



Mathematical Sciences



Fall 2016

Colloquium Series

Friday, October 21, 2016 at 3pm in Bell Hall 143

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**Comparing treatments when data points are
empirical distribution functions**

Applications arise where it is desired to compare treatments, and samples consist of data points that are estimates of distribution functions. While there are many statistical procedures available to compare two distribution functions, where there is a single estimate from each, there are no adequate methods for incorporating a sample of estimates. Extensions of several nonparametric tests for comparing two distribution functions based on a single estimate from each—the Kolmogorov-Smirnov, Cramer von Mises and Kuiper tests—are proposed, where the empirical distributions are regarded as the data points. The proposed test statistics are formed by averaging test statistics of all possible pairs of data points. The reference distribution is then obtained by randomly permuting the empirical distribution functions across the two treatments and calculating the resulting summary test statistics. Simulations compare the Type I error rates and powers of these procedures for a variety of settings. The method is demonstrated using data from an industrial application.