An introduction to high-dimensional time series models

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Abstract

In this talk, I will introduce several useful high-dimensional time series models such as high-dimensional autoregressive exogenous (ARX) models and high-dimensional location-dispersion models with time series error. I will start with a brief review of some fundamental methods for analyzing high-dimensional independent data such as the lasso and the greedy algorithm. Then the pros and cons of these methods are discussed when it comes to the dependent data. In particular, I will detail their statistical strengths and weaknesses under the aforementioned high-dimensional time series models. The key ingredient in this talk is the bias-variance tradeoff in high-dimensional scenarios, which is realized either by the tuning parameters in lasso or the high-dimensional information criterion for determining the number of iterations of the greedy algorithm. Applications of these methods to manufacturing and environmental data will also be given.