

Efficient Risk Quantification via Nested Simulation

Jun Luo

Shanghai Jiao Tong University

jluo_ms@sjtu.edu.cn

Coauthor(s): Guo Liang and Kun Zhang

Risk quantification is pivotal in both portfolio risk measurement and input model uncertainty. This paper aims to quantify the risk by studying widely used risk measures, Value-at-Risk (VaR) and Conditional Value-at-Risk (CVaR). We introduce a jackknife-based nested simulation method to estimate these measures, providing point estimators, confidence intervals (CIs), and deriving their asymptotic properties. Furthermore, we propose an efficient algorithm that ensures the mean squared errors of the estimators and the widths of the CIs decay at their optimal rates in practice. Numerical results are consistent with the theory presented.