An Algorithm for Maximizing the Controllable Set for Open-Loop Unstable Systems under Input Saturation

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Abstract

An optimization technique is presented for approximating the controllable set by an ellipsoid for a linear time-invariant open-loop unstable system subject to input saturation. A technique and algorithms for maximizing the controllable set are also presented. In stead of starting from a positive definite right-hand side matrix Q of the Lyapunov equation as done in almost all applications of the Lyapunov functions, we start from a positive definite Hessian matrix P for the Lyapunov function so that the resulting Lyapunov function will be convex.

Keyword： input saturation, Lyapunov theorem, ellipsoidal controllable set