Development of Constrained Predictive Functional Control using Laguerre Function Based Prediction

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Abstract

This work presents a novel constraint handling strategy for Predictive Functional Control (PFC). First, to improve prediction consistency, the constant input assumption of nominal PFC approaches is replaced with Laguerre based prediction. This substitution improves the effectiveness of using a constrained solution to prevent long-term constraint violations. Secondly, for state constraints, a simpler single regulator approach is proposed instead of switching between regulators, an approach common in the PFC literature. Simulation results verify that the proposed method manages the constraints better than the traditional approach. Moreover, despite all the modifications, the controller formulation and framework remain simple and straightforward which thus are in line with the key ethos of PFC.

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