Weak solutions in fluid-structure interactions: Cauchy and periodic problems

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Abstract

Fluid-structure interactions (FSI) play a pivotal role in various natural and technological phenomena. Mathematically, FSI problems are described by a coupled nonlinear system of partial differential equations, where the Navier-Stokes equations are coupled to elasto-dynamics across the moving interface. In this presentation, we will provide an overview of the most recent advancements in the theory of weak solutions for FSI problems. Specifically, we will explore the challenges and nuances encountered when transitioning from solving the Cauchy problem to obtaining periodic solutions. To illustrate these concepts, we will examine a simple heat-wave system, which serves as a prototypical example of fluid-structure interactions. For this system, we will present some new existence results for periodic solutions.

The presented results are joint work with S. Schwarzacher and J. Webster.

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