多智能体系统快速有限时间平均一致性协议研究

王晓波 1，邢建春 1，李决龙 1, 2，王荣浩 1
（1 解放军理工大学 国防工程学院，江苏 南京 210007；2 海军海防工程研究中心，北京 100841）

摘要： 针对多智能体系统，本文提出了一种新型的有限时间平均一致性协议.基于 Lyapunov 稳定性理论，证明了系统在该协议控制下的稳定性，并得出了系统收敛时间的上限.通过与典型有限时间一致性协议的控制输入进行对比，得出该协议可以有效提高系统的收敛速度.最后，应用仿真实例对本文结论进行了验证.

关键词： 多智能体系统；有限时间；一致性；收敛速度

Finite-time Average Consensus Protocol for Multi-agent Systems with a Fast Convergence Rate

WANG Xiao-bo1, XING Jian-chun1, LI Jue-long1,2, WANG Rong-hao1
（1 College of Defense Engineering, PLA University of Science and Technology, Nanjing 21007, China；2 Research Center of Costal Defense Engineering, Beijing 100841, China）

Abstract： A novel protocol that can achieve an average state consensus for multi-agent systems in finite time is presented in this paper. Based on the Lyapunov stability theory, it is proved that the system stability can be guaranteed. Moreover, the upper bound of convergence time is obtained. Through the study and comparison with the control input of the typical finite-time consensus protocol, it obtains that the protocol can improve the convergence rate effectively. Lastly, simulations are conducted to verify the effectiveness of the results.

Key words： multi-agent system； finite-time；consensus；convergence rate

作者简介：
王晓波男，（1988-），博士研究生.研究方向为多智能体系统一致性研究. E-mail: xbwang1988@163.com.
邢建春男，（1964-），博士，教授.研究方向为国防工程内部设备及智能化.