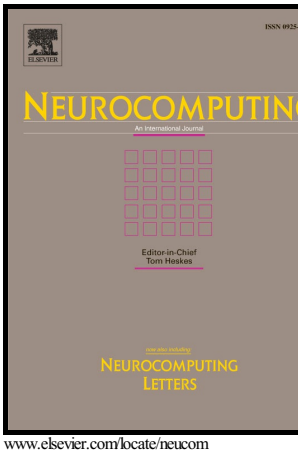

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Novel delay-dependent exponential stability criteria for neutral-type neural networks with non-differentiable time-varying discrete and neutral delays

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Abstract

In this paper, we consider exponential stability problem for neutral-type neural networks with both interval time-varying state and neutral-type delays under more generalized activation functions. We note that discrete and neutral delays are both time-varying where the discrete delay is not necessarily differentiable and the information on derivative of neutral delay is not required. To the best of our knowledge, this is the first study under this conditions on discrete and neutral delays. Furthermore, we consider the case when there are interconnections between past state derivatives, namely, neural networks contain activation function of past state derivatives. Based on the Lyapunov-Krasovskii functional, we derive new delay-dependent exponential stability criteria in terms of linear matrix inequalities (LMIs) which can be solved by various available algorithms. Finally, numerical examples are given to illustrate the effectiveness of theoretical results and to show less conservativeness than some existing results in the literature.

Keywords: Exponential stability, neutral-type neural networks, interval time-varying delay.

1 Introduction

During the last few decades, there have been extensively investigations on the stability analysis of neural networks due to their extensively applications such as signal processing, pattern recognition, associative memories, combinatorial optimization, see [3, 7–12]. An important