A Reproducing Kernel Hilbert Space Approach to Functional Linear Regression

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Abstract

We study a smoothness regularization method for functional linear regression and provide a unified treatment for both the prediction and estimation problems. By developing a tool on simultaneous diagonalization of two positive definite kernels, we obtain shaper results on the minimax rates of convergence and show that smoothness regularized estimators achieve the optimal rates of convergence for both prediction and estimation under conditions weaker than those for the functional principal components based methods developed in the literature. We also show that the procedure is easily implementable.

Based on joint work with Tony Cai.