ON THE NAVIER-STOKES EQUATIONS WITH NONHOMOGENEOUS BOUNDARY CONDITIONS IN A SYSTEM OF CONNECTED LAYERS

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Abstract

The stationary Navier–Stokes equations with nonhomogeneous boundary conditions are studied in a system of connected layers. The boundary of the domain is multiply connected and consists of finite number of infinite connected components, which form the outer boundary, and finite number of compact connected components, forming the inner boundary. The boundary value is assumed to have a compact support and it is supposed that the fluxes of the boundary value over the components of the inner boundary are sufficiently small. We do not pose any restrictions on fluxes of the boundary value over the infinite components of outer boundary. The existence of at least one weak solution to the mentioned Navier–Stokes problem is proved. The solution may have finite or infinite Dirichlet integral depending on geometrical properties of the domain.