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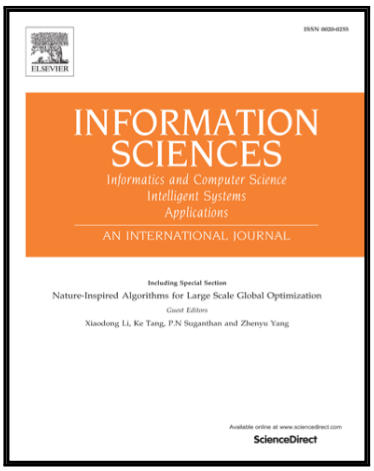

Robust adaptive fuzzy control of a class of uncertain switched nonlinear systems with mismatched uncertainties

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ACCEPTED MANUSCRIPT

Robust adaptive fuzzy control of a class of uncertain switched nonlinear systems with mismatched uncertainties

Yuan-Xin Li* and Guang-Hong Yang †

Abstract

This paper studies the adaptive fuzzy control problem for a class of uncertain switched nonlinear systems with mismatched uncertainties and external disturbances. A new switched adaptive control technique for the problem studied is set up such that the considered switched systems can be stabilized under a class of switching signals characterized by the generalized average dwell-time condition. First, the adaptive state feedback controller is designed based on tuning the estimations of the bounds on switching parameters, instead of estimating the switching parameters directly. Next, by using a switched observer to reconstruct the states of the system, an output feedback controller is also presented. In the design procedure, fuzzy logic systems are used to approximate the unknown nonlinear functions. To overcome the undesirable chattering phenomenon, both control laws are developed using the continuous control strategy. It is shown that both controllers can guarantee that all the signals in the resulting

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