

# Direct cascade numerical simulation in two-dimensional turbulence accompanied by energy flux

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In this paper, we numerically study two-dimensional turbulence in a bounded region of given dimensions in an inviscid medium under the action of an external force. The characteristics of the turbulent flow, such as the evolution of kinetic energy and enstrophy, are given. Spectral characteristics of the flow are shown, revealing the process of energy transfer at different scales of the problem.

The numerical experiment was carried out using the HYPERBOLIC\_SOLVER software package developed by the authors. This package implements a generic approach to the construction of computer programs. To solve the problem, the hydrodynamic part of the package is used, which implements the numerical scheme of the simplest linearization of the Godunov method. This scheme has a second order of accuracy in space.

In general, the problem under consideration belongs to the class of problems whose solution is necessary for understanding the mechanisms of the emergence and development of a two-dimensional turbulent flow and its internal structure.