Home ▶ All Journals ▶ Applied Mathematical Finance ▶ List of Issues ▶ Volume 13, Issue 1 A Semi-Explicit Approach to Canary Swapt

Applied Mathematical Finance > Volume 13, 2006 - Issue 1

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Original Articles

A Semi-Explicit Approach to Canary Swaptions in HJM One-Factor Model

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Abstract

Leveraging the explicit formula for European swaptions and coupon-bond options in the HJM one-factor model, a semi-explicit formula for 2-Bermudan options (also called Canary options) is developed. The European swaption formula is extended to future times. So equipped, one is able to reduce the valuation of a 2-Bermudan swaption to a single numerical integration at the first expiry date. In that integration the most d Furanean swantions valuation complex

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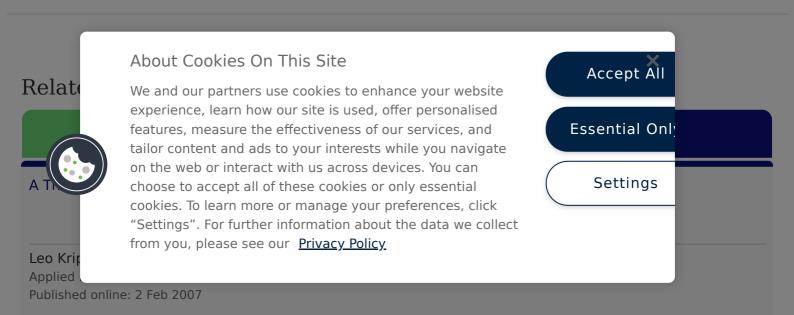
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Notes

- 1. Bounded is too strong for the proof we use, some L^{1} and L^{2} conditions are enough, but as all the examples we present are bounded, we use this condition for simplicity.
- 2. See Hunt and Kennedy (2000) for the definition of a numeraire pair. Note that here we require that the bonds of all maturities are martingales for the numeraire pair (N, N).
- 3. Matlab code available from the author.
- 4. There is nothing special about that date, except it is my sister's birthday!
- 5. As the second step is shorter (6m), the distance between points is also smaller and more than 4n+1 final points are used.
- 6. It took around four hours on my computer to run the (non-optimized) code to compute 3×401 yield curves and the prices for the 4 implementations using 200 steps precisions. As can be inferred from figure 2, most of the time was devoted to the tree computations.



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