A Batch Means Methodology for Estimation of a Nonlinear Function of a Steady- State Mean

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We study the estimation of steady-state performance measures from an Ad-valued stochastic process Y = {Y(t): t≥0} representing the output of a simulation. In many applications, we may be interested in the estimation of a steady-state performance measure that cannot be expressed as a steady-state mean r, e.g., the variance of the steady-state distribution, the ratio of steady-state means, and steady-state conditional expectations. These examples are particular cases of a more general problem-the estimation of a (nonlinear) function f(r) of r. We propose a batch-means-based methodology that allows us to use jackknifing to reduce the bias of the point estimator. Asymptotically valid confidence intervals for f(r) are obtained by combining three different point estimators (classical, batch means, and jackknife) with two different variability estimators (classical and jackknife). The performances of the point estimators are discussed by considering asymptotic expansions for their biases and mean squared errors. Our results show that, if the run length is large enough, the jackknife point estimator provides the smallest bias, with no significant increase in the mean squared error.