
Motion of a solid body in a viscous fluid at high Reynolds numbers

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We consider a solid body of an arbitrary geometry moving in a viscous incompressible fluid. Movement of the body is assumed to be given. We examine the case of perturbed motion of a solid body relatively to the programmed motion, namely weakly perturbed libration movement. Two Cartesian coordinate systems are introduced. One is fixed in inertial space; the other is rigidly connected with the solid body. The position of the related coordinate system in relation to the fixed one is characterized by the displacement vector and rotation vector, which are considered to be small in terms of the proximity of the second order. The problem is solved in the linear formulation. The solution is found by the method of boundary layer, and the functions satisfying the linearized Navier — Stokes equations are taken as the initial approximation.

Keywords: *libration movement, viscous liquid, the Navier — Stokes equations, rigid body dynamics.*

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