Towards Optimal Control for Non-Smooth PDE Problems with Abs-Linearization.

This talk focuses on optimal control problems constrained by non-smooth partial differential equations, where all non-differentiablilities are assumed to be given by the continuous but non-smooth operators abs$()$, min$()$ and max$()$. Even today there are only very few practical methods available for the non-regularized optimization of such non-differentiable problems.

We present a new approach to deal with this kind of optimization problems and explain how the original finite dimensional concept could be extended to the function space setting.

The key idea of the presented optimization method is to locate stationary points by appropriate decomposition of the original problem into several smooth branch problems. Each of these branch problems can be solved by classical means.

Suitable optimality conditions and subsequent exploitation of information given by the respective dual variables lead to the next branch and thus to successive reduction of the function value.

Numerical results for this concept will be discussed considering a non-linear model problem with non-smooth semi-linear elliptic PDE constraints.