

عنوان مقاله:

Observer-based event-triggered guaranteed cost leader-following consensus control for heterogeneous uncertain nonlinear fractional-order multi-agent systems

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نویسندگان:

Mehdi Asaiyan - Faculty of Electrical Engineering, Shahid Beheshti University, Tehran, Iran

Mahdi Pourgholi - Faculty of Electrical Engineering, Shahid Beheshti University, Tehran, Iran

خلاصه مقاله:

Recently, the guaranteed cost consensus problem of multi-agent systems has attracted the attention of researchers. This paper tackles the challenge of event-triggered guaranteed cost leader-following consensus in heterogeneous uncertain nonlinear fractional-order multi-agent systems employing observers. The agents have different fractional-order dynamics coupled with uncertainties in their state, input, and output. To optimize communication resources, the paper introduces an event-triggered strategy, ensuring that updates to the control protocol occur only upon the satisfaction of the triggering condition. Leveraging this strategy and applying the fractional Lyapunov direct method, the problem is formulated. To obtain control and observer gains, a systematic approach algorithm is proposed using Linear Matrix Inequalities (LMI), with corresponding criteria established to guarantee guaranteed cost consensus. The effectiveness of the proposed method is validated through a numerical simulation, with comprehensive results presented. This research not only addresses a complex problem in multi-agent systems but also contributes a practical and resource-efficient solution, showcasing its potential applicability in real-world scenarios.

کلمات کلیدی:

Fractional-order dynamics, Multi-agent systems, Heterogeneous leader-following consensus, Observer, Event-triggered scheme, Guaranteed cost control

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