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Dimension reduction for kernel-assisted M-estimators with missing response at random

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Abstract To obtain M-estimators of a response variable when the data are missing at random, we can construct three bias-corrected nonparametric estimating equations based on inverse probability weighting, mean imputation, and augmented inverse probability weighting approaches. However, when the dimension of covariate is not low, the estimation efficiency will be affected due to the curse of dimensionality. To address this issue, we propose a two-stage estimation procedure by using the dimension-reduced kernel estimators in conjunction with bias-corrected estimating equations. We show that the resulting three kernel-assisted estimating equations yield asymptotically equivalent M-estimators that achieve the desirable properties. The finite-sample performance of the proposed estimators for response mean, distribution function and quantile is studied through simulation, and an application to HIV-CD4 data set is also presented.

Keywords Consistency and asymptotic normality · Dimension reduction · Kernel-assisted · M-estimators · Missing at random

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