

Optimal control of quasistatic plasticity

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The optimization of elastoplastic systems is of significant importance for industrial deformation processes, e.g., for the control of the springback of deep-drawn metal sheets. We consider an optimal control problem for the stress-based (dual) formulation of quasistatic elastoplasticity. The control-to-state map can be interpreted as an evolutionary variational inequality. Hence, it is non-differentiable and the analysis has to rely on time-discretization. For the constitutive equations of the elastoplastic material, we use the linear kinematic hardening model and the von Mises yield condition.

Necessary optimality conditions of weak-stationary type are obtained by time-discretization and regularization. Some numerical results concerning the control of the springback are shown.

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