Atayan A. M., Chistyakov A. E. (Don State Technical University, Rostov-on-Don), **Development of parallel algorithms for predicting the gas regime in the aquatic environment with the dynamics of biota with a stochastic distribution of the substance**[1].

The mathematical model of biological kinetics is based on a system of non-stationary convection-diffusion-reaction equations with non-linear terms, takes into account the movement of water flow, gravitational settling of impurities, microturbulent diffusion, decomposition of detritus as a result of the activity of aerobic and anaerobic bacteria.

The model is a set of equations for each q_i – concentration value of the i-th substance of the form: [1]:

$$\frac{\partial q_i}{\partial t} + u\frac{\partial q_i}{\partial x} + v\frac{\partial q_i}{\partial y} + (w - w_{g_i})\frac{\partial q_i}{\partial z} = \mu_i \Delta q_i + \frac{\partial}{\partial z}\left(\nu_i \frac{\partial q_i}{\partial z}\right) + \psi_i,$$

where w_{g_i} is the deposition rate of the i-th component; μ_i, ν_i are the turbulence coefficients in the horizontal and vertical directions, respectively; ψ_i is the chemical and biological source of the i substance, $i = \overline{1,10}$.

Theorem. The optimal size of a data packet for information exchange between processors is determined by the formula $m = \sqrt{\frac{(N_x-2)\cdot t_l(R-1)}{9t_a(R-1)(N_2-2)}}$, where N_x is number of steps along the O_x axis, N_2 is fragment width, t_a is execution time of one arithmetic operation, t_l is latency.

СПИСОК ЛИТЕРАТУРЫ

[1] A.I.'Sukhinov, Y.V.'Belova, A.E.'Chistyakov, "Mathematical modeling of biogeochemical cycles in coastal systems of the South of Russia", *Mathematical Models and Computer Simulations*, **13** (2021), 930–942.

объем тезисов не должен превышать области выше этой линии (за исключением сносок)

[1]The study was supported by the Russian Science Foundation grant No. 22-71-10102, https://rscf.ru/project/22-71-10102/