



Karlstad Applied Analysis Seminar (2020)

Shodai Kubota, Chiba University, Japan

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Optimal control problems for phase-field models of grain boundary motions with constraints

Abstract

In this talk, we consider a class of optimal control problems, which consists of physically realistic problems and regularized approximating ones. In this class, every optimal control problem are subject to constraints for the temperature controls, and in particular, the constraints in approximating problems are supposed to make the ranges of temperatures bounded. The results of this talk are stated in four Main Theorems 1–4. Main Theorem 1 is concerned with the solvability and continuous dependence for the state-systems. Main Theorem 2 is concerned with the solvability of optimal control problems, and some semi-continuous association in the class of optimal control problems. In Main Theorem 3, we focus on the regularized approximating problems and derive the first order necessary optimality conditions for optimal controls. Also, on this basis, we verify the continuous dependence among the approximating optimal controls. Furthermore, in Main Theorem 4, we will observe the approximating limits of optimality conditions, which will be associated with optimal controls under general unbounded constraints, and those in the physically realistic problems.