A priori error analysis for an optimal control problem governed by a variational inequality of the second kind

Monika Weymuth[1]   Christian Meyer[2]

We consider an optimal control problem governed by an elliptic variational inequality of the second kind. The problem is discretized by linear finite elements for the state and a variational discrete approach for the control. We present nearly optimal a priori error estimates, i.e. we prove second order convergence (up to logarithmic terms) for the state and first order convergence (up to logarithmic terms) for the control. The key tools for the proof are strong stationarity conditions and a quadratic growth condition. The derivation of these strong stationarity conditions is based on differentiability properties of the control-to-state operator and needs only mild assumptions on the active set.

[1]Universität der Bundeswehr München, Institut für Mathematik und Computergestützte Simulation
    `monika.weymuth@unibw.de`

[2]Technische Universität Dortmund, Fakultät für Mathematik
    `cmeyer@math.tu-dortmund.de`