

The Fluid-Elastic Shell Interaction: Analysis, Numerics and Applications

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Abstract

In this mini-course we will discuss questions of well-posedness, design of numerical schemes and application of fluid-structure interaction (FSI) problems. First, we will formulate a nonlinear fluid-elastic shell problem modeling the blood flow through medium to large artery. On this example we will explain the main challenges in design of numerical schemes for FSI problems. The emphasis will be on partitioned schemes where the structure and the fluid problem are solved with separate solvers. We will describe a partitioned scheme called "kinematically coupled scheme" and prove its stability and convergence. We will show how the ideas from numerics can be used to prove the existence of a weak solution. Finally, some extension of this ideas to different FSI problems will be discussed.

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