

# Efficient solvers for saddle point problems with applications to PDE-constrained optimization

Walter Zulehner<sup>1</sup>

In this talk we present a general framework for analyzing saddle point problems. This includes a discussion of sharp estimates for the solution of such problems in terms of the data. We also study possible strategies for constructing norms for parameter-dependent problems leading to robust (i.e.: parameter-independent) estimates.

On the discrete level this framework can be used to construct and analyze preconditioners for the discretized optimality system of PDE-constrained optimization problems. We focus on preconditioners which are based on multigrid techniques.

For the several classes of distributed optimal control problems we discuss the efficiency of the described methods.

---

<sup>1</sup> Johannes Kepler University Linz, Institute of Computational Mathematics, Altenberger Straße 69,  
4040 Linz, Austria,  
zulehner@numa.uni-linz.ac.at