Laplace Transformation Method for the Black-Scholes Equation

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ABSTRACT

In this paper we apply the innovative Laplace transformation method introduced by Sheen, Sloan, and Thomée (IMA J. Numer. Anal., 2003) to solve the Black-Scholes equation. The algorithm is of arbitrary high convergence rate and naturally parallelizable. It is shown that the method is very efficient for calculating various option prices. Existence and uniqueness properties of the Laplace transformed Black-Scholes equation are analyzed. Also a transparent boundary condition associated with the Laplace transformation method is proposed. Several numerical results for various options under various situations confirm the efficiency, convergence and parallelization property of the proposed scheme.

REFERENCES