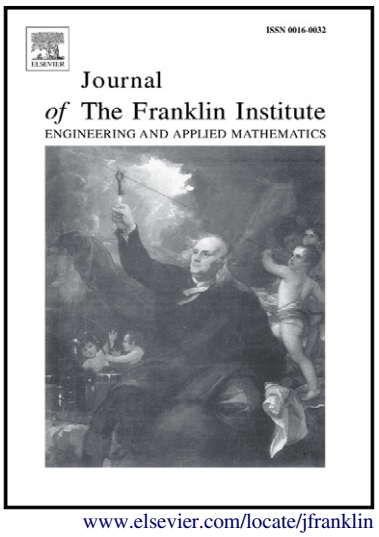

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Output Tracking Control for Fuzzy Delta Operator Systems with Time-Varying Delays

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Abstract

This paper addresses the fuzzy output tracking control problem of Takagi-Sugeno (T-S) fuzzy delta operator systems with time-varying delays. For a new model transformation, the time-varying delay is approximated via an input-output approach. Based on the transformed model, a sufficient criterion of asymptotic stability with H_∞ tracking performance is derived for the closed-loop system by using scaled small gain theorem. Based on the criterion, a fuzzy H_∞ state-feedback controller is designed such that the output of the plant can track the output of a given reference model in H_∞ sense. The existence condition of the controller can be expressed by a convex optimization problem. Finally, simulation results are given to demonstrate the effectiveness and potential of the proposed new design technique.

Keywords: Output tracking control; T-S fuzzy system; Model reference control; Time-varying delay

I. Introduction

During the past few years, tracking control has become a hot research topic in the fields of industry production systems [6], [24], [44], aeronautics and astronautics systems. The primary target of output

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