An initial boundary value problem for the dynamic equations of rotating fluid

© A.A. Gurchenkov[1]

[1] Bauman Moscow State Technical University, Moscow, 105005, Russia

The oscillations of viscous incompressible fluid in the half-space above a rotating flat wall are investigated. The exact solution of initial boundary value problem for Navier — Stokes equations is presented and discussed. The tangential stress vector acting from the fluid on the plate is also calculated. It is shown that in the absence of rotation the solution coincides with the well-known solution of the problem on the unsteady motion of a fluid bounded by a moving flat wall. The quasi-harmonic oscillations of the plate and a motion with a constant acceleration are investigated. In the special case of harmonic oscillations under the assumption that the rotation axis is perpendicular to the plane of plate, the results coincide with those obtained by K. Thornley.

Keywords: *viscous fluid, Navier—Stokes equations, an initial boundary value problem, boundary layers.*

Gurchenkov A.A., Dr.Sci. (Phys.&Math.), Professor of the Higher Mathematics Department of Bauman Moscow State Technical University. Scientific interests in modeling and control of fluid-containing rotating rigid bodies. e-mail: challenge2005@mail.ru