

Accepted Manuscript

Dynamics of a class of delayed reaction-diffusion systems with Neumann boundary condition

Yanxiang Tan, Chuangxia Huang, Bo Sun, Tao Wang

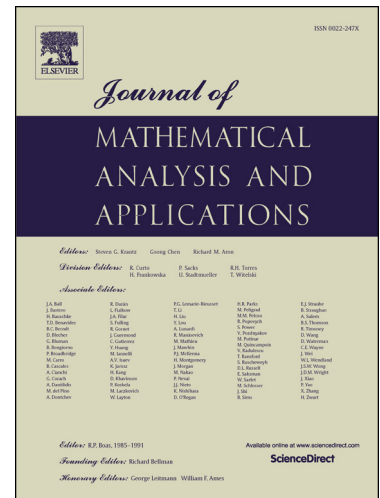
PII: S0022-247X(17)30884-3
DOI: <https://doi.org/10.1016/j.jmaa.2017.09.045>
Reference: YJMAA 21713

To appear in: *Journal of Mathematical Analysis and Applications*

Received date: 20 June 2017

Please cite this article in press as: Y. Tan et al., Dynamics of a class of delayed reaction-diffusion systems with Neumann boundary condition, *J. Math. Anal. Appl.* (2018), <https://doi.org/10.1016/j.jmaa.2017.09.045>

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.



Dynamics of a class of delayed reaction-diffusion systems with Neumann boundary condition *

Yanxiang Tan^{1,2}, Chuangxia Huang^{2†}, Bo Sun², Tao Wang³

¹College of Mathematics and Econometrics, Hunan University

Changsha, Hunan 410082, P. R. China

²School of Mathematics and Statistics,

Changsha University of Science and Technology, Changsha, Hunan 410114, China

³College of Mathematics and Computing Science,

Hunan University of Science and Technology

Xiangtan, Hunan 411201, P. R. China

Abstract. This paper considers a class of delayed reaction-diffusion systems under the Neumann boundary condition which arise in epidemiology and can describe the temporal and spatial evolutionary phenomena for the bacteria population and the human infective population. With the help of the iterative properties of interval mapping and dynamical system approaches, some positively invariant sets and attractive basins of the considered systems are analyzed detailedly. In addition, combining the global attractivity of interval mapping, we provide some sufficient conditions to ensure local or global attractivity of steady states of the systems. Finally, we apply these theoretical results to some models with different nonlinearity demonstrating "force of infection", and then obtain some sufficient conditions about "force of infection" to describe the survival and extinction of bacteria and infective populations.

Key words: Attraction basin; bacteria-infective population model; delayed reaction-diffusion equation

*Partially supported by the National Natural Science Foundation of P. R. China (Nos. 11571371, 71471020), Hunan Provincial Natural Science Foundation (No. 2016JJ1001), Scientific Research Fund of Hunan Provincial Education Department (No. 15A003), China Postdoctoral Science Foundation (Nos. 2014M550097, 2015T80144)

†Corresponding author. *E-mail address:* cxiahuang@amss.ac.cn (C. Huang); *telephone/fax number:* +86 731 85258293 /+86 731 85258787.

Download English Version:

<https://daneshyari.com/en/article/8900272>

Download Persian Version:

<https://daneshyari.com/article/8900272>

[Daneshyari.com](https://daneshyari.com)