

Statistics Seminar
Department of Mathematical Sciences

DATE:	Thursday, Oct. 1, 2020
TIME:	1:15pm - 2:15pm
LOCATION:	Zoom Meeting
SPEAKER:	Yishi Wang, University of North Carolina Wilmington University
TITLE:	Inference of a two-sample order free trend test

Abstract

A new nonparametric methodology is developed for testing whether two independent groups sharing the same changing pattern from a response variable, over multiple ordered sub-populations in each of the two groups. The question is formalized into a nonparametric two-sample comparison problem for the stochastic order among subsamples, through U-statistics with accommodations for zero-inflated distributions. A novel bootstrap procedure is proposed to obtain the critical values with given type I error. Following the procedure, bootstrapped p-values are obtained through simulated samples. It is proven that the distribution of the test statistics is independent from the underlying distributions of the subsamples, when certain sufficient statistics provided. Furthermore, this study also develops a feasible framework for power studies to determine sample sizes, which is necessary in real-world applications. Simulation results suggest that the test is consistent. The methodology is illustrated using a biological experiment with a split-plot design, and significant differences in changing patterns of seed weight between treatments are found with relative small subsample sizes. The asymptotic distribution of the test is also investigated.

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