

Semiparametric estimation in regression with missing covariates using single-index models

Zhuoer Sun¹ · Suojin Wang¹

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Abstract We investigate semiparametric estimation of regression coefficients through generalized estimating equations with single-index models when some covariates are missing at random. Existing popular semiparametric estimators may run into difficulties when some selection probabilities are small or the dimension of the covariates is not low. We propose a new simple parameter estimator using a kernel-assisted estimator for the augmentation by a single-index model without using the inverse of selection probabilities. We show that under certain conditions the proposed estimator is as efficient as the existing methods based on standard kernel smoothing, which are often practically infeasible in the case of multiple covariates. A simulation study and a real data example are presented to illustrate the proposed method. The numerical results show that the proposed estimator avoids some numerical issues caused by estimated small selection probabilities that are needed in other estimators.

Keywords Asymptotic efficiency · Generalized estimating equation · Kernel estimation · Missing at random · Regression · Single-index model

✉ Suojin Wang
sjwang@stat.tamu.edu

¹ Department of Statistics, Texas A&M University, College Station, TX 77843, USA