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A Multiobjective Robust Controller Synthesis Approach Aided by Multicriteria Decision Analysis

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Abstract

This paper proposes a methodology for robust dynamic output-feedback control synthesis of uncertain linear systems represented by polytopic models. This control problem results in a semi-infinite optimization problem. The proposed synthesis procedure improves a previous two-step procedure, composed of synthesis and analysis, by employing both a multiobjective evolutionary algorithm (MOEA) and a multiple criteria decision making (MCDM) strategy in the synthesis step. The analysis stage is performed via a *Branch and Bound* (B&B) algorithm, enabling the validation of the former step. In the proposed multiobjective approach, the project aim is to meet the specifications of (i) reference signal tracking response, (ii) disturbance rejection and (iii) measurement noise attenuation. The project specifications are quantified in terms of \mathcal{H}_∞ and \mathcal{H}_2

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