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**Event-triggered tracking control of heterogeneous multiagent systems based on two kinds of observers with asymmetric delay.** (English) [Zbl 1418.93158](#)

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**Summary:** In this paper, we consider the output tracking problem of a multiagent system with asymmetric delays and a switching topology. The multiagent system contains a leader and some followers, the dynamics of which are heterogeneous, and the output of the leader is available to only a subset of followers. We propose two types of observers to estimate states of the leader and reduce communication cost. For the informed followers that can directly obtain information of the leader, a common observer is given to reduce the complexity of observer design. Meanwhile, for the rest of the followers, a distributed observer with asymmetric communication delays for each follower is designed. The observer error system is transformed into a switched system. Through designing the average dwell-time switching law and constructing multiple Lyapunov functionals, some sufficient conditions for stability of the observer error system are obtained. Furthermore, a distributed controller for followers based on the relative information is developed to track the output of the leader. Finally, an example is given to validate the effectiveness of the proposed results.

**MSC:**

- [93C65](#) Discrete event control/observation systems
- [93A14](#) Decentralized systems
- [68T42](#) Agent technology and artificial intelligence
- [93C30](#) Control/observation systems governed by functional relations other than differential equations (such as hybrid and switching systems)
- [93D05](#) Lyapunov and other classical stabilities (Lagrange, Poisson,  $L^p$ ,  $l^p$ , etc.) in control theory

**Keywords:**

[asymmetric delays](#); [multiagent systems](#); [output tracking](#); [switching topology](#)

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