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KARYA ILMIAH : PROSIDING

Judul Prosiding (Artikel) : Routh-hurwitz criterion and bifurcation method for stability analysis of tuberculosis transmission model
 Nama/Jumlah Penulis : R Mahardika, **Widowati**, YD Sumanto/ 3 orang
 Status Pengusul : penulis ke- 2
 Identitas Prosiding : a. Nama Prosiding : Journal of Physics: Conference Series
 b. Nomor ISSN : 17426588, 17426596
 c. Volume, nomor, bulan tahun : 1217 (2019) 012056
 d. Penerbit : IOP Publishing
 e. DOI artikel (jika ada) : 10.1088/1742-6596/1217/1/012056
 f. Alamat web Prosiding : <https://iopscience.iop.org/article/10.1088/1742-6596/1217/1/012056>
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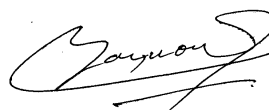
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Prof. Dr. St. Budi Waluya, M.Si
 NIP. 196809071993031002
 Unit kerja : Matematika FMIPA UNNES

Semarang, April 2020
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Prof. Dr. Basuki Widodo, M.Sc
 NIP. 19650506 1989031002
 Unit kerja : Matematika FSAD ITS

**LEMBAR
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d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	9,00			8,35
Total = (100%)	30,00			28,53

Nilai Pengusul = 40% x 1/2 x 28,53 = 5,71

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Penulisan artikel baik dan mengikuti standard penulisan artikel di Journal of Physics: Conference Series, yaitu abstract, Introduction, Result and Discussion (IRaD), Conclusion. Belum memuat Methodology dan Acknowledgement. Artikel ini didukung dengan referensi yang sesuai.

2. Ruang lingkup dan kedalaman pembahasan:

Lingkup bahasan dari artikel ini adalah bidang matematika terapan, khususnya pada bidang model dinamis. Dalam artikel ini dibahas dengan baik tentang penggunaan kriteria stabilitas Routh-Hurwitz untuk menganalisis model stabilitas bebas penyakit dari penularan TB. Relevansi hasil terkait penyebaran penyakit TBC.

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Surabaya, 18 April 2020

Reviewer 1



Prof. Dr. Basuki Widodo, M.Sc

NIP. 19650506 1989031002

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Total = (100%)	30,00			25.00
Nilai Pengusul = 40% x 1/2 x 25.00 = 5.00				

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Kesesuaian dan kelengkapan unsur isi cukup baik. Artikel tersusun dalam kaidah penulisan karta ilmiah. Terdiri atas 5 bagian: Introduction, Routh-Hurwitz Criterion and Bifurcation Method, Model Analysis, Numerical Results and Discussion, Conclusion. Didukung 12 referensi yang up to date.

2. Ruang lingkup dan kedalaman pembahasan:

Ruang lingkup dan kedalaman pembahasan cukup baik. Pembahasan mengenai Routh-Hurwitz stability criterion to analyze the stability of disease free of the tuberculosis transmission model. Pembahasan kurang menonjolkan nilai kebaruan. Termasuk Matematika Terapan yang sesuai dengan bidang keilmuan pengusul.

3. Kecukupan dan kemutakhiran data/informasi dan metodologi :

Kecukupan dan kemutakhiran data/informasi dan metodologi cukup baik. Terdapat 12 referensi yang up to date Sebagian besar berupa jurnal. Menggunakan numerik untuk mensimulasikan hasil (metode penyelesaiannya masalah sudah baik). Secara substansi hasil menunjukkan nilai orisinalitas.

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Semarang, April 2020
Reviewer 2



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Held on 26 September 2018 at Gets Hotel, Semarang, Indonesia
with paper entitled as follows:

Routh-hurwitz Criterion and Bifurcation Method for Stability Analysis of Tuberculosis Transmission Model



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Volume 1217, Issue 1, 17 June 2019, Article number 12056

8th International Seminar on New Paradigm and Innovation on Natural Sciences and Its Application, ISNPINSA 2018; Semarang, Central Java; Indonesia; 26 September 2018 through ; Code 148936

Routh-hurwitz criterion and bifurcation method for stability analysis of tuberculosis transmission model (Conference Paper) (Open Access)

Mahardika, R. , **Widowati** , Sumanto, Y.D.

Department of Mathematics, Faculty of Science and Mathematics, Diponegoro University, Jl. Prof Soedarto SH, Semarang, Central Java, 50275, Indonesia

Abstract

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Tuberculosis is an infectious disease; it caused by Mycobacterium tuberculosis. In this paper, we discuss how to use the Routh-Hurwitz stability criterion to analyze the stability of disease free of the tuberculosis transmission model. From this method, can be found the number of roots of the characteristic polynomial (eigenvalues) with positive real parts is equal to the number of changes in sign of the first column of the Routh array. If all of the eigenvalues are negative, then the model is stable. While the bifurcation method is used to analyze the stability of the endemic equilibrium point of the tuberculosis transmission, the endemic equilibrium point is locally asymptotically stable if reproduction number greater than one and additional parameters requirement that bifurcation met. Finally, numerical simulations are demonstrated to verify the used method. © Published under licence by IOP Publishing Ltd.

