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Robust variable selection with exponential squared loss for partially linear spatial autoregressive models

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Abstract

In this paper, we consider variable selection for a class of semiparametric spatial autoregressive models based on exponential squared loss (ESL). Using the orthogonal projection technique, we propose a novel orthogonality-based variable selection procedure that enables simultaneous model selection and parameter estimation, and identifies the significance of spatial effects. Under appropriate conditions, we show that the proposed procedure is consistent and the resulting estimator has oracle properties. Furthermore, some simulation studies and an analysis of the Boston housing price data are also carried out to examine the finite-sample performance of the proposed method.

Keywords Orthogonal projection · Exponential squared loss · Semiparametric spatial autoregressive models · Oracle property · Variable selection

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