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## **A wavelet look to the discounted expected payoff pricing formula**

### **Abstract:**

We present a novel method for pricing European options based on the wavelet approximation (WA) method and the characteristic function.

We focus on the discounted expected payoff pricing formula, and compute it by means of wavelets. We approximate the density function associated to the underlying asset price process by a finite combination of  $j$ -th order B-splines, and recover the coefficients of the approximation from the characteristic function.

Two variants for wavelet approximation will be presented, where the second variant adaptively determines the range of integration.

The compact support of a B-splines basis enables us to price options in a robust way, even in cases where Fourier-based pricing methods may show weaknesses. The method appears to be particularly robust for pricing long-maturity options, fat tailed distributions, as well as staircase-like density functions encountered in portfolio loss computations.

**Date:** January 23, 2014

**Place:** Room C1/028

**Time:** 12:00



