Pchelintsev E. A., Perelevskiy S. S. (Tomsk State university, Tomsk, Russia) — **On estimation for the trend coefficient of a diffusion process by discrete time observations.** Let on the probability space $(\Omega, \mathcal{F}, \mathbf{P})$ be defined the following stochastic differential equation : $dy_t = S(y_t)\,dt + \sigma(y_t)dw_t\,,\ 0 \le t \le T\,,$ where $(w_t)_{t\ge 0}$ is a scalar standard Wiener process, the initial value y_0 is a given constant, $\sigma(\cdot)$ is an unknown diffusion coefficient and $S(\cdot)$ is an unknown function from special functional class Σ introduced in [1]. The problem is to estimate the function $S(x)$, $x \in [a, b]$, from discrete time observations $(y_{t_j})_{0\le j\le N}$, $t_j = j\delta$, with the frequency $\delta = \delta_T \in (0,\, 1)$ and the sample size $N = N(T) \to \infty$ (as $T \to \infty$) are some functions of T. The diffusion coefficient σ is a nuisance parameter.

Using the sequential analysis method, in [1] for estimating the function S the authors have been proposed an asymptotically efficient model selection procedure $\hat{S}$ based on weighted LSE. In this paper was proposed a model selection procedure S^* based on improved estimates, which outperforms in mean square accuracy the estimate from [1], i.e.

Theorem. The model selection procedure S^* is improved in compare with the procedure $\hat{S}$ in the following sense

$$\sup_{S\in\Sigma}(\mathbf{E}_S\|S^* - S\|^2 - \mathbf{E}_S\|\hat{S} - S\|^2) < 0\,,$$

where $\|\cdot\|$ is the norm in $L_2[a, b]$.

For improvement of the precise we use the special shrinkage estimates from [2, 3]. Sharp non-asymptotic oracle inequality for a quadratic risk of the proposed estimate was obtained.

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