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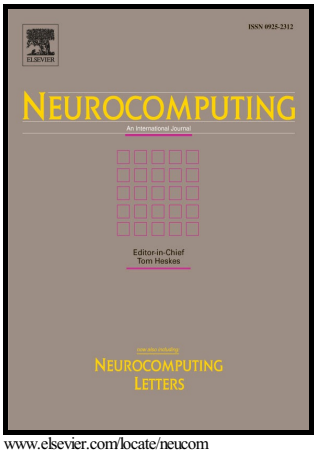

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Finite-Time Containment Control of Multi-Agent Systems with Static or Dynamic Leaders ☆

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Abstract

This paper establishes a novel finite-time containment control framework for multi-agent systems such that the containment control problem can be solved at any preset time with static or dynamic leaders. In order to reach this goal, nonlinear feedback control protocols are introduced. We prove that the proposed protocols can solve containment problems at the preset time if the communication graph has a spanning forest. Numerical simulations are presented to illustrate the effectiveness of the obtained theoretical results.

Keywords: Finite-time containment, multi-agent systems, preset time, time-varying gain, fixed topology

1. Introduction

In recent years, cooperative control of multi-agent systems have received considerable attention due to its extensive potential applications, such as group average in distributed computation, rendezvous of multiple vehicles, multiple spacecraft alignment and formation control of multiple robots [1, 2, 3]. A fundamental but important issue that arises in such robotic applications is the consensus problem, where agents are required to reach an agreement on a state of interest [4, 5, 6]. In this line of research, significant efforts have been made on the development of

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