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Improved double-robust estimation in missing data and causal inference models

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Recently proposed double-robust estimators for a population mean from incomplete data and for a finite number of counterfactual means can have much higher efficiency than the usual double-robust estimators under misspecification of the outcome model. In this talk I will present a new class of double-robust estimators for the parameters of regression models with incomplete cross-sectional or longitudinal data, and of marginal structural mean models with similar advantageous efficiency properties. Unlike the recent proposals, our estimators solve outcome regression estimating equations. The new estimators are essentially a generalization to the regression setting of new outcome regression weighted least squares double-robust estimators of a population mean described in Kang and Shafer (2007). The key innovation of our approach is that the weights depend on an augmented model for the missingness or treatment probability which incorporates clever covariates constructed so as to ensure the advantageous efficiency properties. A feature of our approach is that it exploits the counterintuitive fact that the efficiency of augmented inverse probability weighted estimators improves as the model under which the missingness or treatment probabilities are estimated augments.

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