Bachelor Thesis

(Bakkalaureatsarbeit)

on the topic

"Fluid-Structure-Interaction"

- **Title:** Fluid-Structure-Interaction
- **Supervisor:** DI Dr. Martin Neumüller
- **Student:** Ludwig Mitter
- **Abstract:** In many applications, a flow of a liquid causes a deformation of solid structures. In order to be able to compute the flow accurately, this deformation has to be taken into account. Thus, the interaction between the fluid and the structure has to be modeled carefully. The goal of this Bachelor thesis is to first give a detailed derivation of the equations of linearized elasticity as well as the Navier-Stokes equations, before coupling those two sets of equations. The interaction between fluids and structures should be illustrated by means of several Benchmark examples.
- **Road Map for the Bachelor Thesis:**
  1. Introduction
  2. Linear elasticity equations
  3. Navier-Stokes equations
  4. Fluid-Structure coupling
  5. Benchmark exampples
  6. Conclusions
  7. References
- **Literature:** Lectures and Seminars (Proseminar) on Mathematical Models in Engineering
- **Additional Literature:** [1], [2]

References

[1] F. Nobile. *Numerical approximation of fluid-structure interaction problems with application to Haemodynamics.* PhD thesis, Ecole Polytechnique fédérale de Lausanne, 2001.

[2] S. Deparis. *Numerical analysis of axisymmetric flows and methods for fluid-structure interaction arising in blood flow simulation.* PhD thesis, Ecole Polytechnique fédérale de Lausanne, 2004.