

Optimal Convergence Order for Control Constrained Optimal Control Problems

Gerd Wachsmuth¹ René Schneider²

In this talk we consider the numerical solution of control constrained optimal control problems. We are interested in obtaining the optimal convergence rate for the L^2 -error w.r.t. the number of degrees of freedom. Due to the control constraint, the optimal control possesses a kink at the interface between the active and inactive set w.r.t. the control constraint. This kink limits the convergence order of a uniform discretization to $h^{-3/2}$.

We compare some approaches from the literature. Moreover, we provide a new, efficient and robust error estimator which is used for an adaptive refinement of the mesh.

We also present a new method for solving control constrained problems. In this method, we move the nodes of the mesh at the interface between the active and inactive set. This yields optimal order of convergence.

¹ TU Chemnitz, Faculty of mathematics, Chemnitz, Germany,
gerd.wachsmuth@mathematik.tu-chemnitz.de

² TU Chemnitz, Faculty of mathematics,
rene.schneider@mathematik.tu-chemnitz.de