中央研究院 ACADEMIA SINICA 1928

統計科學研究所
INSTITUTE OF STATISTICAL SCIENCE

SEMINAR STATAS

Seminar

Title：Eigenvalues of Large Spatial Covariance Matrices

Speaker：Prof. Hao Zhang (張 浩 教授)

(Department of Statistic, Purdue University)

Time：10:30 AM~12:00 PM, Monday, Mar. 13, 2023

Place：Auditorium, B1F, Institute of Statistical Science

Abstract

I present some most recent results about the covariance matrix of a stochastic process on a bounded domain. Under very mild conditions that are satisfied by any continuous covariance function (not necessarily stationary), the covariance matrix of observed variables at any n distinct locations in a bounded domain is ill conditioned as n is sufficiently large. Specifically, the smallest eigenvalue of the matrix goes to 0 as n increases to infinity. Technical tools I used to establish the results include approximation theory in Reproducing Kernel Hilbert Spaces, the spectral theory for linear operators in Hilbert spaces, and the Min-Max Theorem. I will also discuss the implication of these results to the analysis of large spatial data. For example, the Gaussian likelihood may have to be approximated, and covariance tapering does not overcome the ill condition. We may have to resort to the low-rank approximation in order to overcome the ill condition.

※Online live streaming through Cisco Webex will be available.

※ The tea reception will be held at 10:10.