

On the convergence of adaptive finite element methods for control constrained optimal control problems

Arnd Rösch (University Duisburg-Essen, Germany) and Kunibert G. Siebert (University Duisburg-Essen, Germany)

Abstract: Adaptive finite element methods become very popular for constrained optimal control problems in the recent years. The most of these results are connected to the construction of a posteriori error estimators. The first class of results is connected to energy based error estimates. The second one is devoted to dual weighted residuals.

But the a posteriori error estimation is only one part of an adaptive method. Together with a reasonable marking and refinement strategy one hopes for a good numerical behavior of such a method. It turns out that even the convergence proof of such a method for constrained optimal control problems is challenging. There are only a few results published on this topic in the literature. Usually it is assumed that the diameter of the largest element is sufficiently small. Moreover, there is an assumption that the active sets of the discretized and the continuous problems are closely related. In our opinion such assumptions are not compatible with the basic ideas of adaptive methods. In this talk we propose a new approach in the convergence analysis of adaptive finite element methods for control constrained optimal control problems.