



Minisymposium 2 - Numerics for PDE-Constrained Control Problems

PDE-constrained control using commercial simulation software - Control of the Navier-Stokes equations with FEMLAB

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We show how the commercial simulation software FEMLAB can be used to solve PDE-constrained optimal control problems. We give a general formulation for such kind of problems and derive the adjoint equation and optimality system. Then these preliminaries are specified for the stationary Navier-Stokes equations with distributed and boundary control. The main steps to define and solve a PDE with FEMLAB are described. We describe how the adjoint system can be implemented, and how the optimality system can be used by FEMLAB's built-in functions. Special crucial topics concerning efficiency are discussed. Examples with distributed and boundary control for different type of cost functionals in 2 and 3 space dimensions are presented.