

Statistics Seminar
Department of Mathematical Sciences

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| 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, \dots, X_n from a density f . For a positive α , the density g of $t(X_1) = |X_1|^{\alpha} \text{sign}(X_1)$ can be estimated in two ways: by a kernel estimator based on the transformed data $t(X_1), \dots, t(X_n)$ 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 $\alpha \geq 2.5$ 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 $0.4 \leq \alpha < 1$ 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.

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