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Concerning an Applied Analysis of Fluid-Structure Interactive PDE Models.

In this talk we will present qualitative results for a partial differential equation (PDE) system which models a fluid-structure PDE of longstanding interest within the mathematical literature. The coupled PDE model under discussion involves a Stokes or Navier-Stokes system, which evolves on a three dimensional domain, interacting with a fourth order plate equation which evolves on a flat portion of said fluid domain. Among other technical difficulties we note that, inasmuch as the fluid velocity does not vanish on all of the boundary, the associated pressure variable cannot be eliminated via the classic Leray Projector. We will discuss current wellposedness work for the fully nonlinear model; i.e., the fluid component of the dynamics is governed by the Navier-Stokes, rather than the Stokes equations. (Received August 24, 2015)