Some existence results for fluid-structure interaction problems

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We study an unsteady nonlinear fluid-structure interaction problem that can be viewed as a toy model to describe blood flow in large arteries. We consider a Newtonian incompressible two-dimensional flow described by the Navier-Stokes equations set in an unknown domain depending on the displacement of a structure, which itself satisfies a linear wave equation or a linear beam equation with or without damping. The fluid and the structure systems are coupled via interface conditions prescribing the continuity of the velocities at the fluid?structure interface and the action-reaction principle. The aim is to investigated existence of strong or weak solutions with possible contact between the structure and the bottom of the fluid cavity, depending on the considered elastic model. We will present existence of local in time strong solutions (joint work with M. Hillairet and J. Lequeurre), existence of global in time strong solution in the case of a damped beam (joint work with M. Hillairet), and existence of weak solution “beyong contactïn the case where the structure is described by a beam equation (joint work with J.-J. Casanova and M. Hillairet).

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