

Robust and efficient variable selection for semiparametric partially linear varying coefficient model based on modal regression

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Abstract Semiparametric partially linear varying coefficient models (SPLVCM) are frequently used in statistical modeling. With high-dimensional covariates both in parametric and nonparametric part for SPLVCM, sparse modeling is often considered in practice. In this paper, we propose a new estimation and variable selection procedure based on modal regression, where the nonparametric functions are approximated by B -spline basis. The outstanding merit of the proposed variable selection procedure is that it can achieve both robustness and efficiency by introducing an additional tuning parameter (i.e., bandwidth h). Its oracle property is also established for both the parametric and nonparametric part. Moreover, we give the data-driven bandwidth selection method and propose an EM-type algorithm for the proposed method. Monte Carlo simulation study and real data example are conducted to examine the finite sample performance of the proposed method. Both the simulation results and real data analysis confirm that the newly proposed method works very well.