CONFERENCE ABSTRACTS & PROGRAM

The Fourth IndoMS International Conference on Mathematics and Its Applications 2019

September 23-25, 2019

Pontianak, West Kalimantan

Media Partner

The 4th IICMA 2019

IndoMS International Conference on Mathematics and Its Application

"Mathematics and Its Applications For Better Environment"

September 23 – 25, 2019

Pontianak, West Kalimantan, Indonesia

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Pontianak-Indonesia

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Message

From the

Rector
Tanjungpura University

It is with great pleasure that Universitas Tanjungpura welcome you to the fourth IndoMS International Conferences in Mathematics and its Applications, organize by the Indonesian Mathematical Society (IndoMS) and Faculty of Natural Science and Mathematics, Universitas Tanjungpura.

Welcome to all international and national guests to Pontianak. Our university is honored and delighted to support this conference and I should like to personally welcome each and every one of you for being here.

I thank to Organizing Committee of IndoMS to have elected Pontianak as the seat of this conference. A special thanks to the member of local organizing committee.

I am happy to welcome, most especially the keynote speakers,

- Dr. Siti Nurbaya, the Minister of Environment and Forestry of Republic of Indonesia,
- Mr Sutarmidji, S.H., M.Hum, the Governor of West Kalimantan Province, and
- Prof. Jose Maria Balmaceda, the President of Southeast Asian Mathematical Society.

We want to sincerely thank you for honoring our invitation in spite of your very busy and tight schedule.

The schedule of this conference is rich in contents and in subjects, and I think it will be for each attendee a very impactful experiences. Thus, I should like to thanks all speakers.

However, please have fun and enjoy the culinary and the atmosphere of Pontianak City.

Thank you and please enjoy the gathering

Prof. Dr. Garuda Wiko, S.H, M.Si
Rector

Message

From the

President
Indonesia Mathematical Society

Bismillahirrahmanirrahim, Assalamualaikum warahmatullahi wabarakatuh.
Allahumma Sholli ala saydina Muhammad, wa'ala ali saydina Muhammad, robbis rohli sodri, wayassirli amri, wahlul ukhdatan minlisani yapkohu koili, amma ba'du,

The Honorable Rector of Tanjungpura University (Prof. Dr. Garuda Wiko, SH. MSi.), the distinguished keynote speakers, the invited speakers, the participants and the committee of the 4th IndoMS International Conference on Mathematics and Its Applications (IICMA) 2019.

Please allow me to convey a speech. We sincerely welcome and thank you for your coming to this event. This event has been going on for the four times. And for this time take the theme of Mathematics and Its Application for Better Environment.

Ladies and Gentlemen, Environmental damage has been getting worse lately. The environmental damage is increasingly felt the impact on society. This is marked by the frequent occurrence of natural disasters that adorn the news both in print and electronic media. Forest fires, landslides, floods, and other environmental issues are mostly caused by human actions. The behavior of human life is negligent, selfish and irresponsible in exploiting the environment, including the often ignored importance of environmental preservation. Therefore, all parties are expected to take part in saving and preserving the environment by developing attitudes, forms of behavior, social abilities and abilities of individuals who love the environment. Mathematics should contribute to the formation of character, both directly and indirectly. The application of mathematics in accordance with its rules and integrated with the reality of daily life, as related to environmental issues is expected to have concern for the environment. Thus, mathematics is able to contribute positively to the management and preservation of the environment. A well-maintained and good environment will prevent disasters and can be used to improve human welfare.

Ladies and Gentlemen, The IICMA 2019 is the right moment to convey the idea of mathematics that has an environmental perspective to develop an environmentally friendly attitude and better environment. Therefore, in this conference we hope there are efforts to implement the research results of mathematics and its applications in realizing better environment for human welfare and society prosperity.

Finally, we are thankful and conveys best wishes to all the participants of the IICMA 2019. We apologize should there any matters considered inconvenience during the arrangement of this event. May our efforts be blessed by Allah SWT, and bring benefits to All of you and environment. Aamiin.
Wallahul muwaffiq illa aqwamittariq. Billahi taufiq walhidayah, wasalamualaikum warahmatullahi wabarakatuh.

