

# **Estimation of autocovariance matrices of serially dependent data and analysis of high-dimensional multivariate time series**

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## **Abstract**

In this talk, we consider estimating the (inverse) autocovariance matrix of  $n$  consecutive time series observations. Since the number of parameters in the autocovariance matrix is equivalent to  $n$ , we are faced with a high-dimensional estimation problem. To circumvent this difficulty, we introduce a banded covariance matrix of Wu and Pourahmadi (2009) and a modified Cholesky decomposition of Ing et al. (2016). The spectral norm consistency of these estimates is established under short and long memory time series models. Applications of these methods to estimation and model averaging for regression models with time series error are also given. The second issue of this talk is concerned with the estimation and prediction of high-dimensional multivariate time series, in which the number of predictor variables or the number of variates is allowed to be much larger than the sample size. We review the performance of the existing methods based on the  $L_1$ -penalized least squares and introduce a new method based on the greedy algorithm. The performance of the latter method is discussed by both theoretical and numerical analyses.