

Risk-Measure-Preserving Compression of Monte Carlo Simulation Results with Insurance Applications

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Abstract

Recent regulatory regimes in insurance such as Solvency II and SST require to assess risks not only in terms of a few key statistics but in terms of the whole distribution. Due to the complexity of all model components, typically such distributions are obtained by Monte Carlo simulations. An increased necessity to reuse those simulation results motivate us to introduce a compression algorithm which approximates an empirical distribution function through a piecewise linear distribution function. This approximation facilitates data exchange and interaction between systems, and moreover drastically reduces memory requirements compared to storing the full sample distribution that is a challenge even with modern technology. The approximation is designed such that the relative error over a set of coherent risk measures is uniformly bounded. An efficient, open source implementation is provided.

Keywords

Sample distribution, piecewise linear distribution, compression, approximation