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Accelerated simulation for pricing Asian options

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Abstract:
When pricing options via Monte Carlo simulations, precision can be improved either by performing longer simulations, or by reducing the variance of the estimators. Two methods for variance reduction are combined: the control variable and the change of measure (or likelihood) methods. We specifically consider Asian options, and show that a change of measure can very significantly improve the precision when the option is deeply out of the money, which is the harder estimation problem. We also show that the simulation method itself can be used to find the best change of measure. This is done by incorporating an updating rule, based on an estimate of the gradient of the variance. The paper includes simulation results.

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