

Probability and Statistics

Asymptotic theory of M-estimators for multiple linear regression in time series

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We contribute to the asymptotic theory of M-estimators, as introduced by Huber (1964), for multiple linear regression by analysing absolutely continuous objective functions with a right and left derivative at all points, and which are non-decreasing on $[0, \infty[$ and non-increasing on $] - \infty, 0]$. Particular cases are the Huber-skip and quantile estimation. We allow for a variety of regressors, both deterministic and stochastic, where the stochastic regressors can be either stationary or random walks. We prove tightness, consistency, and find a stochastic expansion of the M-estimator, from which one can derive limit distributions under weak assumptions on the objective function and regressors. The results are obtained using some recent martingale results, see Johansen and Nielsen (2016).

References

Johansen, S. and Nielsen B. (2016) Analysis of the Forward Search using some new results for martingales and empirical processes. *Bernoulli*, 22, 1131–1183.

Johansen, S. and Nielsen B. (2015) Asymptotic theory of M-estimators for multiple linear regression in time series. In preparation.

This is joint work with Bent Nielsen.