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HAMILTONIAN SYSTEMS IN THE THEORY OF SMALL OSCILLATIONS OF A ROTATING IDEAL FLUID. I

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This article describes the behavior of solutions to two-dimensional Hamiltonian systems arising in the theory of small oscillations of a rotating ideal fluid. Representation is established for a class of exact solutions to the linearized Euler equations (the Poincaré–Sobolev system), with the help of which a mathematical model is constructed for the process of origination and development of vortex structures in a cylindric domain.

The first part of the article deals with the general properties of fluid oscillations and describes those connected with the presence of symmetry groups defined by the initial manifold of perturbations of the velocity field. In particular, we demonstrate that fluid motions are cellular-like and synchronous appearance or disappearance of vortex structures hold in every cell.

Key words and phrases: Hamiltonian system, continuous spectrum, vortex structure.

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