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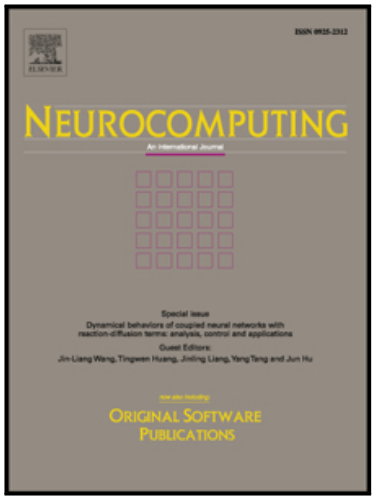

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Distributed consensus control for second-order nonlinear multi-agent systems with unknown control directions and position constraints☆

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Abstract

This paper investigates the leaderless consensus problem in the presence of unknown control directions and position constraints under directed graph. Based on the Nussbaum-gain technique and Barrier Lyapunov functions, the position-constrained consensus protocol is proposed for the multi-agent systems with unknown control directions. The proposed protocol ensures that all the signals in the closed-loop system are globally bounded and the consensus errors asymptotically converge to zero. Moreover, during the process of consensus, the trajectory of the position state of each agent is contained in the open interval which can be chosen arbitrarily in advance. A simulation example is given to demonstrate the effectiveness of the proposed control protocol.

Keywords: distributed consensus control, Barrier Lyapunov functions, Nussbaum gain control, directed graph

1. Introduction

Apart from its theoretical significance, dealing with control systems in a distributed sense is useful and even essential in many practical scenarios such

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