National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»
Institute of Mathematics, National Academy of Sciences of Ukraine
Taras Shevchenko National University of Kyiv
University of Oslo
Vasyl' Stus Donetsk National University
Uzhhorod National University

International Conference «Stochastic Equations, Limit Theorems and Statistics of Stochastic Processes»

dedicated to the 100th anniversary of I. I. Gikhman

September 17–22, 2018

ABSTRACTS

Igor Sikorsky Kyiv Polytechnic Institute
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International Conference «Stochastic Equations, Limit Theorems and Statistics of Stochastic Processes», dedicated to the 100th anniversary of I. I. Gikhman, September 17–22, 2018, Kyiv, Ukraine

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STOCHASTIC PROCESSES FROM THE SPACES $\mathbf{F}_\psi(\Omega)$. CONDITIONS FOR THE WEAK CONVERGENCE

YURII KOZACHENKO, YURII MLAVETS

Definition 1. [1] We say that the condition **H** is fulfilled for the Banach space of random variables $B(\Omega)$, if there exists an absolute constant C_B such that for any centered and independent random variables $\xi_1, \xi_2, \dots, \xi_n$ from $B(\Omega)$, the following is true:

$$\left\| \sum_{i=1}^{n} \xi_i \right\|^2 \le C_B \sum_{i=1}^{n} \|\xi_i\|^2 .$$

The constant C_B is called a scale constant for the space $B(\Omega)$. For space $\mathbf{F}_\psi(\Omega)$ we shall denote the constants $C_{\mathbf{F}_\psi(\Omega)}$ as C_ψ.

Let $X = \{X(t),\ t \in T\}$ be a stochastic process from the space $\mathbf{F}_\psi(\Omega)$, $EX(t) = 0$. Let the condition **H** be fulfilled for this space.

Assume that compact pseudometric space (T, ρ_ψ), $\rho_\psi(t,s) = \|X(t) - X(s)\|_\psi$ is separable and the process $X = \{X(t),\ t \in T\}$ is separable as well. Let $X_k(t)$, $k = 1, 2, \dots, n$ be independent copies of $X(t)$. Consider a stochastic process $Y_n(t) = \frac{1}{\sqrt{n}} \sum_{k=1}^{n} X_k(t)$. By Definition (1) we have $\|Y_n(t) - Y_n(s)\|_\psi^2 \le C_\psi \frac{1}{n} \sum_{k=1}^{n} \|X_k(t) - X_k(s)\|_\psi^2 = C_\psi \rho_\psi^2(t,s)$.

The pseudometric space (T, ρ_ψ) is separable and the processes $Y_n(t)$ are separable in this space.

Theorem 1. [1] *If the following condition holds*

$$\hat{\varepsilon}_0 = \sup_{t,s \in T} \|X(t) - X(s)\|_\psi < \infty,$$

and for any $\tau > 0$

$$\int_0^\tau \kappa_\psi(\tilde{N}(u))du < \infty,$$

where $\kappa_\psi(n)$ *is the M-characteristic of the space* $\mathbf{F}_\psi(\Omega)$, $\tilde{N}(\varepsilon)$ *is the metric massiveness of the space* (T, ρ_ψ), *then* $Y_n(t)$ *converge weakly in* $\mathbf{C}(T, \rho_\psi)$ *to the Gaussian process* $X_\infty(t)$ *such that* $EX_\infty(t) = 0$, $EX_\infty(t)X_\infty(s) = EX(t)X(s)$.

References

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