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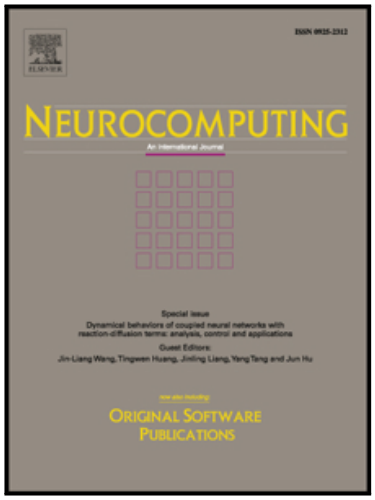

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An event-triggered protocol for distributed optimal coordination of double-integrator multi-agent systems

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Abstract

This paper designs two kinds of event-triggered control protocols for distributed optimal coordination of a group of agents with second order dynamics interacting according to given communication graph. First, a centralized event-triggered protocol is developed to accomplish the optimal coordination in the Pareto sense. The parameter is designed by constructing a new Lyapunov function. Second, it is shown that the event-triggered scheme is Zeno-free. Third, a distributed event-triggered protocol is devised by extending the proposed technique. Simulations are provided to demonstrate the effectiveness of the proposed design.

Keywords: Multi-agent systems, Distributed optimization, Event-triggered function

1. Introduction

During the past few decades, distributed convex optimization using a multi-agent system had received increasing attention [1, 2]. A typical formulation of this problem considered multiple agents with specified dynamics that interact according to a graph. Each agent wished to control its state to minimize a private convex cost function; however, the costs are function of state of other agents as well. It is desired to design an algorithm to update the

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