



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON STATISTICS

Heteroskedastic Sparse PCA in High Dimensions

By

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Abstract

Principal component analysis (PCA) is one of the most commonly used techniques for dimension reduction and feature extraction. Though it has been well-studied for high-dimensional sparse PCA, little is known when the noise is heteroskedastic, which turns out to be ubiquitous in many scenarios, like biological sequencing data and information network data. We propose an iterative algorithm for sparse PCA in the presence of heteroskedastic noise, which alternatively updates the estimates of the sparse eigenvectors using the power method with adaptive thresholding in one step, and imputes the diagonal values of the sample covariance matrix to reduce the estimation bias due to heteroskedasticity in the other step. Our procedure is computationally fast and provably optimal under the generalized spiked covariance model, assuming the leading eigenvectors are sparse. A comprehensive simulation study demonstrates its robustness and effectiveness in various settings.

Biography

Dr. Zhao Ren is an Associate Professor in the Department of Statistics at the University of Pittsburgh. Dr. Ren obtained his Ph.D. in Statistics at Yale University in 2014. His research interests are in high-dimensional statistical inference, covariance/precision matrix estimation, robust inference, graphical models, nonparametric function estimation, and applications in statistical genomics.

Date : 17 November 2023 (Friday)

Time : 11:00am

Venue : Room 4475 (Lifts 25/26)

All are Welcome!