中央研究院統計科學研究所

學 術 演 講

講 題：P-value free Methods for FDR Controls: A personal perspective

演 講 人：Prof. Jun S Liu（ 劉軍 教授 ）
Department of Statistics, Harvard University

時 間： 2025-1-3(Fri.) 10:30-12:00

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

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

Abstract

There has been significant interest among researchers in false discovery rate (FDR) control methods partially due to the strong desire from the scientific community for reproducibility and replicability of scientific discoveries. I will discuss my own perspectives on both methodological and theoretical developments in FDR control methods applicable to a wide class of regression models, covering the knockoff filter, data splitting (DS), and Gaussian mirror (GM). A classical statistical idea is to introduce certain data perturbations and examine their impacts on a statistical procedure, and all these methods follow this line of thinking one way or another. We present some power analysis of these methods under the weak-and-rare signal framework and discuss its implications under different correlation structures of the design matrix. We then focus on the DS procedure and its variation, Multiple Data Splitting (MDS), which are straightforward conceptually, easy to implement algorithmically, and applicable to a wide class of linear and nonlinear models. Their specializations in GLMs result in scale-free procedures that can circumvent difficulties caused by non-traditional asymptotic behaviors of MLEs in moderate-dimensions and debiased Lasso estimates in high-dimensions. Some future developments along the line of e-values will be discussed. The presentation is based on joint work with Chenguang Dai, Buyu Lin, Yuanchuan Guo, and Tracy Ke.

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