Prof. Dr. Basuki Widodo, MSc.
The President of IndoMS,

Message

From the

Chairman of
Organizing Committee

Dear Excellences, distinguished guests, dear colleagues, ladies, and gentlemen.

It is a great pleasure to welcome you to the fourth IndoMS International Conferences in Mathematics and its Applications, here in Universitas Tanjungpura, Pontianak. It is a biannual conference conducted by the Indonesian Mathematical Society (IndoMS).

I am so pleased to see my colleagues, professors, friends from several countries and from almost all provinces in Indonesia, all in one place, here in Pontianak, *Kota Khatulistiwa* (the Equator City). In this conference, you can meet colleagues from your own specialty area, and reunite with your old friends during colleges. We hope you can also establish networking and cooperation among mathematicians, statisticians, and practitioners. There are 73 participants and 11 invited speakers at this conference.

I would like to thanks to our special keynote speakers to this conference, i.e.,

- Dr. Siti Nurbaya, the Minister of Environment and Forestry,
- Mr. Sutarmiji, S.H, M.Hum, the Governor of West Kalimantan Province, and
- Prof. Jose Maria Balmaceda, the President of Southeast Asian Mathematical Society.

I would also like to thanks to the invited speakers to this conference, i.e.,

- Prof. Dominic Reeve, Swansea University
- Intan Muhtadi, Ph.D., Institut Teknologi Bandung,
- Julien Dambrine, Ph.D., Université de Poitiers, France,
- Prof. Basuki Widodo, Institut Teknologi Sepuluh November, Surabaya
- Prof. Yaya S. Kusumah, Universitas Pendidikan Indonesia, Bandung,
- Prof. Budi Nurani Ruchjana, Universitas Padjadjaran, Bandung,
- Prof. Khairil Anwar Notodiputro, Institut Pertanian Bogor, and
- Dr. Ikha Magdalena, Institut Teknologi Bandung.

Thank you for fulfilling our invitation despite your busy and tight schedule.

This conference will consist of parallel sessions and mini symposiums, all conducted in three days, from September 23 to 25, 2019. Selected papers will be published in AIP Conference Proceedings. Please submit your full papers to the committee as soon as possible since prior to the publication, the papers will be reviewed by two reviewers. It is expected that the conference proceedings to be published by January 2020.

We also thank Mr Edi Rusdi Kamtono, the Major of Pontianak City for the support to this conference. The support from Rector, Vice Rectors, Dean of FMIPA and FKIP, and the sponsors are highly appreciated.

Last but not least, I would like to convey my high appreciation to my colleagues and students of the Department of Mathematics, Faculty of Natural Sciences and Mathematics, Universitas Tanjungpura, for their effort and hard work in preparing and organizing this conference.

Thank you and have a happy conference….

Dadan Kusnandar, Ph. D.
Chairman,

IICMA 2019 Conference Timetable

1st Day : Monday, 23th September 2019

1	07.30-07.50	Registration
2	07.50-08.05	Art performance
3	08.05-08.10	Opening by MC
4	08.10-08.20	sing the national anthem Indonesia Raya
5	08.20-08.30	Conference report by Chairman
6	08.30-08.40	Speech of IndoMS President
7	08.40-08.50	Speech of Rector Untan and opening
8	08.50-09.00	Giving souvenir to the speakers
9	09.00-09.10	DOA
10	09.10-11.00	**Keynote Speaker (Panel)**
		1. Dr.Ir. Siti Nurbaya Bakar, M.Sc (The Ministry of Environment and Foresty)
		2. H. Sutarmidji, SH, M. Hum (Governor Kalimantan Barat
		3. Prof. Jose Balmaceda (President of SEAMS)
11	11.00-17.00	City Tour (Monument of Khatulistiwa-PSP-Dekranasda-Radank's house- Melayu's house)
12	18.30-19.00	Pickup participants
13	19.00-19.05	Opening by MC
14	19.05-19.15	Speech of Rector
15	19.15-20.30	Dinner and performance

