Steady flow of a Navier-Stokes liquid past an elastic body

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Abstract

We consider a steady flow past a three-dimensional elastic body fully submerged in an incompressible viscous fluid. We treat the problem as a coupled steady state fluid-structure problem with the surface of the elastic body as a free boundary. We assume the fluid, occupying the exterior domain with respect to the elastic body, is governed by the Navier-Stokes equations with non-zero velocity at infinity and that the elastic body is a St.Venant-Kirchoff material. We address the question of existence and uniqueness for small data. We use a fixpoint approach based on a priori estimates of the Oseen linearization of the Navier-Stokes equations.

Keywords: Fluid-solid interactions, Navier-Stokes equations, elasticity, exterior domain.

References

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