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Model checks for functional linear regression models based on projected empirical processes.
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Summary: The goodness-of-fit testing for functional linear regression models with functional responses is studied. A residual-marked empirical process-based test is proposed. The test is projection-based, which can well circumvent the curse of dimensionality. The test is omnibus against any global alternative hypothesis as it integrates over all projection directions in the unit ball. The weak convergence of the test statistic under the null hypothesis is derived and it is shown that the proposed test can detect the local alternative hypotheses distinct from the null hypothesis at the fastest possible rate of order $O(n^{-1/2})$. To reduce computational burden for critical value determination, a nonparametric Monte Carlo method is used, and simulation studies show the good performance of the proposed method in various scenarios. An ergonomics data set is analyzed for illustration.

MSC:

62 Statistics

Keywords:

functional linear models; model checking; residual-marked; projected empirical processes

Software:

[rp.flm.test](#)

Full Text: [DOI](#)

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