

# Nonparametric quantile regression with heavy-tailed and strongly dependent errors

Toshio Honda

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**Abstract** We consider nonparametric estimation of the conditional  $q$ th quantile for stationary time series. We deal with stationary time series with strong time dependence and heavy tails under the setting of random design. We estimate the conditional  $q$ th quantile by local linear regression and investigate the asymptotic properties. It is shown that the asymptotic properties are affected by both the time dependence and the tail index of the errors. The results of a small simulation study are also given.

**Keywords** Conditional quantile · Random design · Check function · Local linear regression · Stable distribution · Linear process · Long-range dependence · Martingale central limit theorem