

ERROR BOUNDS FOR EULER APPROXIMATION OF A STATE AND CONTROL CONSTRAINED OPTIMAL CONTROL PROBLEM¹

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Abstract

We examine convergence of the Euler approximation to a nonlinear optimal control problem subject to mixed state-control and pure state constraints. We prove that under smoothness, independence, controllability and coercivity conditions at a reference solution of the continuous problem, there exists a locally unique solution to the Euler approximation, for sufficiently fine discretization, which converges to the reference solution with rate proportional to the mesh size.

Key words. Optimal control, nonlinear systems, state and control constraints, Euler discretization, rate of convergence.

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