

## Accepted Manuscript

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

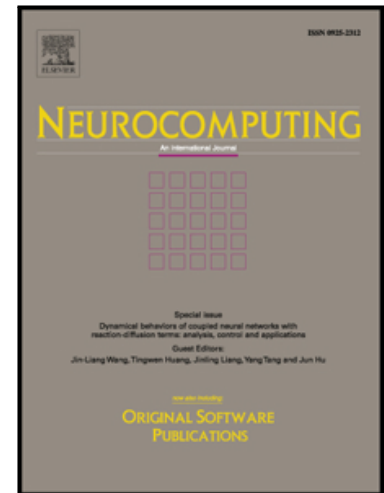
Xuan Cai, Chaoli Wang, Gang Wang, Dengyu Liang

PII: S0925-2312(18)30469-7  
DOI: [10.1016/j.neucom.2018.03.063](https://doi.org/10.1016/j.neucom.2018.03.063)  
Reference: NEUCOM 19502

To appear in: *Neurocomputing*

Received date: 2 January 2018  
Revised date: 8 March 2018  
Accepted date: 19 March 2018

Please cite this article as: Xuan Cai, Chaoli Wang, Gang Wang, Dengyu Liang, Distributed consensus control for second-order nonlinear multi-agent systems with unknown control directions and position constraints, *Neurocomputing* (2018), doi: [10.1016/j.neucom.2018.03.063](https://doi.org/10.1016/j.neucom.2018.03.063)



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Distributed consensus control for second-order nonlinear multi-agent systems with unknown control directions and position constraints<sup>☆</sup>

Xuan Cai<sup>a</sup>, Chaoli Wang<sup>a,\*</sup>, Gang Wang<sup>b</sup>, Dengyu Liang<sup>a</sup>

<sup>a</sup>*Department of Control Science and Engineering, University of Shanghai for Science and Technology, Shanghai 200093, China*  
<sup>b</sup>*Department of Electrical and Biomedical Engineering, University of Nevada, Reno, Nevada 89557, USA*

---

## 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

---

<sup>☆</sup>This paper was partially supported by The National Natural Science Foundation (61374040, 61673277, 61503262).

\*Corresponding author

*Email address:* clwang@usst.edu.cn (Chaoli Wang)

Download English Version:

<https://daneshyari.com/en/article/6863760>

Download Persian Version:

<https://daneshyari.com/article/6863760>

[Daneshyari.com](https://daneshyari.com)