

Rigorous derivation of a sixth order thin film equation

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Abstract

In this talk we will study a linear 3D/3D fluid-structure interaction between a thin layer of a viscous fluid and a thin elastic body. First, suitable a priori estimates in terms of thickness of the fluid layer and the elastic body, which are both small parameters, will be derived. Using the obtained estimates we will identify the scaling properties of the physical parameters which give rise to a sixth-order thin film equation, which describes the evolution of the thin elastic body interacting with the thin layer of the fluid. We will analyze the convergence of solutions as small parameter (thickness of the domain) tends to zero and possible extensions to the non-linear case will be discussed.

This is joined work with M. Bukal, University of Zagreb.

Keywords: thin film equation, fluid-structure interaction, convergence analysis

References

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