# Accepted Manuscript


Delay dependent dissipativity for a class of nonlinear neutral delay differential equations

Peng Hu, Haijun Xiao

PII: S0893-9659(18)30158-7
DOI: https://doi.org/10.1016/j.aml.2018.05.016
Reference: AML 5523

To appear in: *Applied Mathematics Letters*

Received date : 18 March 2018
Revised date : 17 May 2018
Accepted date : 17 May 2018

Please cite this article as: P. Hu, H. Xiao, Delay dependent dissipativity for a class of nonlinear neutral delay differential equations, Appl. Math. Lett. (2018), https://doi.org/10.1016/j.aml.2018.05.016

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

*Manuscript
Click here to view linked References

# Delay dependent dissipativity for a class of nonlinear neutral delay differential equations⋆

Peng Hu *, Haijun Xiao

*School of Mathematics and Physics, China University of Geosciences, Wuhan 430074, P. R. China*

**Abstract**

This paper is concerned with the delay dependent dissipativity for a class of nonlinear neutral delay differential equations. By taking into account the influence of the delay, a new dissipativity criterion is derived by using a generalized Halanay's inequality, which is less conservative than those in the existing literature in some cases. At last, two examples are provided to validate our theoretical results.

*Keywords:* Nonlinear neutral delay differential equations, dissipativity, delay dependent, generalized Halanay's inequality

## 1. Introduction

Many real world problems are modeled by dissipative dynamical systems such as the Navier-Stokes equations, the reaction-diffusion equations from chemical dynamics and population growth and so on [1]. In the past decades, the dissipativity of delay differential equations has been received many attentions. Especially in numerical analysis, researchers pay more attentions on that whether or not numerical methods inherit the dissipativity of the underlying system. Therefore the theoretical dissipativity results should be considered firstly. For nonlinear delay differential equations with constant delay, a sufficient condition for the dissipativity of the analytical solution has been given by Huang [2, 3, 4]. Based on these results, a significant number of valuable results have been obtained for delay differential equations with a bounded variable delay [5], neutral delay differential equations [6, 7, 8], delay integro-differential equations [9, 10], neutral delay integro-differential equations [11, 12, 13, 14, 15, 16], and functional (integro-) differential equations [17, 18, 19, 20, 21].

Nevertheless, as mentioned above, all of the dissipativity results do not depend on the delay. As we know that one of the interesting problems in stability analysis for delay differential equations

⋆This work was in part supported by NSF of China (Nos. 11401545, 11771163), the Opening Project of Sichuan Province University Key Laboratory of Bridge Non-destruction Detecting and Engineering Computing (No. 2014QZJ04) and the Fundamental Research Funds for the Central Universities, China University of Geosciences (Wuhan) (No. CUGL160411).

*Corresponding author (Peng Hu).

*Email addresses*: hupeng1118@126.com, hupeng@cug.edu.cn (P. Hu)

Download English Version:

https://daneshyari.com/en/article/8053402

Download Persian Version:

https://daneshyari.com/article/8053402

Daneshyari.com