QUASILINEAR OBSTACLE PROBLEMS IN FERROMAGNETIC SHIELDING: ANALYSIS AND OPTIMAL CONTROL

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ABSTRACT

In this talk, we aim to discuss the analysis and optimal control of a quasilinear first kind variational inequality (VI) in magnetostatics, in which first order differential constraints are imposed. Based on a Moreau-Yosida approximation for the indicator function of a specific underlying zeroth order obstacle set, we construct a sequence of approximating quasilinear variational problems where the occurring max-operation is smoothed. The corresponding limiting analysis leads to a well-posedness result and entails a dual formulation for VI.

More importantly, our construction comprises sufficient regularity, providing a suitable tool for studying optimality conditions corresponding to the optimal control of VI. Here, due to the character of the first order constraint, the main difficulty is that the sequence of Lagrangian multipliers appearing in the smoothed problems is suffering from poor stability properties. Thus, the characterization of the limiting (dual) multiplier needs a detailed investigation in which projection arguments play a crucial role.

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