Optimal control of singularly perturbed advection-diffusion-reaction problems with control constraints

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In this talk, we consider the numerical analysis of discretized optimal control problems governed by a linear advection-diffusion-reaction equation with pointwise control constraints. The standard Galerkin discretization is stabilized via the local projection approach which leads to a symmetric optimality system at the discrete level. The optimal control problem simultaneously covers distributed and Robin boundary control. In the singularly perturbed case, the boundary control at characteristic parts of the boundary can be seen as regularization of a Dirichlet boundary control. Some numerical tests confirm the analytical results.

References:

[1] Becker, R. and Vexler, B.: *Optimal control of the convection-diffusion equation using stabilized finite element methods*, Numer. Math. 106 (2007) 3, 349-367.

[2] Lube, G. and Tews, B.: *Optimal control of singularly perturbed advection-diffusion-reaction problems*, Universität Göttingen, NAM-Preprint 2008.

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