

Proposal for a poster. Abstract.

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*Numerical Aspects of the Implementation of a Two-Factor Hull-White Type Short Rate Model. Quadrinomial and Orthogonal Tree Constructions.*

With the development of the Fixed Income markets, the need for multi-factor models describing the short rate dynamics has increased significantly. It is important for their successful application that on one hand closed-form solutions for Caps/Floors and/or Swaptions exist (for calibration purposes) and on the other hand that they are numerically tractable for the pricing of exotic products with American features, path-dependence and coupons depending on several Libor or CMS rates.

We address these problems by offering a two-factor Hull-White type model derived from the HJM framework. This model has two major advantages. It has a very intuitive form and the initial yield curve as an input by construction. It allows for closed-form solutions of Cap/Floor prices as well as a semi-closed form solution of Swaption prices.

Moreover, for the pricing of complex claims we first offer a quadrinomial lattice which deals with the mean reversion in the stochastic factors in a flexible way following the idea of Li, Ritchken and Sankarasubramanian (1995) in the Cheyette tree construction. Furthermore, we offer an orthogonal tree construction also with a flexible mean-reversion implementation which overcomes the drawback of the (possibly) negative risk-neutral tree probabilities in the quadrinomial lattice.

Finally, comparison of both tree constructions (with MC prices) are delivered in the pricing of various simple and exotic (path-dependent) claims.