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Optimal control problems of phase field system with total variation functional as the interfacial energy

In this talk, we consider optimal control problems of phase field system with total variation functional as the interfacial energy. Our system consists of two parabolic PDEs: a heat equation and a singular diffusion equation of an order parameter. We prove the existence of an optimal control that minimizes the nonlinear and nonsmooth cost functional. Also, we show the necessary condition of the optimal pair by using the optimal control problem of the approximating system. Moreover, we propose the numerical scheme to find the approximating optimal control, and to show the convergence of our numerical algorithm.