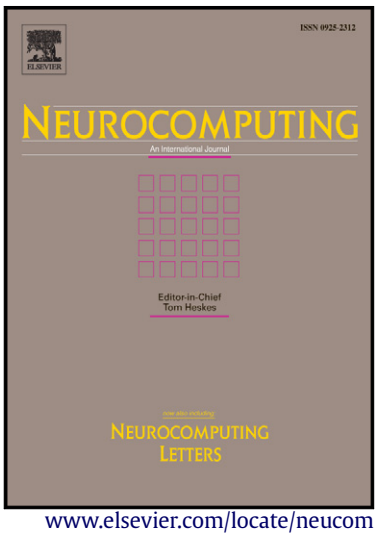

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Leader-following consensus of multi-agent systems via sampled-data control with randomly missing data☆

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Abstract

The objective of this paper is to inspect the leader-following consensus of distributed multi-agent system (MAS) under sampled-data control. The communication flow among neighbor agents is described by an undirected graph. The control protocols are designed by using sampling period technique and zero-order hold circuit along with missing data. A stochastic variable satisfying Bernoulli distributed white noise sequences is introduced to model the missing data. Moreover, by employing the input-delay approach, we transform the sampling data into time-varying delayed data and on the basis of receiving data, two sampled-data control models are proposed. Through the construction of a suitable Lyapunov-Krasovskii functional and by the utilization of integral inequalities, new delay-dependent consensus conditions for the concerned system are derived in the form of linear matrix inequalities (LMIs) which can be readily solved by utilizing any of the valid software packages. The effectiveness of the proposed algorithms is illustrated by two numerical simulations.

Keywords: Leader-following consensus; Multi-agent system (MAS); Sampled-data control; Missing data

1. Introduction

In artificial intelligence research, agent-based systems technology has been hailed as a new paradigm for conceptualizing, designing and implementing software systems. Generally, agents are sophisticated computer programs that act autonomously on behalf of their users across open and distributed environments to solve a growing number of complex problems. However, in the

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