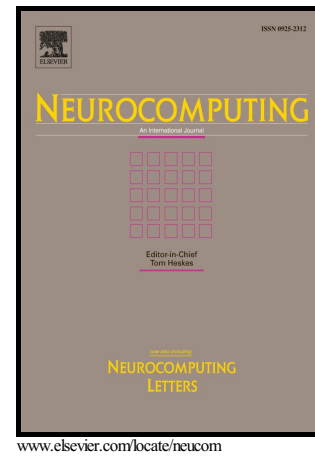


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Global generalized exponential stability for a class of nonautonomous cellular neural networks via generalized Halanay inequalities

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Abstract This paper investigates a new type of stability, namely global generalized exponential stability, of the nonautonomous delayed cellular neural networks. Several novel delay-dependent sufficient conditions are established by applying a new generalized Halanay inequality. In these conditions, the boundedness of time-varying delays and coefficients are not required. In addition, the effectiveness of these conditions is illustrated by two numerical examples.

Keywords Generalized exponential stability; Cellular neural network; Generalized Halanay inequality; Unbounded time-varying delay

1 Introduction

The cellular neural networks (CNN), first introduced by Chua and Yang ([1, 2]) in 1988, have attracted an active research attention in both theoretical and applied studies due to their potential applications in various fields such as signal and image processing, associative memories, pattern classification and so on ([3–6]).

In these applications, the existence of time delay is unavoidable due to the finite switching speed of the amplifiers and the communication time which occurs during hardware implementation. Time delay is constantly a source of poor performance, such as oscillation and instability. Therefore, the study of stability of cellular neural

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