

A Multigrid Approach to Obstacle Problems and to Optimal Control of Obstacle Problems

Michelle Vallejos¹ Roland Herzog²

An optimal control problem governed by an elliptic variational inequality is considered. We focus on the optimal control of the obstacle problem, which is a prototypical example of variational inequalities of the first kind. A robust multigrid strategy for solving obstacle problems will be presented. This algorithm is then extended in order to apply the same strategy for solving optimal control of obstacle problems. A collective smoothing multigrid is utilized since it belongs to the family of multigrid strategies which perform well in solving optimal control problems with PDE constraints. The algorithmic concept will be discussed and numerical examples will be presented to illustrate the efficiency of the proposed methods.

¹ TU Chemnitz, Reichenhainer Str. 41, 09107 Chemnitz,
mival@hrz.tu-chemnitz.de

² TU Chemnitz,
roland.herzog@mathematik.tu-chemnitz.de