

μ -Dynamical Systems and Adaptive Control

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Abstract

We introduce the notion of a dynamical system which generates its own domain, called a μ -*dynamical system*, and explore questions in the stability and control of these systems. Since our emphasis is on Lyapunov methods, we will compare and contrast the discrete and continuous version of Lyapunov's equation in both the algebraic and dynamic settings. We show the deficiency of the standard techniques on \mathbb{R} and \mathbb{Z} , but how this generalized μ -dynamical setting provides a natural framework in which to tackle both analysis and design problems in adaptive control theory. Doing so leads to questions rooted in convex analysis, Lie algebras, and combinatorial topology.