

Estimation of central shapes of error distributions in linear regression problems

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Abstract Consider a linear regression model subject to an error distribution which is symmetric about 0 and varies regularly at 0 with exponent ζ . We propose two estimators of ζ , which characterizes the central shape of the error distribution. Both methods are motivated by the well-known Hill estimator, which has been extensively studied in the related problem of estimating tail indices, but substitute reciprocals of small L_p residuals for the extreme order statistics in its original definition. The first method requires careful choices of p and the number k of smallest residuals employed for calculating the estimator. The second method is based on subsampling and works under less restrictive conditions on p and k . Both estimators are shown to be consistent for ζ and asymptotically normal. A simulation study is conducted to compare our proposed procedures with alternative estimates of ζ constructed using resampling methods designed for convergence rate estimation.

Keywords Centre exponent · L_p estimator · Regression · Subsampling