

Numerical analysis for coupled parabolic PDE-ODE systems

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In this talk we investigate a priori error estimates for the space-time Galerkin finite element discretization of an optimal control problem governed by a simplified damage model. The model equations are of a special structure as the state equation consists of a coupled parabolic PDE-ODE system. Among other things, challenges for the derivation of error estimates arise from low regularity properties of solutions provided by this system. The state equation is discretized by a piecewise constant discontinuous Galerkin method in time and usual conforming linear finite elements in space. We provide error estimates both for the discretization of the state equation as well as for the optimal control. Numerical experiments are added to illustrate the proven rates of convergence.

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