

# Optimal boundary control problems with application to stationary fluid-structure interaction systems

Andrea Chierici

This seminar aims to highlight the theoretical and numerical aspects of the optimal control of a multi-scale fluid-structure interaction problem where the structure obeys a membrane model derived from the Koiter shell equations. I first introduce the optimal control problem, and different regularization techniques are then proposed, together with some basis for the numerical implementation of a regularization term relying on fractional operators. Then, after some basic theorems on the existence of the FSI solution, I will introduce a gradient-based optimization method that relies on the Lagrange multiplier formalism to obtain the first-order necessary conditions for optimality. Lastly, some numerical results of the numerical implementation of the presented algorithm in a finite element framework are reported.