



Simultaneous confidence bands for nonparametric regression with missing covariate data

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Abstract

We consider a weighted local linear estimator based on the inverse selection probability for nonparametric regression with missing covariates at random. The asymptotic distribution of the maximal deviation between the estimator and the true regression function is derived and an asymptotically accurate simultaneous confidence band is constructed. The estimator for the regression function is shown to be oracally efficient in the sense that it is uniformly indistinguishable from that when the selection probabilities are known. Finite sample performance is examined via simulation studies which support our asymptotic theory. The proposed method is demonstrated via an analysis of a data set from the Canada 2010/2011 Youth Student Survey.

Keywords Brownian motion · Maximal deviation · Simultaneous confidence band · Weighted local linear regression

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