

A Computational Approach to State Feedback Synthesis for Polynomial Systems Using Convex Optimization

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Abstract

This paper deals with a computational approach to the state feedback synthesis problem with guaranteed cost for input-affine polynomial systems based on a state-dependent linear matrix inequality (SDLMI) from the Hamilton-Jacobi inequality. The design follows two-step procedure. In the first step, a direct usage of the matrix sum of squares relaxations and semidefinite programming present a feasible solution of the SDLMI. In the second step, two kinds of polynomial annihilator decrease the conservativeness of the first design. The paper also shows that a control oriented structural reduction can reduce the computational effort.