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Xiaozheng Jin, Xianfeng Zhao, Jiahu Qin, Wei Xing Zheng, Yu Kang

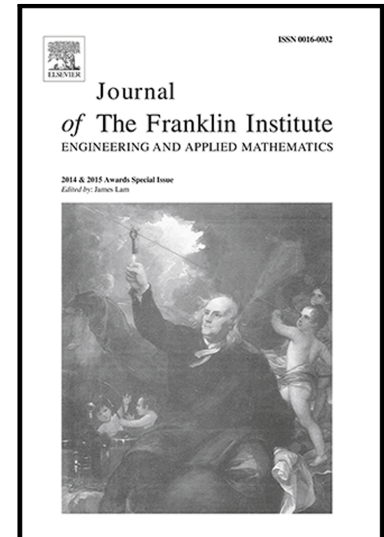
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# Adaptive Finite-time Consensus of a Class of Disturbed Multi-agent Systems

Xiaozheng Jin<sup>\*</sup>, Xianfeng Zhao<sup>†</sup>, Jiahu Qin<sup>‡§</sup>

Wei Xing Zheng<sup>¶</sup> and Yu Kang<sup>||</sup>

## Abstract

In this paper, the finite-time exponential consensus problem is addressed for a class of multi-agent systems against some disturbed factors, which include system uncertainties, communication perturbations, and actuator faults. All disturbed factors are supposed to be influenced by internal and external effects of systems. The internal effects are described in terms of dependency on the system states, while the external actions are restricted by constant bounds. To obtain the information of the rate of dependency on the states and constant bounds, an adaptive mechanism is designed to estimate the rate and bounds. Based on these estimates, a distributed adaptive sliding mode controller is constructed to eliminate the effects of those disturbed factors. Then exponential consensus of the closed-loop adaptive multi-agent system is achieved within a finite time based on Lyapunov stability theory. The efficiency of the developed adaptive consensus control strategy is verified by a coupled system with four F-18 aircrafts of decoupled longitudinal model.

*Keywords:* Uncertain multi-agent systems; exponential consensus; finite-time control; actuator faults; perturbed communications.

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<sup>\*</sup>Xiaozheng Jin is with the School of Electrical Engineering and Automation, HeFei University of Technology, HeFei, AnHui 230009, P. R. China. [xzjin@hfut.edu.cn](mailto:xzjin@hfut.edu.cn)

<sup>†</sup>Xianfeng Zhao is with the School of Electrical Engineering and Automation, HeFei University of Technology, HeFei, AnHui 230009, P. R. China. [xfz5072@163.com](mailto:xfz5072@163.com)

<sup>‡</sup>Jiahu Qin is with the Department of Automation, University of Science and Technology of China, HeFei, AnHui 230009, P. R. China. [jqin@ustc.edu.cn](mailto:jhqin@ustc.edu.cn)

<sup>§</sup>Corresponding author: Jiahu Qin

<sup>¶</sup>Wei Xing Zheng is with the School of Computing, Engineering and Mathematics, Western Sydney University, Sydney, NSW 2751, Australia. [w.zheng@westernsydney.edu.au](mailto:w.zheng@westernsydney.edu.au)

<sup>||</sup>Yu Kang is with the Department of Automation, University of Science and Technology of China, HeFei, AnHui 230009, P. R. China. [kangduyu@ustc.edu.cn](mailto:kangduyu@ustc.edu.cn)

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