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## Robust estimators in semi-functional partial linear regression models

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**Abstract**

Partial linear models have been adapted to deal with functional covariates to capture both the advantages of a semi-linear modelling and those of nonparametric modelling for functional data. It is easy to see that the estimation procedures for these models are highly sensitive to the presence of even a small proportion of outliers in the data. To solve the problem of atypical observations when the covariates of the nonparametric component are functional, robust estimates for the regression parameter and regression operator are introduced. Consistency results of the robust estimators and the asymptotic distribution of the regression parameter estimator are studied. The reported numerical experiments show that the resulting estimators have good robustness properties. The benefits of considering robust estimators is also illustrated on a real data set where the robust fit reveals the presence of influential outliers.

*Keywords:* Functional data, Kernel smoothers, Partial linear models, Robust estimation

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**AMS Subject Classification:** 62G35, 62G08, 62G05

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