A general efficiency augmentation method

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Abstract

Estimating function-based inference procedure has broad application in statistics. In general, the estimating functions can be constructed based on a set of moment conditions. However, in many cases, the resulting estimating function is neither smooth nor monotone and thus it may be very difficult to solve the corresponding equations and make reliable statistical inference. Furthermore, unlike the likelihood based procedure, the efficiency of the estimating function-based estimator is not guaranteed in general. In this talk, we proposed a simple resampling-based efficiency augmentation method to improve the performance of a simple initial estimator using a set of estimating functions. An adjusted variance estimator was also proposed to provide a more accurate assessment of the sampling variability in the augmented estimator. We introduced the applications of the proposed methods in several examples raised in survival analysis and clinical trials. Simulation studies have been performed to examine the finite sample performance of the augmented estimator and related inference procedure.