ROBUST ESTIMATION FOR ADDITIVE MODELS USING THE BACKFITTING ALGORITHM

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ABSTRACT

This paper presents a method of estimation and simulation of an additive model of two variables using robust splines, but the general method can be applied to several variables. The software used for the simulations is S+ and it uses explicitly the smooth.splineRob function in an implementation of the backfitting algorithm. The smooth.splineRob function has been coded based on the work of Cantoni and Ronchetti [3], which emphasizes the robust selection of the smoothing parameter using a robust version of Mallows' C_p, RC_p , and robust cross validation, *RCV*. The existence of outliers or non-normal data in the stochastic part of the additive model may cause a poor estimate of the smoothing parameter that will influence the overall estimate process. For the simulation stage estimations are performed by classical and robust splines (with robust estimation of the parameter). The estimates obtained are very convincing but the execution time of the program is relatively high for both RC_p and *RCV*, even if, in certain cases, few robust iterations are enough to get better results than the classical estimates.

Keywords: Nonparametric Models, Additive Models, *M*-type Robust *Splines*, Robust Mallows' $C_{p.}$