathematische Statistik und Stochastische Prozesse

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13.05.2025, 16:15 Uhr, Geom Hörsaal H5

Conditionally specified graphical modeling of stationary multivariate time series

Abstract:

Graphical models have become an important tool for summarizing conditional relations in a multivariate time series. Typically, the partial covariance is used as a measure of conditional dependence and forms the basis for construction of the interaction graph. However, for many real time series the outcomes may not be Gaussian and/or could be a mixture of different outcomes. For such time series using the partial covariance as a measure of conditional dependence may lead to misleading results. The aim of this paper is to develop graphical models for non-Gaussian time series. We propose a broad class of time series models which are specifically designed to succinctly encode the graphical model in its coefficients. For each univariate component in the time series, we model its conditional distribution with a distribution from the exponential family. We derive conditions under which the conditional specification leads to a well-defined strictly stationary time series. Further, we show that the time series is geometrically mixing and obtain an approximate Gibbs sampler to simulate sample paths.

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