
HKMetrics-Seminar@Heidelberg

Research seminar in Econometrics and Statistics

Permutation Tests for Equality of Distributions of Functional Data

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Abstract:

Economic data are often generated by stochastic processes that take place in continuous time, though observations may occur only at discrete times. For example, electricity and gas consumption take place in continuous time. Data generated by a continuous time stochastic process are called functional data. This paper is concerned with comparing two or more stochastic processes that generate functional data. The data may be produced by a randomized experiment in which there are multiple treatments. The paper presents a method for testing the hypothesis that the same stochastic process generates all the functional data. The test described here applies to both functional data and multiple treatments. It is implemented as a combination of two permutation tests. This ensures that in finite samples, the true and nominal probabilities that each test rejects a correct null hypothesis are equal. The paper presents upper and lower bounds on the asymptotic power of the test under alternative hypotheses. The results of Monte Carlo experiments and an application to an experiment on billing and pricing of natural gas illustrate the usefulness of the test.