

**The Hong Kong Polytechnic University
Department of Applied Mathematics**

AMA Distinguished Seminar Series in Data Science and Machine Learning

Statistical Inference for Nonlinear Regression Models with a Diverging Number of Covariates

By

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Abstract

For statistical inference on regression models with a diverging number of covariates, the existing literature on debiased lasso typically makes sparsity assumptions on the inverse of the Fisher information matrix. Such assumptions, however, are often violated particularly for nonlinear regression models such as generalized linear models and Cox proportional hazards models, leading to biased estimates with under-coverage confidence intervals. We propose to modify the debiased lasso approach by either directly inverting the information matrix or solving a series of quadratic programming problems to approximate the inverse information matrix without posing sparse matrix assumptions. We establish asymptotic results for the estimated regression coefficients when the dimension of covariates diverges with the sample size. As demonstrated by extensive simulations, our proposed method provides consistent estimates and confidence intervals with nominal coverage probabilities. The utility of the method is further demonstrated by assessing the effects of genetic markers on patients' overall survival with the Boston Lung Cancer Survival Cohort, a large-scale epidemiology study investigating mechanisms underlying the lung cancer. This is joint work with Lu Xia and Yi Li.

Biography

Dr. Bin Nan is Chancellor's Professor of Statistics at University of California Irvine; ASA Fellow; IMS Fellow; Elected Member of ISI; Associate Editor of JASA A&CS, Lifetime Data Analysis, and Statistics in Biosciences. His research interests include censored survival data, longitudinal data, brain image data, high-dimensional data, two-phase sampling designs, and applications in health research particularly in aging and Alzheimer's disease.

Date: 30 November 2022 (Wednesday)

Time: 11:00-12:00 (Hong Kong Standard Time GMT +8)

Venue: Online Talk via Zoom (Meeting ID: 918 9672 1461)

Speaker: Prof. Bin Nan, University of California, Irvine

Host: Prof. Xingqiu Zhao, The Hong Kong Polytechnic University

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