

Ievgen Turchyn (Dnipropetrovsk State Agrarian University, Dnipropetrovsk, Ukraine)

Rate of Convergence in Orlicz Spaces for Wavelet-based Expansion of Stationary Gaussian Stochastic Processes

Let ϕ be a f -wavelet, ψ — corresponding m -wavelet, $X(t)$ — a centered second-order wide-sense stationary stochastic process which has spectral density $f(y)$. There has been obtained an estimate for rate of convergence in Orlicz space $L_U([0, T])$ of series

$$X(t) = \sum_{k \in \mathbb{Z}} \xi_{0k} a_{0k}(t) + \sum_{j=0}^{\infty} \sum_{k \in \mathbb{Z}} \eta_{jk} b_{jk}(t)$$

(see [2]), where

$$a_{0k}(t) = \frac{1}{\sqrt{2\pi}} \int_R \sqrt{f(y)} \exp\{-iy(t-k)\} \widehat{\phi}(y) dy,$$
$$b_{jk}(t) = \frac{1}{\sqrt{2\pi} 2^{j/2}} \int_R \sqrt{f(y)} \exp\left\{-iy\left(t - \frac{k}{2^j}\right)\right\} \widehat{\psi}(y/2^j) dy,$$

ξ_{0k}, η_{jk} are centered random variables such that

$$\mathbf{E} \xi_{0k} \overline{\xi_{0l}} = \delta_{kl}, \quad \mathbf{E} \eta_{jk} \overline{\eta_{lm}} = \delta_{jl} \delta_{km}, \quad \mathbf{E} \xi_{0k} \overline{\eta_{nl}} = 0.$$

- [1] Hernandez E., Weiss G. A First Course on Wavelets. — Boca Raton: CRC Press Inc., 1996.
 - [2] Kozachenko Yu.V., Turchyn Ye. On Karhunen-Loeve-like expansion for a class of random processes // Internat. J. of Statist. and Management System. — 2008. — **3**. — P. 43–55.
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