

Editorial

Welcome to the first issue of the journal “Modern Stochastics: Theory and Applications”! The MSTA is a peer reviewed international open access scientific journal published quarterly. Our principal aim is to provide a forum for specialists in all fields of stochastics to present their original results of highest quality in probability theory, mathematical statistics, theory of stochastic processes and random fields, stochastic analysis and stochastic differential equations, stochastic geometry and in a variety of applied fields such as financial mathematics, actuarial mathematics and risk theory, economics, physics, biology, engineering, stochastic aspects of system analysis and control, filtering theory, optimization etc. The emphasis is made on the innovative nature of results, path-breaking ideas and methods and their high potential for practical applications.

The MSTA journal was founded and established by Vilnius University, Taras Shevchenko National University of Kyiv and Publishing Company VTeX. The idea to launch this new journal with joint efforts of Vilnius and Kyiv mathematicians came very naturally with several historical prerequisites. First of all, there exist well established Lithuanian and Ukrainian probabilistic schools of word recognition, founded and developed by outstanding mathematicians such as V. Statulevičius, B. Grigelionis, J. Kubilius and B. Gnedenko, A. Skorokhod, V. Korolyuk, respectively. Lithuanian and Ukrainian representatives of these scientific schools have long lasting relations of friendship and fruitful cooperation. During four decades Vilnius conferences on Probability and Mathematical Statistics have developed a strong platform for international exchange of knowledge and strengthening links between scientists over the world. The series of Kyiv conferences “Modern Stochastics: Theory and Applications” hosted by Kyiv University although having much shorter history dated from 2006, nevertheless have gained already world-wide recognition and reputation among scientists in our field. With this new journal we hope to promote further development of probability, statistics and all related fields connected with stochastics, keeping tradition of high standards and quality of research.

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The first issue of the journal consists of seven papers.

In the paper by *L. Aleksidze, M. Mumladze, and Z. Zerakidze* the existence of consistent criterion for hypothesis testing is studied in the general abstract setting introduced by authors.

C. Chimisov and A. Kukush consider Cox proportional hazards regression model in which the regressors are observed with errors. A corrected maximum likelihood technique is applied for the estimation of both the regression coefficients and the baseline hazard function. The asymptotic normality of obtained estimators is stated and an algorithm for their calculation is discussed.

In the paper by *D. Ivanenko and A. Kulik* the property of local asymptotic normality is proved for the statistical model based on discrete-time observations of solution to Lévy driven stochastic differential equation (SDE). For the proof the authors use essentially the Malliavin calculus-based integral representations for derivatives of log-likelihood of the considered model.

In the paper by *T. Kosenkova and A. Kulik* the Lévy-type process with a given symbol (state dependent analogue of the characteristic triplet) is proved to be well defined as a strong solution to SDE under the assumption of the Lipschitz continuity of Lévy kernel in the symbol with respect to the state space variable in the transportation distance. As examples, the Gamma-type process and the α -stable like process as strong solutions to SDEs are constructed. The notion of transportation distance on the set of Lévy measures on R is introduced.

In the paper by *G. Kulnich and S. Kushnirenko* strong uniqueness is established for a solution to system of SDEs with random non-Lipschitz coefficients that involve both square integrable continuous vector martingales and centered and non-centered Poisson measures. The conditions are much milder than those present in the literature.

The paper by *V. Makogin and Yu. Mishura* is devoted to self-similar fields. The strong limit theorems for the anisotropic growth of sample paths of self-similar field at zero and at infinity are proved both for upper and lower functions. For a field with ergodic scaling transformation, the authors obtain an upper bound for the growth, involving a slowly varying function.

Yu. Mishura, G. Rizhniak, and V. Zubchenko study European call option issued on a bond governed by a modified geometric Ornstein-Uhlenbeck process. Objective and fair prices of such option as a function of the mean and the variance of a geometric Ornstein-Uhlenbeck process is studied. It is proved that the Ornstein-Uhlenbeck market is arbitrage-free and complete. The authors obtain risk-neutral measure and calculate the fair price of a call option. The case is also studied, where the bond price is governed by a modified fractional geometric Ornstein-Uhlenbeck process.

K. Kubilius
Yu. Mishura
L. Sakhno