Generalizations of Black-Scholes Model.

Exact Solutions. Numerical Implementations.

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Abstract

In financial crises the problem of imitation modelling, simulation and detailed investigation of the functions of call- and put-options is very modern. This talk will consist of two parts. In the first part analytical solution method based on Mellin transform approach will be applied in order to find exact solutions of nonlinear Black-Scholes equation arising in option pricing theory. We present alternative solution method that is seldom used in Finance.

In the second part we propose new modules in MATHEMATICA programming environment for the generalizations of Black-Scholes (BS) model taking into account the market price and coefficient of variation. We derive the Garman-Kohlhagen's model as generalization of BS model. The proposed modules give the possibility for visualization and hypersensitive analysis. These modules are components of web-based application, realized in the program environmental with central mathematical kernel and in some sense realizes the problem proposed above, and the build software instruments can be used for research investigations, as well as for training.