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Globally optimal dynamic real time optimization without model mismatch between optimization and control layer

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Highlights of "Globally optimal dynamic real time optimization without model mismatch between optimization and control layer"

- · A framework for integration of D-RTO and NMPC
- · Elimination of the mismatch between D-RTO and NMPC models
- · Global optimal real time optimization based on modified normalized multi-parametric disaggregation (NMDT)

ABSTRACT

Global optimality of dynamic operations ensures maximum economic benefits over time. We introduce Dynamic Real Time Optimization (D-RTO) method which uses the same model for D-RTO and for Nonlinear Model Predictive Controller (NMPC), thereby eliminating the model mismatch between the D-RTO and the NMPC. An integration framework based on two different predictive horizons for time-scale decomposition is proposed. Fast updates and reoptimization of the dynamic trajectories ensure that the dynamic operation is optimal over time. Proposed global optimization algorithm is a variation of normalized multi-parametric disaggregation (NMDT) where NMDT is modified by the use of a bivariate partitioning to solve the D-RTO problem. Elimination of the mismatch between D-RTO and NMPC models significantly reduces the effort required to eliminate the model errors between D-RTO, NMPC and the plant. Three chemical process examples are included to illustrate the proposed framework.

KEYWORDS: Global optimal dynamic real time optimization; ; , Normalized multi-parametric

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