

# Numerical analysis for anisotropic multivariate Lévy processes

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## Abstract

Arbitrage-free prices  $u$  of financial derivatives on  $d \geq 2$  assets are considered where the underlyings are modeled by Markov processes of Lévy type. They satisfy a high dimensional parabolic partial integrodifferential equation (PIDE)  $\partial_t u + Au = 0$  on  $[0, 1]^d$ . Numerical pricing of these contracts by sparse Finite Element Methods requires the efficient discretization of the infinitesimal generator  $A$  of  $X$ .

For a wide class of operators we present a new sparse grid based wavelet compression scheme for *anisotropic* tensor product wavelets that (asymptotically) reduces the matrix complexity from originally  $\mathcal{O}(h^{-2d})$  to  $\mathcal{O}(h^{-1})$ . Numerical results from joint work with C. Winter are presented for  $d = 2$ .

Keywords: Wavelet Compression, Sparse Tensor Products, Markov Processes, Lévy Copulas.

## References

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