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Editorial

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This special issue consists of 15 articles presented at the International Conference "Modern Stochastics: Theory and Applications III" held on September 10 – 14, 2012 at Taras Shevchenko National University of Kyiv, Ukraine. The conference was dedicated to anniversaries of the prominent mathematicians: 100th anniversary of Boris Vladimirovich Gnedenko (1912-1995) and 80th anniversary of Mikhail Iosifovich Yadrenko (1932-2004), who contributed significantly to the establishment and development of Ukrainian school of probability and statistics and whose scientific achievements gained worldwide recognition.

The conference was organized by Taras Shevchenko National University of Kyiv in cooperation with other Ukrainian research institutions.

The conference demonstrated growing interest to the "Modern Stochastics: Theory and Applications" series of conferences, the first two of which had taken place in 2006 and 2010. At this third conference 234 scientists from 29 countries presented their newest developments in the fields of probability, mathematical statistics, financial and actuarial mathematics etc.

We find it impossible not to mention that one of the prominent and active participants of the conference, Marc Yor, passed away very recently, January 10, 2014.

The collection of articles of this special issue begins with the article by Volodymyr Koroliuk where the role of B.V.Gnedenko as a classic of limit theorems in the theory of probability is highlighted. B.V.Gnedenko deserved worldwide popularity by his investigations of limit distributions for sums of independent random variables and, in particular,

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the idea of "accompanied infinitely divisible distributions" developed by him became a guidance in the limit theory of semimartingales developed in the future. The article also demonstrates how the limit theorems for stochastic processes based on a semimartingale representation can be applied to the random evolution processes in the Poisson approximation scheme.

Konrad Abramowicz and Oleg Selezniev consider the problem of numerical approximation of integrals of random fields over a unit hypercube with the use of a stratified Monte Carlo quadrature defined by a finite number of stratified randomly chosen observations. Corresponding results are presented for a class of locally stationary random fields whose local behaviour is like a fractional Brownian field in the mean square sense, for a Hölder class of random functions, and for a class of isotropic random functions with an isolated singularity at the origin.

The article by Iryna Dubovetska, Oleksandr Masyutka and Mikhail Moklyachuk deals with the problem of optimal estimation of a linear functional of periodically correlated isotropic random fields. The authors use Hilbert space projection and minimax-robust methods of estimation and obtain the results on the mean-square errors, the spectral characteristic of the optimal linear estimate of the functional under consideration, and determine the least favorable spectral densities for some special classes of spectral densities.

Claudio Fontana, Bernt Øksendal and Agnès Sulem consider a financial market model with a single risky asset whose price process evolves according to a general jump-diffusion with locally bounded coefficients and where market participants have only access to a partial information flow. In this setting with partial information the authors state the result on equivalence between local viability of the market (in the sense of the ability to solve utility maximization problems) and existence of equivalent martingale measure.

In the article by Jan Gairing and Peter Imkeller the problem of estimation of parameters of a stable process with the use of power variations is addressed. The authors establish the rate of convergence in the central limit theorem for power variations, this rate is described via relation between the power p of variations and the unknown stability parameter of the underlying process, and the distances between the approximate power variations and the limiting law are measured in terms of Kolmogorov-Smirnov metric.

The article by Yuri E. Gliklikh and Olga O. Zheltikova is devoted to a brief introduction into the theory of stochastic equations and inclusions with mean derivatives and to investigation of a special type of such inclusions called inclusions of geometric Brownian motion type. The authors prove the existence of optimal solutions maximizing some cost criteria.

The article by Dmytro O. Ivanenko and Alexey M. Kulik deals with statistical inference for the model given by stochastic differential equation driven by a Lévy process and based on discrete time observations. The authors obtain, using the Malliavin calculus approach, the integral representations for the likelihood function and for the derivative of the log-likelihood function for the problem of estimation of unknown parameter involved in the equation.

Peter Keller, Sylvie Roelly and Angelo Valleriani consider the movement of linear motors transport cargos along rope-like structures from one location of the cell to another in a stochastic fashion. They give a mathematical formalization of such dynamics as a random process which is an extension of random walks, to which they add an absorbing state to model the detachment of the motor from the rope. Particular properties of such processes that have not been available before are derived.

The article of Yuriy Kozachenko, Andriy Olenko and Olga Polosmak presents new results on convergence in $L_p([0, T])$ of wavelet expansions of φ-sub-Gaussian random processes. The paper extends the recent results on uniform convergence to new classes

of stochastic processes and probability metrics. The convergence rate of the expansions is obtained.

Nikolai Leonenko and Ely Merzbach present a new definition of a fractional Poisson process parametrized by points of the Euclidean space R^2_+. It is defined as a superposition of a homogeneous Poisson field with two independent inverse stable subordinators. Finite-dimensional distributions are calculated. Some properties of such fractional Poisson process are given and, in particular, a long-range dependence property is established.

Alexander Melnikov, Yuliya Mishura and Georgiy Shevchenko establish a stochastic viability theorem for a multidimensional mixed stochastic differential equation containing both Wiener process and a Hölder continuous process with exponent $\gamma > 1/2$. In particular, it can be fractional Brownian motion with Hurst index $H > 1/2$ or multifractional Brownian motion. As a consequence, a result about positivity of solution and a pathwise comparison theorem are obtained and applied to option price estimation. In general, the strongest motivation to study such mixed equations comes from financial modeling.

The paper of Paula Reis, Luisa Canto e Castro, Sandra Dias and M. Ivette Gomes is devoted to some problem of reliability theory. In this theory any coherent system can be represented as either a series-parallel or a parallel-series system. Its lifetime can thus be written as the minimum of maxima or the maximum of minima. The main achievement of the paper is that dealing with regular and homogeneous parallel-series systems, the authors assess both theoretically and through Monte-Carlo simulations the gain in accuracy when a penultimate approximation is used instead of the ultimate one.

In the paper of M.D. Ruiz-Medina and R.M. Espejo the asymptotic distribution of the maximum likelihood estimators of the auto-covariance operator of the Hilbert-valued innovation process, and of the autocorrelation operator of a Gaussian ARH(1) process is derived, under suitable conditions. An invariance principle for the Robbins-Monro process in a Hilbert space is applied. The illustration of the performance of the maximum likelihood projection estimation methodology in the ARH(1) framework, from incomplete functional data, is achieved in terms of a real-data example in the financial context.

Olena Sugakova and Rostyslav Maiboroda concentrate on nonparametric estimation of means (or other functional moments) of the distributions of mixture components. The concentrations (mixing probabilities) of components vary from observation to observation and are assumed to be known. If no sampling bias is present these means can be estimated by weighted empirical means of the observations. When there is some sampling bias it is necessary to combine the Horvitz-Thompson and mixture with varying concentrations weighting methodologies. The paper is devoted to the technique of such combination.

The paper of Nadiia Zinchenko presents sufficient conditions, which provide almost sure approximation of the superposition of the random processes $S(N(t))$, in the case when processes S and N themselves admit approximation by a Wiener or stable Lévy processes. As a consequence a number of results concerning the a.s. approximation of the Kesten-Spitzer random walk, accumulated workload input into queuing system, risk processes in the classical and renewal risk models with small and large claims are obtained.

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