



The Hong Kong Polytechnic University Department of Applied Mathematics

AMA Distinguished Seminar Series in Data Science and Machine Learning

Asymptotic Distributions of High-Dimensional Distance Correlation Inference

By

Prof. Qiman SHAO Southern University of Science and Technology

Abstract

Distance correlation has become an increasingly popular tool for detecting the nonlinear dependence between a pair of potentially high-dimensional random vectors. Most existing works have explored its asymptotic distributions under the null hypothesis of independence between the two random vectors when only the sample size or the dimensionality diverges. Yet its asymptotic null distribution for the more realistic setting when both sample size and dimensionality diverge in the full range remains largely underdeveloped. In this talk, we will develop the central limit theorem and associated rates of convergence for a rescaled test statistic based on the bias-corrected distance correlation in high dimensions under some mild regularity conditions and the null hypothesis. Our new theoretical results reveal an interesting phenomenon of blessing of dimensionality for high-dimensional distance correlation inference in the sense that the accuracy of normal approximation can increase with dimensionality. This talk is based on a joint work with Lan Gao, Yingying Fan and Jinchi Lv.

Biography

Qi-Man SHAO is Chair Professor, the founding Head of the Department of Statistics and Data Science, Southern University of Science and Technology. Prof. Shao received his Bachelor degree and Master degree at Hangzhou University (now known as Zhejiang University) in 1983 and 1986 respectively. Then he got his Ph.D. degree at University of Science and Technology of China in 1989. He once worked in Hangzhou University, National University of Singapore, University of Oregon, the Hong Kong University of Science and Technology and the Chinese University of Hong Kong successively. Prof. Shao has made significant contributions to limit theory in probability and statistics. He was awarded the State Natural Science Award (2nd class) in 2015. He was an invited speaker at the International Congress of Mathematicians in 2010. He is an elected Fellow of the Institute of Mathematical Statistics (IMS) and served as chairman of IMS Committee on Fellows. He served as an Associate Editor of the Annals of Statistics and the Annals of Applied Probability. He is currently a council member of IMS and a Co-Editor of the Annals of Applied Probability from 2022 to 2024.

Date: 28 July 2022 (Thursday) Time: 10:00-11:00 (Hong Kong Standard Time GMT +8) Venue: Online Talk via Zoom (Meeting ID: 918 2628 9492) Speaker: Prof. Qiman Shao, Southern University of Science and Technology Host: Prof. Jian Huang and Prof. Xingqiu Zhao, The Hong Kong Polytechnic University Click to join: https://polyu.zoom.us/j/91826289492?pwd=YUIPUzRiRGRWNjNOMUhlaWNpYitydz09



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