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Recent results on analysis and optimal control of phase field models

Optimal control of doubly nonlinear evolution equations governed by subdifferentials

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Abstract: In this talk, we consider the following doubly nonlinear evolution equations governed by subdifferentials, denoted by (P):

Problem (P).

$$\begin{cases} \partial\psi^t(u'(t)) + \partial\varphi(u(t)) + g(u(t)) \ni f(t) \text{ in } H, \quad 0 < t < T, \\ u(0) = u_0 \text{ in } H, \end{cases}$$

where H is a real Hilbert space, $\psi^t : H \to \mathbb{R} \cup \{\infty\}$ is a time-dependent proper (i.e., $-\infty < \psi^t(\cdot) \leq \infty$, not identically ∞), l.s.c. (lower semi-continuous) and convex function, $\varphi : H \to \mathbb{R} \cup \{\infty\}$ is a time-independent proper, l.s.c. and convex function, $g(\cdot)$ is a Lipschitz operator in H, f is a given H-valued function and u_0 is a given initial value in H.

The main aim of this talk is to discuss the optimal source control problem of (P). In fact, we show the existence of optimal control f^* that minimizes the nonlinear cost functional. Also, we give some applications of our abstract results.

This is a joint work with M. H. Farshbaf-Shaker (WIAS Berlin).