# Seminar on Numerical Mathematics

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Large Deformation and Contact in Fluid-structure Interactions

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Faculty of Mathematics and Physics of the Charles University
Sokolovská 83, Praha 8, lecture hall K3 at 14:00

Organizers of the seminar:
Miloslav Feistauer
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*Abstract*

In this talk we address the following fundamental question: what happens if an elastic ball is falling in a container with a viscous fluid towards a rigid wall on the bottom? Will it come to contact? Or will there always remain a thin fluid film between wall and bottom? Will the ball bounce off? Or will the ball come to rest and stick?

We start by giving an overview on various results on this topic, computationally, theoretically and experimentally. Then in a second part we numerically investigate this challenging problem.

The possible contact between ball and boundary is a fundamental difficulty for established discretization schemes as it involves topology changes in the domain. For describing the interaction problem between elastic solid and fluid we shortly introduce the ALE approach and discuss its shortcomings in terms of modeling contact. Then, we introduce an alternative Eulerian approach that is well suited for contact problems. This Eulerian approach however brings along new difficulties with respect to discretization.