Sparse Composite Quantile Regression with Ultra-high Dimensional Heterogeneous Data

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Abstract: Quantile regression is widely employed in heterogeneous data, but to select covariates that globally affect the response and estimate coefficients simultaneously are very challenging. In this article, we introduce a new globally concerned quantile variable screening method called sparse composite quantile regression (SCQR) for the analysis of ultra-high dimensional heterogeneous data. The proposed method enjoys the sure screening property, can derive a consistent selection path and yields a consistent estimation for coefficients simultaneously across a continuous range of quantile levels. An extended Bayesian information criterion (EBIC) is employed to select the ``best" candidate from the path. Extensive simulation studies demonstrate the usefulness of the proposed method.