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Multilevel Monte Carlo using approximate distributions

Abstract : Standard Multilevel Monte Carlo methods for SDE path simulation use Normal random variables for the Brownian increments. In this work we develop and fully analyse a nested MLMC method using approximate Normal random variables. Further computational savings can be achieved by using reduced precision floating point arithmetic in the computations. This research is motivated by recent computer hardware developments, and the opportunities for approximations of other distributions such as the non-central chi-squared distribution for the CIR and Heston models. This is joint work with Oliver Sheridan-Methven.

References

O. Sheridan-Methven. Nested multilevel Monte Carlo methods and a modified Euler-Maruyama scheme utilising approximate Gaussian random variables suitable for vectorised hardware and low-precisions'. PhD thesis, University of Oxford, 2021.

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