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Solving Optimal Control of Semilinear Elliptic Variational Inequalities Obstacle Problems using Smoothing Functions

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Abstract : In this paper, we investigate optimal control problems governed by semilinear elliptic variational inequalities involving constraints on the state, and more precisely, the obstacle problem. We present a relaxed formulation for the problem using smoothing functions. Since we adopt a numerical point of view, we first relax the feasible domain of the problem, then using both mathematical programming methods and penalization methods, we get optimality conditions with smooth Lagrange multipliers. Some numerical experiments using IPOPT algorithm (Interior Point Optimizer) are presented to verify the efficiency of our approach.

Keywords : complementarity problem, IPOPT, Lagrange multipliers, mathematical programming, optimal control, smoothing methods, variationally inequalities
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