



A tuning-free efficient test for marginal linear effects in high-dimensional quantile regression

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Abstract

This work is concerned with testing the marginal linear effects of high-dimensional predictors in quantile regression. We introduce a novel test that is constructed using maxima of pairwise quantile correlations, which permit consistent assessment of the marginal linear effects. The proposed testing procedure is computationally efficient with the aid of a simple multiplier bootstrap method and does not involve any need to select tuning parameters, apart from the number of bootstrap replications. Other distinguishing features of the new procedure are that it imposes no structural assumptions on the unknown dependence structures of the predictor vector and allows the dimension of the predictor vector to be exponentially larger than sample size. To broaden the applicability, we further extend the preceding analysis to the censored response case. The effectiveness of our proposed approach in the finite samples is illustrated through simulation studies.

Keywords High dimension · Marginal quantile regression · Multiplier bootstrap · Quantile correlation · Quantile slope · Randomly censored data

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