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Kernel regression with Weibull-type tails

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Abstract We consider the estimation of the tail coefficient of a Weibull-type distribution in the presence of random covariates. The approach followed is non-parametric and consists of locally weighted estimation in narrow neighbourhoods in the covariate space. We introduce two families of estimators and study their asymptotic behaviour under some conditions on the conditional response distribution, the kernel function, the density function of the independent variables, and for appropriately chosen bandwidth and threshold parameters. We also introduce a Weissman-type estimator for estimating upper extreme conditional quantiles. The finite sample behaviour of the proposed estimators is examined with a simulation experiment. The practical applicability of the methodology is illustrated on a dataset of sea storm measurements.

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