THE UNIVERSITY OF CHICAGO

Department of Statistics

DISSERTATION PRESENTATION AND DEFENSE

ZHIPENG LOU

Department of Statistics
The University of Chicago

High Dimensional Inference Based on Quadratic Forms

MONDAY, April 27, 2020, at 2:00 PM
Zoom Meeting, 5747 S. Ellis Avenue

ABSTRACT

In this talk, we first present a systematic theory for high dimensional analysis of variance in multivariate linear regression, where the dimension and the number of coefficients can both grow with the sample size. We propose a new U type test statistic to test linear hypothesis. Under fairly mild moment conditions, we establish a high dimensional invariance principle, which provides distributional approximation of quadratic forms of non-Gaussian vectors by those of Gaussian ones. Our general framework and theory can be applied to deal with the classical one-way multivariate ANOVA and the nonparametric one-way MANOVA in high dimensions.

We then consider the white noise test for high dimensional time series. Based on a modified Box-Pierce test statistic, we propose a new portmanteau test for detecting serial correlations of high dimensional time series. To obtain the asymptotic distribution of the new test statistic, we develop a new high dimensional Gaussian approximation result for quadratic forms of martingale differences. To estimate the cutoff values, we propose a permutation procedure which avoids estimating the cross-sectional dependencies.

For information about building access for persons with disabilities, please contact Keisha Prowoznik at 773.702-0541 or send an email to kprowoznik@galton.uchicago.edu. If you wish to subscribe to our email list, please visit the following web site: https://lists.uchicago.edu/web/subscribe/statseminars.