Statistics Seminar

Department of Mathematical Sciences

DATE:	Thursday, April 16, 2015
TIME:	1:15pm to 2:15pm
LOCATION:	WH 100E
SPEAKER:	Ruiqi Liu (Binghamton University)
TITLE:	Density estimation for power transformations—Paper Discussion

Abstract

I will discuss a paper of Olga Y. Savchuk and Anton Schick. Consider a random sample $X_1,\ldots,X_n$ from a density f. For a positive α, the density g of $t(X_1) = |X_1|^\alpha sign(X_1)$ can be estimated in two ways: by a kernel estimator based on the transformed data $t(X_1),\ldots,t(X_n)$ or by a plug- in estimator transformed from a kernel estimator based on the original data. In this paper, they compare the performance of these two estimators using MSE and MISE. For MSE, the plug-in estimator is better in the case $\alpha > 1$ when f is symmetric and unimodal, and in the case $\alpha \ge 2.5$ when f is right- skewed and/or bimodal. For $\alpha < 1$, the plug-in estimator performs better around the modes of g, while the transformed data estimator is better in the tails of g. For global comparison MISE, the plug-in estimator has a faster rate of convergence for $0.4 \le \alpha < 1$ and $1 < \alpha < 2$. For $\alpha < 0.4$, the plug-in estimator is preferable for a symmetric density f with exponentially decaying tails, while the transformed data estimator has a better performance when f is right-skewed or heavy-tailed. Applications to real and simulated data illustrated these theoretical findings.