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"Actuator Fault Accommodation for a Class of Nonlinear Uncertain Interconnected Systems: An Adaptive Command Filtering-Based Scheme"

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Abstract. Actuator fault accommodation plays a critical role in ensuring the reliability and safety of control systems, particularly in nonlinear interconnected systems where faults can severely impact performance. This work presents a robust fault-tolerant control strategy designed to manage both partial and total actuator failures while maintaining system stability and operational effectiveness. The proposed distributed control framework combines adaptive approximation and command filtering backstepping techniques to handle unmatched modeling uncertainties, unknown interconnection terms, and the complexities of systems with multiple actuators of varying relative degrees. A fault diagnosis agent is integrated into the control design, enabling real-time detection, isolation, and estimation of actuator faults. This allows for dynamic reconfiguration of control strategies or switching to healthy actuators, ensuring continued functionality. The effectiveness of the approach is validated through theoretical analysis and simulations, demonstrating its capacity to provide reliable operation even under significant fault and uncertainty conditions.

Biography: Hamed Tirandaz holds a B.Sc. in Applied Mathematics from Hakim Sabzevari University, completed in 2006, and an M.Sc. in Mechatronics Engineering from Semnan University, Iran, in 2009. After working as a programmer for a power distribution system company, he transitioned to academia, serving as a Lecturer at Hakim Sabzevari University from 2010 to 2019. He is currently pursuing a Ph.D. at the Department of Electrical and Computer Engineering at the University of Cyprus and is a researcher at the KIOS Center of Excellence. His research interests focus on fault diagnosis and fault-tolerant control of distributed systems.