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Multilevel Monte Carlo method for jump-diffusion SDEs

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We investigate the extension of the multilevel Monte Carlo path simulation method to jump-diffusion SDEs. We consider models with finite rate activity, using a jump-adapted discretisation in which the jump times are computed and added to the standard uniform dis- cretisation times. The key component in multilevel analysis is the calculation of an expected payoff difference between a coarse path simulation and a fine path simulation with twice as many timesteps. If the Poisson jump rate is constant, the jump times are the same on both paths and the multilevel extension is relatively straightforward, but the implementation is more complex in the case of state-dependent jump rates for which the jump times naturally differ.

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