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Title:

Quantile pyramids for simultaneous quantile regression

Abstract:

Quantile regression models provide a wide picture of the conditional distributions of the response variable by capturing the effect of the covariates at different quantile levels.

Fitting quantiles at multiple levels simultaneously allow for borrowing of information across the quantile levels, leading to an improvement in efficiency. At the same time, the long standing issue of quantiles crossing can be handled easily under this setup.

We consider the use of Bayesian nonparametric prior known as the quantiles pyramid in the quantile regression setting. We show how to flexibly construct a base distribution in the context of quantile regression, and obtain inference at multiple quantile levels simultaneously. We discuss the implementation in both linear and nonlinear quantile regression cases.