Chistyakov A. E., Protsenko S. V. (Rostov-on-Don, Russia). **The investigation of turbulent exchange by methods of stochastic analysis.**

During the expeditionary research of the Sea of Azov, data were obtained on the pulsations of the velocities of the water flow in some points of water bodies with the help of the ADSP (Acoustic Doppler Current Profiler) WHS600 Sentinel probe [1]. To process the results of field measurements, trigonometric interpolation polynomial was used:

$$\xi(t) = \frac{1}{N}\left[a_0 + a_{N/2}\cos(\pi t) + 2\sum_{n=1}^{N/2-1}\left(a_n \cos\left(\frac{2\pi tn}{N}\right) - b_n \sin\left(\frac{2\pi tn}{N}\right)\right)\right],$$

where $a_n = ReX_n$, $b_n = ImX_n$, $X_n = \sum_{n=0}^{N-1}\left(x_n exp(-\frac{2\pi ikn}{N})\right)$ is the signal spectrum, x_n is the original signal.

The correlation coefficients of the initial data of the velocity vector components with the obtained normal and log-normal distributions are found. The values of the velocity vector fields of the spectra are obtained, which are distributed according to the normal and lognormal laws and have mathematical expectations and variances corresponding to real field data. The processed values of the velocity vector are used to obtain the distribution of the coefficient of vertical exchange based on the approaches of Monin and Smagorinsky [2]. A system of Reynolds equations was used to simulate turbulent flows.

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