

[Applied Mathematical Finance](#) >Volume 14, 2007 - [Issue 2](#)268 | 37 | 0
Views | CrossRef citations to date | Altmetric

Original Articles

On American Options Under the Variance Gamma Process

Ariel Almendral  & Cornelis W. Oosterlee

Pages 131-152 | Published online: 16 May 2007

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

Sample our
Mathematics & Statistics
Journals

>> [Sign in here](#) to start your access
to the latest two volumes for 14 days

 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

This research was supported by the Dutch government through the national program BSIK: knowledge and research capacity, in the ICT project BRICKS (<http://www.bsik-bricks.nl>), theme MSV1.

We would like to thank the referees for valuable comments.

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

Information for

[Authors](#)

[R&D professionals](#)

[Editors](#)

[Librarians](#)

[Societies](#)

Opportunities

[Reprints and e-prints](#)

[Advertising solutions](#)

[Accelerated publication](#)

[Corporate access solutions](#)

Open access

[Overview](#)

[Open journals](#)

[Open Select](#)

[Dove Medical Press](#)

[F1000Research](#)

Help and information

[Help and contact](#)

[Newsroom](#)

[All journals](#)

[Books](#)

Keep up to date

Register to receive personalised research and resources by email



Sign me up



Copyright © 2026 Informa UK Limited [Privacy policy](#)

[Cookies](#) [Terms & conditions](#) [Accessibility](#)

Registered in England & Wales No. 01072954
5 Howick Place | London | SW1P 1WG



Taylor & Francis
by informa