

# **High-Dimensional Time Series Analysis: Introduction and Some Recent Developments**

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## **Abstract**

High-dimensional time series become commonplace in the data-rich environment. The dynamic or serial dependence distinguishes analysis of such data from the conventional statistical analysis. Methods developed for independent data may encounter difficulties when they are applied to high-dimensional time series data. In this talk, we introduce some general concepts of high-dimensional time series and discuss some recent developments in studying such series. We also discuss difficulties for dealing with strong serial dependence. The developments discussed include testing for serial dependence, variable selection, and factor models. The difficulties encountered include co-integration, over-differencing, and non-stationarity. If time permits, I shall also discuss some experience in applying deep learning to analysis of categorical time series and compare the results with traditional methods.

[The talk is based on some joint projects with Rong Chen (Rutgers), Yuefeng Han (U. Chicago), and Shiqing Ling (HKUST).]