

# MATHEMATICAL MODELING OF THE SUSPENDED POLLUTION ZONES SPREAD IN THE MARINE ENVIRONMENT

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This work presents a three-dimensional non-stationary mathematical model that describes the diffusion and drift of the suspension mass in a liquid under the action of flow and wind loads. The system of Navier-Stokes equations is written under the assumption of a hydrodynamic approximation based on inhomogeneous fluid flows equations in the presence of spatially distributed sources. It considers the turbulent nature of the water flow movement, the nonlinear law of hydraulic resistance of natural flows, and describes the process of channel deformations. Numerical modeling of water dynamics is carried out on weak solutions of the problem previously linearized using Newton's method. Convective flows are modeled by the method of characteristics. A numerical-analytical solution of the three-dimensional equations of the dynamics of the aquatic environment in the FreeFem ++ package is found using finite-difference analysis. The numerical model is used to obtain hydrodynamic data in open areas of the sea to calculate the dynamics of movements and the concentration of suspended solids during hydrological work in the coastal sea area.

**Keywords:** finite element modeling, hydrodynamic modeling, shallow water equations.

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