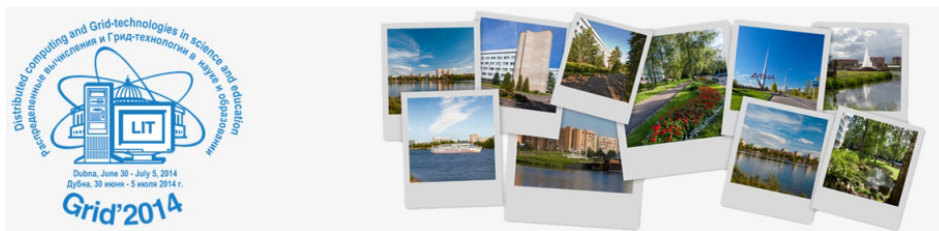


The 6th International Conference "Distributed Computing and Grid-technologies in Science and Education"



Contribution ID: 29

Type: poster presentations

Modeling of Behavior of the Option. The Formulation of the Problem

Thursday, 3 July 2014 13:00 (1 hour)

Object of research: The creation of algorithm for mass computations of options' price for formation of a riskless portfolio. The method is based on the generalization of the Black-Scholes approach[1]. The task is the modeling of behavior of all options and tools for their insurance. This task is characterized by large volume of real-time complex computations that should be executed concurrently

The problem of the research: depending on conditions approaches to the solution should be various. There are three methods which can be used with different conditions: the finite difference method[2], the path-integral approach[3] and methods which work in conditions of trade stop [4]. Distributed computing in these three cases is organized differently and it is necessary to involve various approaches.

In addition to complexity the mathematical formulation of the problem in literature is not quite correct. There is no complete description of boundary and initial conditions[5] and also several hypotheses of the model do not correspond to real market[6].

It is necessary to give mathematically correct formulation of the task, and to neutralize a difference between hypotheses of the model and their prototypes in the market. For this purpose it is necessary to expand standard formulation by additional methods and develop methods of realization for each of solution branches.

References

- [1] Black F., Scholes M. The Pricing of Options and Corporate Liabilities //Journal Political Economy, 81 (May/June 1973). P. 637-659; Merton R.C/ Theory of Rational Option Pricing //Bell Journal of Economics and Management Science. 4 (Spring 1973)
- [2] Daniel J. Duffy, Finite Difference Methods in Financial Engineering,(2006)240-249.
- [3] B. E. Baaquie Quantum finance. Cambridge University Press The Edinburgh Building, Cambridge CB2 8RU, UK 2004
- [4] Investor Bulletin: New Measures to Address Market Volatility / <http://www.sec.gov/investor/alerts/circuitbreakersbulletin.htm>
- [5] Jens Hugger/ Wellposedness of the boundary value formulation of a fixed strike Asian option. Journal of Computational and Applied Mathematics, 185 (2006) 460-481
- [6] Taleb, Nassim Nicholas and Martin, George A., The Illusion of Thin-Tails Under Aggregation(January 18, 2012). Journal of Investment Management, Forthcoming.

Primary authors: Prof. BOGDANOV, Alexander (Saint-Petersburg State University); Mr STEPANOV, Eduard (Saint-Petersburg State University); Mrs PANCHENKO, Marina (Saint Petersburg State University); Prof. MAREEV, Vladimir (Saint-Petersburg State University)

Presenter: Mrs PANCHENKO, Marina (Saint Petersburg State University)

Session Classification: Posters

Track Classification: Section 4 - Algorithms and methods of application tasks solving in distributed computing environments