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Constrained Data-Driven Model-Free ILC-based Reference Input Tuning Algorithm

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Abstract

This paper proposes a data-driven Iterative Reference trajectory tracking problem viewed as an optimization problem with saturation constraints and to control signal rate constraints. A model-free, experiment-based stochastic search algorithm formulated within a model-free framework in order to combine the advantages of model-based and model-free approaches. The reference input vector's dimensionality is reduced by using a set of neural networks (NNs) trained in an ILC framework are employed to estimate the gradient estimation. The IRIT algorithm is validated by simulation and experiment on a nonlinear aerodynamic system. The results prove that the control system performance improvement by few iterations. The paper successfully merges the use of ILC and model-free approaches.

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