Projection tests for linear hypothesis in the functional response model

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Abstract

The paper concerns the linear hypothesis testing problem in the functional response model, which is one of the regression models considered in the functional data analysis. In this model, the response is a function represented as a random process, while the predictors are random variables. To test the linear hypothesis, the projection tests are constructed and theoretically justified. Namely, a kind of equivalence between the functional null hypothesis and its projected version is established. Different Gaussian processes and numbers of projections are considered in the implementation of new solutions. Moreover, as there is no one test having the best power for all correlation cases, a simple combining test is also proposed. It has satisfactory power in all cases. In simulation studies, the new tests are compared with existing methods in terms of size control and power. The real data example is also provided to illustrate the results.

Keywords

Functional regression model, Gaussian process, Linear hypothesis, Projection method, Statistical test

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