References
1. Pashko, A., Rozora, I. Estimation of the Probability of Buffer Overflow for Self-Similar Traffic.2021 IEEE 8th International Conference on Problems of Infocommunications, Science and Technology, PIC S and T 2021. Proceedings, 2021, стр. 28–32.
2. Pashko, A., Rozora, I., Syniavska, O. Estimation of Hurst Index and Traffic Simulation / Advances in Computer Science for Engineering and Education IV (Lecture Notes on Data Engineering and Communications Technologies), 2021, 83, стр. 37–46.

TWO APPROACHES FOR EVALUATION OF OPTION PRICES UNDER ILLIQUIDITY

V. Pauk, O. Petrenko, N. Shchestyuk
National University "Kyiv-Mohyla Academy", Ukraine
n.shchestiuk@ukma.edu.ua

Analysis of different financial markets shows that during global crises that have a negative impact on financial activity we can observe some kinds of risky assets which have the periods in their dynamic without change. Such behavior is typical for emerging markets with low number of transactions, for interest rate markets and for commodity markets. So, for these markets the problem of evaluating fair price of derivative instruments on stocks has become extremely important.

The classical diffusion models for continuous time like Black-Scholes-Merton and its discrete variant - binomial tree model of Cox-Ross-Rubinstein are incapable of adequately modelling illiquidity for real-life asset dynamic and evaluate derivatives.

In order to overcome this difficulty for discrete-time approach was considered the trinomial tree model. This model improves upon the binomial model by allowing a stock price not only to move up or down, but stay the same with certain probabilities, what are desirable properties for the illiquid modelling.

For continuous-time approach one can notice, that the constant periods of stagnation in financial processes are analogous in nature to the trapping events of the subdiffusive particle. Therefore, the physical models of subdiffusion can be successfully applied to describe financial data. Many types of subordinators such as α-stable, tempered-stable, Gamma, Poisson and other have been already applied for different subdiffusive models of illiquidity.

In this paper we propose to take the Inverse Gaussian process IG as a subordinator for the subdiffusive modelling. The simulation of the trajectories for subordinator, inverse subordinator and subdiffusive GBM were performed. The Monte Carlo method for option evaluation was applied.

Our aim was not only to compare these two models each with other, but also to show that both models adequately describe the illiquid market and can be used for option pricing on this market. For this purpose, absolute relative percentage and root mean squared error for both models were computed and analysed.

Thanks to the proposed approaches, the investor gets the tools, which allows him to take into account the illiquidity.

References

1. Donatien, H., Leonenko, N. N. (2020). Option pricing in illiquid markets: A fractional jump–diffusion approach, *Journal of Computational and Applied Mathematics*, 381.

2. Magdziarz, M. (2009). Black–Scholes formula in subdiffusive regime, *J. Stat. Phys*., 136, 553–564.

3. Wylomanska, A., Kumar, A., Polocz´anski, R., Vellaisamy, P. (2016). Inverse Gaussian and its inverse process as the subordinators of fractional Brownian motion. *Physcal Review*, 96.

4. Shchestyuk, N., Tyshchenko, S. (2021). Monte-Carlo method for option pricing in sub-diffusive arithmetic models. *Bulletin of Taras Shevchenko National University of Kyiv. Series: Physics and Mathematics*, 2, 85-95.

EXISTENCE AND NONEXISTENCE OF GLOBAL SOLUTIONS FOR NONLINEAR PARABOLIC EQUATIONS

R.A. Rasulov

Sheki Branch Azeribajian Pedaqogical University, Azerbaijan

rasulovrafiq@yahoo.com

Let be a bounded domain in *Rn* with smooth boundary , *p* a real number p>2 and *a* a nonnegative real number. In this paper we consider the initial-boundary value problems for nonlinear parabolic equations.

In a recent work , Fujita gave existence and nonexistence theorems for global solutions of the heat equation .

In this paper our purpose is to obtain analogous results for the nonlinear problem

1) in some conditions the problem for p and initial functions,problem has global (nonnegative) solutions belong to some Sobolev space.