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Title:

Finite-time stabilization of some class of infinite dimensional systems

Abstract:

Based on the well-known Lyapunov method, the finite-time stability (FTS) is investigated for a class of abstract bilinear systems. The well-posedness of the system in closed loop is studied using the theory of maximal monotone operators. In order to insure the finite time stability in a settling time, a Lyapunov function is proposed, which also leads to a sliding mode area for the system at hand. A necessary and sufficient condition for FTS is formulated in term of an observability property (in the sense of linear systems). The approach is also applicable to finite time stability in a prescribed time, where the idea consists on the design of time-varying feedbacks law. These results are further applied to derive FTS of abstract linear systems. The obtained results cover various situations from parabolic and hyperbolic equations. This work is joint with Hanan Najib.