

# Existence Analysis for a Class of Fluid-Composite Structure Interaction Problems

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We consider a class of fluid-structure interaction (FSI) problems between an incompressible, viscous fluid and an elastic structure composed of two layers: a thin layer in direct contact with the fluid, and a thick layer sitting on top of the thin layer. The fluid is modeled by the Navier-Stokes equations for an incompressible, viscous fluid, the thin structure is modeled by the Koiter shell equations, and the thick structure is modeled by the equations of 2D elasticity. The resulting problem is a nonlinear moving-boundary problem of parabolic-hyperbolic type. We will discuss the main steps of the first (constructive) existence proof for this type of fluid-composite structure interaction problems. The existence proof is based on an operator splitting strategy, which was used in the construction of a partitioned numerical scheme for the solution of this class of FSI problems. Our proof shows, among other things, that the numerical scheme converges to a weak solution of this nonlinear moving-boundary problem.

This is a joint work with Boris Muha (University of Zagreb, Croatia).