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The modified method of contour dynamics and modeling of vortical structures

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Abstract

© 2019, Kazan Federal University. All rights reserved. This paper considers one of the most effective methods for modeling vortical structures, which are described by the 2-dimensional equation of carry of a vortex and by the Poisson equation for a flow function, namely, the contour dynamics method based on representation of a vortical stream by finite-area vortical regions. A modification of the contour dynamics method minimizing the errors arising at its direct application to description of vortical structures has been elaborated. The examples of the results of numerical experiments on the study of the dynamics of interaction of vortical structures for various configurations of their relative positioning, signs of vorticity, and distances between borders of the finite-area vortical regions have been presented.

Keywords

Finite-area vortical regions, Hydrodynamics, Modeling, Modified contour dynamics method, Phase inter-mixing, Quasi-recurrence phenomenon, Regimes of interaction, Vortices

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