

Observer Design for Polynomial Systems Using Convex Optimization

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Abstract

This paper presents a computational technique of observer design for input-affine polynomial systems based on Lyapunov's stability theorem and invariance principle by using convex optimization. After some elementary results, an observer design method is discussed guaranteeing a regional stability of the closed-loop system for a given state estimate feedback law. Two performance improvements are also discussed with respect to decay rate and \mathcal{L}_2 gain filter. To compute these observer gains, scalar and matrix-valued sum of squares optimization are effectively used.