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Liang Zhao, Guang-Hong Yang

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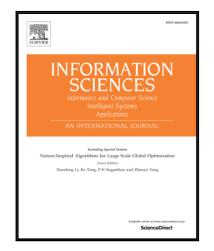
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End to end communication rate-based adaptive fault tolerant control of multi-agent systems under unreliable interconnections

Liang Zhao * and Guang-Hong Yang †

Abstract

The active fault tolerant control (FTC) problem for nonidentical high-order multi-agent systems (MASs) with network disconnections and actuator faults is studied in this paper. To address the challenges incurred by network disconnections, a novel FTC method based on the end-to-end communication rates is proposed, where the MAS is considered as a cyber-physical system (CPS). In the cyber components, the pre-specified minimum values of the end-to-end communication rates are used to determine the status of network connections. In the physical components, a cooperative controller and a high-gain observer-like protocol are presented to compensate the actuator faults and the nonidentical nonlinearities. Compared with the previous turning mechanisms based on the output errors method, the end-to-end communication rates method is a more direct way to determine status of network connection. Finally, a simulation is given to validate the effectiveness of the proposed method.

Key words: Fault tolerant control; Cyber-physical system; Multi-agent system; Consensus; Nonlinear systems; Cooperative control

^{*}Liang Zhao is with the College of Information Science and Engineering, Northeastern University, Shenyang, Liaoning, 110819, P. R. China. 3488361059@qq.com

[†]Guang-Hong Yang is with College of Information Science and Engineering, Northeastern University, Shenyang, Liaoning, 110819, P. R. China. He is also with the State Key Laboratory of Synthetical Automation of Process Industries, Northeastern University, Shenyang, Liaoning, 110819, P. R. China. Corresponding author. yangguanghong@ise.neu.edu.cn

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