

Receding Horizon Control of the Magnetic Flux Bilinear PDE based on Sequential Linear Quadratic Control

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We present a framework to solve a finite-time optimal control problem for parabolic partial differential equations (PDE) with diffusivity-interior actuators, which is motivated by the control of the current density profile in tokamak plasmas. The problem is formulated as an abstract bilinear-quadratic regulator (BQR) problem. A receding horizon control scheme is combined with a successive approximation algorithm to numerically solve the quadratic optimal control problem subject to the bilinear PDE. Convergence and stability properties of the combined approach are provided.