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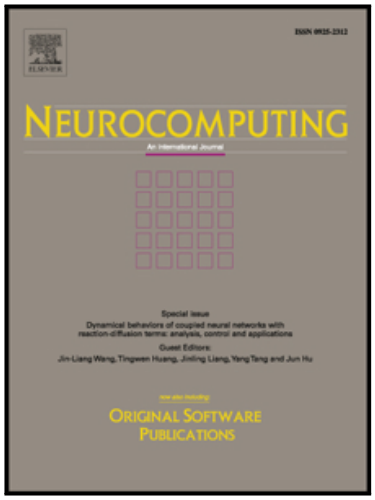

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Non-fragile state observation for delayed memristive neural networks: continuous-time case and discrete-time case

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Abstract

The topic of non-fragile observation for memristive neural networks with both continuous-time and discrete-time cases are provided in this paper. By endowing the Lyapunov technique, the corresponding sufficient criteria for the stability findings are furnished in the form of linear matrix inequalities (LMIs), of which, the desired observer gains can be calculated via the LMIs. What is the difference lies that the driven memristive neural networks are recast into models with interval parameters when considering the fact that the parameters of memrisitve model are state-dependent, which lead to parameter mismatch issue when different initial values are given. Thus, a new robust control method is introduced to tackle with the target model. Finally, the analytical design are substantiated with numerical results.

Keywords: Non-fragile ; State observer; Memristive neural networks; Linear matrix inequality

1. Introduction

About 8 years ago, a new nanoscale element that possess pinched hysteresis was demonstrated [1], which thus taken as the first real-life realization of the fourth circuit device, memristor. As a brand new nanometer circuit component, memristor has igniting unprecedented worldwide interest from the research organization for its future applications prospect, especially in the powerful brain-like "neural" computers.

In view of the symmetric and logical properties that observed in mathematical models of four basic electronic components, the theoretical existence of such a basic element was envisioned out by L. O. Chua in 1971 for the first time [2]. Actually, the idea of memristor are regard as the starting point for the design of the next generation high density processors computer due to its

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