Numerical analysis and computing of option pricing in jump-diffusion models

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We present a finite difference method for solving numerically second-order integro-differential equations (PIDE) arising in pricing derivatives in jump-diffusion markets. In order to treat accurately the non local term involving the integral operator some techniques have been used in the literature (see [1] for instance.) We propose a non uniform spatial mesh avoiding to impose artificial boundary conditions out of a bounded numerical domain. Following the techniques developed in [2] for partial differential problems study of the positivity of the numerical solution as well as stability and consistency with the PIDE problem is performed. Numerical tests and simulations are included.

References

[1] R. Cont, E. Voltchkova, A finite difference scheme for option pricing in jump diffusion and exponential Lévy models, *SIAM J Numer Anal* 43, 1596–1626, 2005.

[2] M.C. Casabán, R. Company, L. Jódar, J.R. Pintos, Numerical analysis and computing of a non-arbitrage liquidity model with observable parameters for derivatives, *Computers and Mathematics with Applications* 61, 1951–1956, 2011.