

Nonparametric Comparison of Multiple Regression Curves in Scale-Space

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Summary: This work concerns testing the equality of multiple curves in a nonparametric regression context. The proposed test forms an ANOVA type test statistic based on kernel smoothing and examines the ratio of between and within group variations. The empirical distribution of the test statistic is derived using a permutation test. Unlike traditional kernel smoothing approaches, the test is conducted in scale-space so that it does not require the selection of an optimal smoothing level, but instead considers a wide range of scales. The proposed method also visualizes its testing results as a color map and graphically summarizes the statistical differences between curves across multiple locations and scales. A numerical study using simulated and real examples is conducted to demonstrate the finite sample performance of the proposed method.

Keywords: Comparison of multiple curves, Kernel smoothing, Scale-Space, Visualization.

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