
Summary: Variable selection problem is one of the most important tasks in regression analysis, especially in a high-dimensional setting. In this paper, we study this problem in the context of scalar response functional regression model, which is a linear model with scalar response and functional regressors. The functional model can be represented by certain multiple linear regression model via basis expansions of functional variables. Based on this model and random subspace method of J. Mielniczuk and P. Teisseyre [Comput. Stat. Data Anal. 71, 725-742 (2014; Zbl 1471.62139)], two simple variable selection procedures for scalar response functional regression model are proposed. The final functional model is selected by using generalized information criteria. Monte Carlo simulation studies conducted and a real data example show very satisfactory performance of new variable selection methods under finite samples. Moreover, they suggest that considered procedures outperform solutions found in the literature in terms of correctly selected model, false discovery rate control and prediction error.

MSC:
62G08 Nonparametric regression and quantile regression
62J05 Linear regression; mixed models
62H25 Factor analysis and principal components; correspondence analysis

Keywords:
basis functions representation; functional regression analysis; information criterion; random subspace method; variable selection; multiple linear regression model; prediction error

Software:
R; regRSM; fda (R)

Full Text: DOI

References:


This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.