

# The interaction between a thin fluid layer and an elastic plate

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We study the interaction of an incompressible viscous fluid occupying a thin two-dimensional channel with an elastic plate located on part of the fluid boundary. We assume that the deformation of the boundary is small enough and consider the fluid flow equations in the initial configuration. The non-stationary Stokes equations are used to model the flow, and pressure boundary conditions are prescribed at the ends of the channel'. The results on the existence, uniqueness and regularity of the solution are given.

Furthermore, the dynamics of this fluid-structure interaction problem is studied in the limit when the thickness of the fluid domain tends to zero. Using the asymptotic techniques, we obtain a sixth-order parabolic equation with nonstandard boundary conditions for the effective plate displacement. Results on the existence, uniqueness, and regularity of the solution are proved. The approximation is justified by a weak convergence theorem.

This is a joint work with Eduard Marušić-Paloka.