Mathematical Properties of the Viscous Rotating Stratified Fluid Counting with Salinity and Heat Transfer in a Layer

Authors : A. Giniatoulline

Abstract : A model of the mathematical fluid dynamics which describes the motion of a three-dimensional viscous rotating fluid in a homogeneous gravitational field with the consideration of the salinity and heat transfer is considered in a vertical finite layer. The model is a generalization of the linearized Navier-Stokes system with the addition of the Coriolis parameter and the equations for changeable density, salinity, and heat transfer. An explicit solution is constructed and the proof of the existence and uniqueness theorems is given. The localization and the structure of the spectrum of inner waves is also investigated. The results may be used, in particular, for constructing stable numerical algorithms for solutions of the considered models of fluid dynamics of the Atmosphere and the Ocean.

Keywords : Fourier transform, generalized solutions, Navier-Stokes equations, stratified fluid