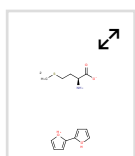
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Topic: Epidemic model | Global stability | Backward bifurcation

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Indexed keywords

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Bifurcation (mathematics) Eigenvalues and eigenfunctions Stability criteria
Tubes (components)

Engineering uncontrolled terms

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Growth and fabrication of 850 nm AlGaAs/GaAs vertical cavity surface emitting laser structure

N I Cabello*, P M Tingzon, H A Husay, J D Vasquez, R Jagus, K L Patrocenio, K C Gonzales, G A Catindig, E A Prieto, A Somintac, A Salvador and E Estacio

National Institute of Physics, College of Science, **University of the Philippines**
NIP Bldg, National Science Complex, Diliman, Quezon City 1101, Philippines
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Abstract. In this work, we demonstrate the NIP's all in-house development of a vertical cavity surface emitting laser structure. The VCSEL structure grown via MBE consists of an AlAs/AlGaAs distributed Bragg reflector and an AlGaAs/GaAs quantum well designed to issue at the 850 nm region. Reflectance spectroscopy showed that the stop band is centered around the designed wavelength. The electroluminescence spectra displayed that the maximum light emission corresponded to its design. This is a crucial step in the NIP's development of semiconductor lasers, leading towards future high-speed and highly-tunable VCSEL devices.

1. Introduction

Semiconductor lasers have been at the forefront of high-speed interconnects, thanks to the development of lasers capable of operating at gigahertz speeds [1]. Expansion to other applications such as proximity sensing [2] and light detection and ranging (LIDAR) [3] have driven further research on this field. For high-speed devices, switching speeds at the gigahertz range are desired [1], while high tuning speeds and increased tunability are sought for wavelength-tunable devices [4]. With its molecular beam epitaxy (MBE) and device fabrication facilities, the National Institute of Physics (NIP) has recently renewed its research thrust in this field, most notably on vertical cavity surface emitting lasers (VCSELs).

The VCSEL is a type of semiconductor laser with light emission orthogonal to the wafer plane. Its main advantages over other conventional semiconductor lasers such as edge-emitting lasers are the ease of coupling to optical fibers, direct wafer scale probing and low threshold operation [5]. A standard VCSEL design is composed of an optical cavity with an active region in the center, which is usually a quantum well (QW). The optical cavity is then sandwiched between two distributed Bragg reflectors (DBRs), which are highly reflecting mirrors composed of alternating high and low refractive index medium materials. The stop band of the DBR, which is the wavelength region with the highest reflectance, should coincide with the QW emission wavelength. Oxidation apertures, usually situated near the active region, are also employed for optical and current confinement [6].

In this paper, we report on the all in-house development of an AlGaAs/GaAs-based DBR VCSEL structure at the chip level. The whole process entails the whole production processes: the growth of the layers, device fabrication, and characterization of both as-grown and device-fabricated layers. Oxidation was also performed to explore the possibility of current and optical confinement effects [6].

2. Experimental Details



An investigation of a CT noise reduction using a modified of wiener filtering-edge detection

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Abstract. The aims of this study were to investigate the noise reduction in a CT image using a modified Wiener filtering-edge detection method. We modified the noise reduction algorithm of a combination of the Wiener filter and edge detection by addition of a dilation stage after edge detection. We then evaluated kernel size of the Wiener filter, threshold values in the edge detection, and size of structuring elements in the dilation process. Images of adult anthropomorphic and self-built wire phantoms were acquired by the new 4-row multislice CT Toshiba Alexion™. The images of the anthropomorphic phantom were used for a visual evaluation, while the images of the wire-phantom were used to obtain the spatial resolution and noise of the images. A Wiener filter-edge detection filter coupled with dilation, potentially reduced more CT noise. We found that the spatial resolution and noise of the filtered images were influenced by the size of the Wiener filter kernel, threshold of edge detection, and size of structuring element.

1. Introduction

Several approaches have been proposed to reduce CT dose without compromising image quality. One method has been proposed is the tube current modulation (TCM) [1, 2]. In TCM, tube currents decrease and increase proportionally with the decreasing and increasing attenuation of body parts [3]. Tube current modulation could be implemented by the rotation of the x-ray tube (angle-modulation) or by modulation in the direction of the longitudinal axis (Z-modulation), or a combination of both [4]. Another method proposed for reducing the dose is to utilize iterative reconstruction (IR) [5], instead of filtered back-projection (FBP). In fact, the IR technique is not only iterative during reconstruction but also iteratively processes in either the sinogram [6] or image spaces [7], in accordance with the specific physical modeling or statistical approaches. There are several IR software products used by major CT vendors including ASIR, AIDR, VEO, IRIS, SAFIRE, and iDose [8]. However, the details of the algorithms are very sparse, and they are still considered proprietary algorithms [5].

Another method that can be used for CT dose reduction is the use of noise reduction in the image space [8]. A noisy image due to acquisition with a small tube current-time (mAs) parameter can have

