

Large time behavior of solutions to 3D Navier-Stokes system with Tresca's friction law

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Motivated by lubrication and injection/extrusion problems where heat transfer and friction play an important role, we consider an unsteady and non-isothermal fluid flow in the three-dimensional case. The problem is described by the Navier-Stokes system subjected to non-homogeneous Dirichlet conditions on a part of the boundary and Tresca's friction law on the other part. First, we recall the existence result of weak solutions to the problem [2]. Then, starting from the approximation of the problem based on regularization of the free boundary condition combined with a special penalty method, we establish some sharp *a priori* estimates leading to better regularity properties for the velocity field and to the uniqueness of the solution [1]. We end up by proving the existence of a global attractor for the associated semi-group. To accomplish this, we use the method of *l*-trajectories introduced in [4]. This work extends the results of [3] to the case of more general 3D geometries.

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