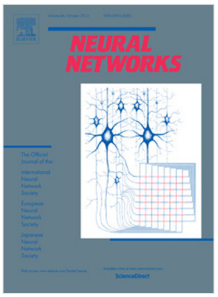
Accepted Manuscript



Delay-dependent dynamical analysis of complex-valued memristive neural networks: Continuous-time and discrete-time cases

Jinling Wang, Haijun Jiang, Tianlong Ma, Cheng Hu

PII: S0893-6080(18)30029-7
DOI: https://doi.org/10.1016/j.neunet.2018.01.015
Reference: NN 3889

To appear in: *Neural Networks*

Received date : 22 October 2017
Revised date : 21 December 2017
Accepted date : 30 January 2018

Please cite this article as: Wang, J., Jiang, H., Ma, T., Hu, C., Delay-dependent dynamical analysis of complex-valued memristive neural networks: Continuous-time and discrete-time cases. *Neural Networks* (2018), https://doi.org/10.1016/j.neunet.2018.01.015

Delay-dependent dynamical analysis of complex-valued memristive neural networks: continuous-time and discrete-time cases

Jinling Wang[1], Haijun Jiang[1], Tianlong Ma[2], Cheng Hu[1]

[1] College of Mathematics and System Sciences,

Xinjiang University, Urumqi, 830046, Xinjiang, China

[2] College of Basic Research,

Qinhai University, Xining, 810016, Qinghai, China

Abstract: This paper considers the delay-dependent stability of memristive complex-valued neural networks (MCVNNs). A novel linear mapping function is presented to transform the complex-valued system into the real-valued system. Under such mapping function, both continuous-time and discrete-time MCVNNs are analyzed in this paper. Firstly, when activation functions are continuous but not Lipschitz continuous, an extended matrix inequality is proved to ensure the stability of continuous-time MCVNNs. Furthermore, if activation functions are discontinuous, a discontinuous adaptive controller is designed to acquire its stability by applying Lyapunov-Krasovskii functionals. Secondly, compared with techniques in continuous-time MCVNNs, the Halanay-type inequality and comparison principle are firstly used to exploit the dynamical behaviors of discrete-time MCVNNs. Finally, the effectiveness of theoretical results are illustrated through numerical examples.

Keywords: Memristor; Complex-valued neural networks; Discontinuous activation functions; Matrix inequalities; Delay-dependent stability.

---

*

This was supported in part by the Excellent Doctor Innovation Program of Xinjiang University under Grant XJUBSCX-2016004, in part by the National Natural Science Foundation of People's Republic of China(Grants No. 61473244, No. 61563048, No. 11402223).