

Periodic economic MPC for nonlinear constrained systems^{*}

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Abstract: In this paper, we consider the problem of periodic optimal control of nonlinear systems subject to online changing and periodically time-varying economic performance measures using model predictive control (MPC). The proposed economic MPC scheme uses an online optimized artificial periodic orbit to ensure recursive feasibility and constraint satisfaction despite unpredictable changes in the economic performance index. We demonstrate that the direct extension of existing methods to periodic orbits does not necessarily yield the desirable closed-loop economic performance. Instead, we carefully revise the constraints on the artificial trajectory and provide closed-loop average performance guarantees.

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