APPLICATION OF THE SPECTRAL METHOD
IN THE STOCHASTIC VOLATILITY MODEL

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At present two types of models are applied in the financial industry. There are models of investment banks and hedge funds. The hypothesis of the arbitration absence is used and fair value of an option is rated in models of investment banks. Analysts try to create effective and more applicable models to gain more profit. All variety of hedge funds strategies are based on hypothesis about the predictability of some variable. Therefore now the financiers turn to models of hedge funds more often. Such models are models of local, undetermined, and stochastic volatility.

We consider the stochastic volatility model, known as the Heston model [1], which generalizes the Black-Scholes model. It is used to estimate asset and option prices. This model allows us to find distribution function close to real for the asset price and also includes the correlation between the asset price and its volatility.

The problem of finding asset price probability density function, expected asset price, and its dispersion as well as the option price is studied in this work.

To solve this problem (to find probability density function for asset price) we have developed the algorithm based on the spectral form of mathematical description [2].

Simulated results for different variants of the asset price, volatility, and value of the option behaviors are analyzed.

References

1. Heston S. A Closed-Form Solution for Options with Stochastic Volatility with Applications to Bond and Currency Options // The Review of Financial Studies. – 1993. V. 6. No 2. – P. 327–343.
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