

Estimation of Functional Response Model by Supervised Functional Principal Component Analysis

Authors : Hyon I. Paek, Sang Rim Kim, Hyon A. Ryu

Abstract : In functional linear regression, one typical problem is to reduce dimension. Compared with multivariate linear regression, functional linear regression is regarded as an infinite-dimensional case, and the main task is to reduce dimensions of functional response and functional predictors. One common approach is to adapt functional principal component analysis (FPCA) on functional predictors and then use a few leading functional principal components (FPC) to predict the functional model. The leading FPCs estimated by the typical FPCA explain a major variation of the functional predictor, but these leading FPCs may not be mostly correlated with the functional response, so they may not be significant in the prediction for response. In this paper, we propose a supervised functional principal component analysis method for a functional response model with FPCs obtained by considering the correlation of the functional response. Our method would have a better prediction accuracy than the typical FPCA method.

Keywords : supervised, functional principal component analysis, functional response, functional linear regression

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