中央研究院統計科學研究所

學 術 演 講

講 題：Asymptotic theory for time series analysis

演 講 人：Prof. Masanobu Taniguchi
Waseda University

時 間：2025-02-24 (Mon.) 10:30-12:00

地 點：Auditorium, B1F, Institute of Statistical Science；The tea reception will be held at 10:10.

備 註：Online live streaming through Cisco Webex will be available.

Abstract

This talk consists of the following two parts(i)&(ii).

(i)Hellinger Distance Estimation for Non-Regular Spectra
For Gaussian stationary process, we derive the time series Hellinger distance for spectra f and g: T(f, g). Evaluating T(f_θ, f_θ+h) of the form O(hˆα), we elucidate the 1/α-consistent asymptotics of the maximum likelihood estimator of θ for non-regular spectra. For regular spectra, we introduce the minimum Hellinger distance estimator \hat{θ} = arg minθ T(f_θ, gˆn), where gˆn is a nonparametric spectral density estimator. We show that \hat{θ} is asymptotically efficient, and more robust than the Whittle estimator. Small numerical studies will be provided.

(ii) The least squares estimator (LSE) seems a natural estimator of linear regression models.
Whereas, if the dimension of the vector of regression coefficients is greater than 1 and
the residuals are dependent, the best linear unbiased estimator (BLUE), which includes the
information of the covariance matrix Γ of residual process has a better performance than
LSE in the sense of mean square error. As we know the unbiased estimators are generally
inadmissible. In this talk, we propose a shrinkage estimator based on BLUE. Sufficient conditions for this shrinkage estimator to improve BLUE are also given. Furthermore, since Γ is infeasible, assuming that Γ has a form of $\Gamma = \Gamma(\boldsymbol{\theta})$, we introduce a feasible version of that shrinkage estimator with

replacing $\Gamma(\boldsymbol{\theta})$ by $\Gamma(\hat{\boldsymbol{\theta}})$. Additionally, we give the sufficient conditions where the feasible version improves BLUE.

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Joint work with Yujie Xue(Waseda University)

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