THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

MATHEMATICS COLLOQUIUM

Statistical Inference for High-Dimensional Spectral Density Matrix

By

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Abstract

The spectral density matrix is a fundamental object of interest in time series analysis, and it encodes both contemporary and dynamic linear relationships between component processes of the multivariate system. In this paper we develop novel inference procedures for the spectral density matrix in the high-dimensional setting. Specifically, we introduce a new global testing procedure to test the nullity of the cross-spectral density for a given set of frequencies and across pairs of component indices. For the first time, both Gaussian approximation and parametric bootstrap methodologies are employed to conduct inference for a high-dimensional parameter formulated in the frequency domain, and new technical tools are developed to provide asymptotic guarantees of the size accuracy and power for global testing. We further propose a multiple testing procedure for simultaneously testing the nullity of the cross-spectral density at a given set of frequencies. The method is shown to control the false discovery rate. Both numerical simulations and a real data illustration demonstrate the usefulness of the proposed testing methods.

Biography

Jinyuan Chang is a Guanghua Distinguished Professor of Statistics and Econometrics at Southwestern University of Finance and Economics, and also a professor at Academy of Mathematics and Systems Science of Chinese Academy of Sciences. His main research interests include high-dimensional data analysis, and high-frequency data analysis. He currently serves as the Associate Editor of Journal of the American Statistical Association, Journal of Business & Economic Statistics, and Statistica Sinica.

Date : 29 September 2023 (Fri)
Time : 3:00pm – 4:00pm
Venue : Lecture Theater F (Lifts 25/26)

All Are Welcome!