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Early exercise boundary and option prices in Lévy driven models

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Abstract

Pricing and hedging of European, American, barrier options and interest rate derivatives for wide classes of Lévy driven models is considered in situations where qualitative and quantitative differences between Gaussian and Lévy modelling are most prominent, and the dependence on the choice of a family of Lévy processes is analysed. Asymptotics of option prices near the barrier and expiry are calculated; for American options, two fast numerical methods are constructed. It is shown that for many classes of Lévy processes, the early exercise boundary of the American put is separated from the strike by a non-vanishing margin, and as the riskless rate vanishes, the early exercise boundary tends to 0 uniformly over the interval $[0, T)$. Implications for fitting of parameters are discussed.

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