

# Nonregular convergence rates for estimators in regression models

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1. For sufficiently nonregular distributions with bounded support, the extreme observations converge to the boundary points at a faster rate than the square root of the sample size. In a nonparametric regression model with such a nonregular error distribution, this fact can be used to construct an estimator for the regression function that converges at a faster rate than the usual estimators.
2. The response density of a parametric or nonparametric regression model can be estimated by a convolution estimator or by a local U-statistic. If the regression function has a derivative that is bounded away from zero, these estimators converge as the square root of the sample size. If the derivative vanishes for some covariate value, these estimators slow down, but are usually still faster than the usual regression estimators. We describe the rate in terms of how “flat” the regression function is at some point.