



Robust estimation in single-index models when the errors have a unimodal density with unknown nuisance parameter

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Abstract

This paper develops a robust profile estimation method for the parametric and nonparametric components of a single-index model when the errors have a strongly unimodal density with unknown nuisance parameter. We derive consistency results for the link function estimators as well as consistency and asymptotic distribution results for the single-index parameter estimators. Under a log-Gamma model, the sensitivity to anomalous observations is studied using the empirical influence curve. We also discuss a robust K -fold cross-validation procedure to select the smoothing parameters. A numerical study carried on with errors following a log-Gamma model and for contaminated schemes shows the good robustness properties of the proposed estimators and the advantages of considering a robust approach instead of the classical one. A real data set illustrates the use of our proposal.

Keywords Kernel weights · Fisher consistency · Local polynomials · Single-index models · Robustness

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