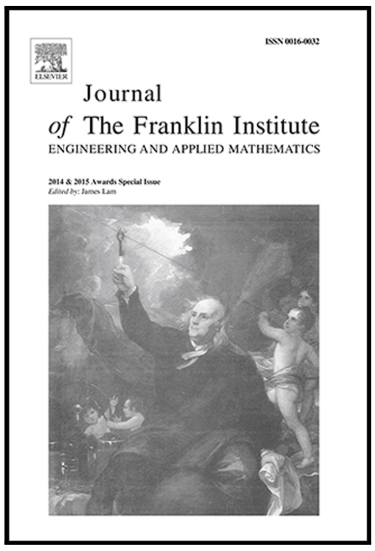

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Exponential Stability and Extended Dissipativity Criteria for Generalized Neural Networks with Interval Time-Varying Delay Signals

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Abstract

This paper discusses the problems of exponential stability and extended dissipativity analysis of generalized neural networks (GNNs) with time delays. A new criterion for the exponential stability and extended dissipativity of GNNs is established based on the suitable Lyapunov-Krasovskii functionals (LKFs) together with the Wirtinger single integral inequality (WSII) and Wirtinger double integral inequality (WDII) technique, and that is mixed with the reciprocally convex combination (RCC) technique. An improved exponential stability and extended dissipativity criterion for GNNs are expressed in terms of linear matrix inequalities (LMIs). The major contributions of this study are an exponential stability and extended dissipativity concept can be developed to analyze simultaneously the solutions of the exponential H_∞, $\mathcal{L}_2-\mathcal{L}_\infty$, passivity, and dissipativity performance for GNNs by selecting the weighting matrices. Finally, several interesting numerical examples are developed to verify the usefulness of the proposed results, among them one example was supported by real-life application of the benchmark problem that associates with reasonable issues under extended dissipativity performance.

Keywords: Exponential stability; Extended dissipativity; Generalized neural networks; Interval time delays ; Wirtinger integral inequality; Reciprocally convex approach.

1 Introduction

Neural networks (NNs) have seen an explosion of interest over the past several years, and been successfully applied across an extraordinary range of problem domains in science and engineering fields, such as static image treatment, image processing, signal processing, pattern recognition, associative memories,

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