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Global Valuation

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Abstract

Although economically more meaningful than the alternatives, short rate models have been dismissed for financial engineering applications in favor of market models as the latter are more flexible and best suited to cluster computing implementations. In this paper, we argue that the paradigm shift toward GPU architectures currently taking place in the high performance computing world can potentially change the situation and tilt the balance back in favor of a new generation of short rate models. We find that operator methods provide a natural mathematical framework for the implementation of realistic short rate models that match features of the historical process such as stochastic monetary policy, calibrate well to liquid derivatives and provide new insights on complex structures. In this paper, we show that callable swaps, callable range accruals, target redemption notes (TARNs) and various flavors of snowballs and snowblades can be priced with methods numerically as precise, fast and stable as the ones based on analytic closed form solutions by means of BLAS level-3 methods on massively parallel GPU architectures.

Keywords: interest rate models, long dated derivatives, GPU computing

JEL Classification: G13

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