Minimum Prole Hellinger Distance Estimation of Semiparametric Multiple Linear Regression Models

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Abstract:

As the most fundamental tool to analyze associations, the semiparametric multiple linear regression model is considered in this work where the error distribution is assumed symmetric but otherwise completely unknown. To handle the common concern about possible outlying observations, especially in the era of big data, we propose a robust estimator of regression coecients based on Hellinger distance and proling technique. We prove in theory that the resulting estimator, minimum prole Hellinger distance estimator (MPHDE), is consistent. Its nite-sample performance is examined via both extensive simulation studies and a real data application. Our numerical results demonstrate that the proposed MPHDE has good eciency and simultaneously is very robust against outlying observations.

Keywords:

Semiparametric linear regression model; minimum prole Hellinger distance estimator; kernel estimator; identiability; eciency; robustness.