Consistent Variable Selection in Functional Linear Regression Model

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The dual problem of testing the predictive significance of a particular covariate, and identification of the set of relevant covariates is common in applied research and in methodological investigations. For the functional linear regression model where the predictor variables are observed over a grid and the response is scalar, we consider basis expansions of the functional covariates and apply the likelihood ratio test. Based on p-values from testing each predictor, we propose a new variable selection method, which is proven to be consistent in selecting the set of relevant predictors. A real dataset from weather stations in Japan is analyzed.

Keywords: B-splines; hypotheses testing; false discovery rate; likelihood ratio test.