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DELAY-DEPENDENT ADAPTIVE RECONFIGURATION CONTROL IN THE PRESENCE OF INPUT SATURATION AND ACTUATOR FAULTS

Yuying Guo[1,2], Bin Jiang[1] and Peng Shi[3,4]

[1]College of Automation Engineering
University of Aeronautics and Astronautics
29, YuDao Street, Nanjing, 210016, P. R. China
binjiang@nuaa.edu.cn

[2]School of Information Engineering
Southwest University of Science and Technology
Mianyang, 621010, P. R. China
polarisguo@163.com

[3]Department of Computing and Mathematical Sciences
University of Glamorgan
Pontypridd, CF37 1DL, United Kingdom
pshi@glam.ac.uk

[4]School of Engineering and Science
Victoria University Melbourne
Vic 8001, Australia
peng.shi@vu.edu.au

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Abstract. *In this paper, an active fault tolerant control strategy is developed for a class of linear state-delayed systems with unknown actuator faults and input constraints. The design is a combination between a direct adaptive control algorithm and multiple model switching, and the μ-modification is introduced in the model reference control architecture. The main features of the proposed control strategy are the reliability and simplicity in tracking against actuator faults. By Lyapunov-Krasovskii theory, the stability of overall system is guaranteed and the boundness of all signals is ensured. Numerical simulation results demonstrate the effectiveness of the proposed fault-tolerant control scheme.*
Keywords: Time delays, Actuator fault, Adaptive control reconfiguration, Multiple model, Input constraints

1. **Introduction.** Fault-tolerant control (FTC), due to the issues of availability, reliability and operating safety of increasingly complex systems, is currently an important research area, and has been addressed by many authors and their results reported in numerous studies, to name a few, we refer the readers to [1-6] and references therein.

Actuator faults are common in modern dynamical systems and can cause performance deterioration or even fatal disasters if not effectively accommodated, moreover, the presence of input saturation may lead to serious degradation of system performance [7]. These problems have attracted much attention during recent years, for example, the reconfiguring method was presented in [8,9] to reconfigure the faulty system with actuator saturation. In [10], a fault detection, a diagnostic and accommodation procedure are considered for stable nonlinear state delay plants. Adaptive control approach was used in [11,12] to compensate actuator faults for a class of delayed systems. A neural networks based on a fault detection method for nonlinear systems was proposed in [13]. However, relatively