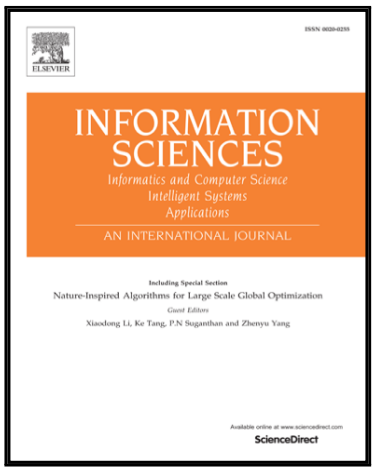

Sampled-data output feedback control based on a new event-triggered control scheme

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Sampled-data output feedback control based on a new event-triggered control scheme

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Abstract

In this paper, a new event-triggered control (ETC) scheme is proposed to investigate the observer-based output feedback control problems. To reduce the usage of communication resources, the control input is designed as a specific time-varying signal between two consecutive event-triggering instants, which is different from the general ETC methods. For the continuous-time event detection case, it is shown that the obtained lower bound of the minimum inter-event interval is not smaller than the one using the existing method. In addition, a novel discrete-time event detection scheme and the corresponding ETC policy based on the sampling output is proposed. Employing the stability analysis method for the time-delay system, a sufficient condition on the existence of an observer-based controller is presented. Finally, the simulation results are given to show that the proposed ETC scheme is beneficial to further reduce the frequency of the communication between sensors and the control unit.

Keywords: Linear systems, state estimation, event-triggered control, sampled-data control, stability.

1. Introduction

Over the last decades, the digital control techniques have found wide application in the practical control systems [4, 12, 34], where the new control signals are computed and implemented based on the sampling outputs of the plants. Traditionally, the sampling data is transmitted periodically. Then, the controller design for the closed-loop system can be executed using the theory on the discrete-time control systems [14, 21, 24, 29]. Although the periodic sampled-data control method has some advantages from the point of view of the

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