Taylor & Francis
Online

Home ▶ All Journals ▶ Mathematics, Statistics & Data Science ▶ Applied Mathematical Finance
▶ List of Issues ▶ Volume 14, Issue 2 ▶ On American Options Under the Variance G ....

Original Articles

On American Options Under the Variance Gamma Process

Ariel Almendral ✉ & Cornelis W. Oosterlee

 Cite this article   https://doi.org/10.1080/13504860600724885

 Full Article   Figures & data   References   Citations   Metrics

 Reprints & Permissions   Read this article   Share

Abstract

American options are considered in a market where the underlying asset follows a Variance Gamma process. A sufficient condition is given for the failure of the smooth fit principle for finite horizon call options. A second-order accurate finite-difference method is proposed to find the American option price and the exercise boundary. The problem is formulated as a Linear Complementarity Problem and solved numerically by a convenient splitting. Computations have been accelerated with the help of the Fast Fourier Transform. A stability analysis shows that the scheme is conditionally stable, with a mild stability condition of the form $k = O(|\log(h)|^{-1})$. The theoretical results are verified numerically throughout a series of numerical experiments.

Keywords:

Integro-differential equations   variance gamma   finite differences   FFT

Acknowledgements

Related Research Data

[A penalty method for American options with jump diffusion processes](#)
Source: Numerische Mathematik

[Numerical Methods for Conservation Laws](#)
Source: Unknown Repository

[Some remarks on first passage of Lévy processes, the American put and pasting principles](#)
Source: The Annals of Applied Probability

[Computational Frameworks for the Fast Fourier Transform](#)
Source: Unknown Repository

[Variational inequalities and the pricing of American options](#)
Source: Acta Applicandae Mathematicae

[Optimal Stopping, Free Boundary, and American Option in a Jump-Diffusion Model](#)
Source: Applied Mathematics & Optimization

[Option valuation using the fast Fourier transform](#)
Source: The Journal of Computational Finance

Related research 🛈

People also read | Recommended articles | Cited by 37

Keep up to date

Register to receive personalised research and resources by email

✉ Sign me up