2ndDay : Tuesday, 24th September 2019

1	08.00-09.15	Invited Talk and Pararel Session
2	09.15-09.30	Coffee Break
3	09.30-12.00	Minisymposium
4	12.00-13.00	Lunch
5	13.00-14.45	Invited talks and pararel sessions
6	14.45-15.15	Coffee Break
7	15.15-16.00	Pararel sessions
8	18.30-19.00	Pickup participants
9	19.00-19.05	Opening by MC
10	19.05-19.15	Speech of Mayor of Pontianak
11	19.15-20.30	Dinner

3rdDay : Wednesday, 25th September 2019

1	08.00-10.15	Pararel sessions
2	08.00-11.45	Minicourse (Dr. Julien Dambrine)
3	11.45-13.00	Lunch
4	13.00-14.45	Invited Talk and pararel sessions
5	14.45-15.15	Coffee Break
6	15.15-16.15	Pararel sessions

Applied Mathematics

descriptor system can be separated into purely dynamical and purely algebraic parts (fast and slow subsystems). However, the decomposition form entails a change of the internal variable. In this paper, we developed a direct approach to the study of linear descriptor systems in the time domain. The approach is based on viewing the system as a whole and generally not decomposed systems into slow and fast subsystems. Then, we derived the structure of controllable and unobservable subspaces. Based on these subspaces, we studied the properties of linear descriptor system related to controllability and observability.

Keywords: Descriptor system, Controllability, Observability

AM4 A Study Of Time-Step In The Integration Of A Globular Cluster In Galaxy

Hasanuddin[1] and Azrul Azwar[2], Department of Physics, Faculty of Mathematics and NaturalSciences, Tanjungpura University of Pontianak, e-mail : hasanuddin@physics.untan.ac.id[1], a.azwar@physics.untan.ac.id[2]

In this study, we show the efficiency and reversibility of the time-step based on the tidal force in the integration of a globular cluster in Galaxy. For comparison, we review the efficiency and reversibility of the time-step base on other criteria such as potential and acceleration. With application to the condition of stars escaping from its satellite, the time-step based on tidal force can be tested against other criteria.

Keywords: time-step, numerical methods, globular cluster

AM5 An Application 2D Linear Map Derived From Generalized ΔΔ Sine-Gordon Equation For A Digital Image Cryptography

La Zakaria[1], Aang Nuryaman[2], Dwi Sakethi[3] and Febi Eka Febriansyah[4], Department of Mathematics, Faculty of Mathematics and Natural Sciences, Universitas Lampung,email:lazakaria.1969@fmipa.unila.ac.id[1],aang.nuryaman@fmipa.unila.ac.id[2], dwijim@fmipa.unila.ac.id[3], febi_ef@yahoo.com[4]

Cryptography is the science and study of methods of protecting data in computer and communication systems from unauthorized disclosure and modification. Mathematical principles play important role in cryptography. Encryption-decryption algorithm using a mapping can be done for encoding a digital image, such as 2D Arnold's Cat Map. In this article, we show a procedure (encryption-decryption algorithm) for protecting a digital image through 2D linear map that derived from modified ΔΔ sine-Gordon map.

Keywords: 2D map, cryptography, digital image, ΔΔ sine-gordon

AM6 Parameter Sensitivity Analysis On Mathematical Model Of Oxidation Reaction Using Reverse Flow Reactor With Periodically Perturbed Feed Gas

Aang Nuryaman[1], La Zakaria[2] and Suharsono[3], Department of Mathematics, Faculty of Mathematics and Natural Sciences, Universitas Lampung, e-mail : aang.nuryaman@fmipa.unila.ac.id[1], lazakaria.1969@fmipa.unila.ac.id[2], suharsono.1962@fmipa.unila.ac.id[3]

In this paper, we investigate the effect of operation parameters to dynamic of dependent variables for catalytic oxidation reaction using reverse flow reactor (RFR). Here, we consider a 1-D pseudo-homogeneous model for RFR with cooling through the wall and periodically perturbed feed gas. By using finite difference method to the model, we construct numerical schemes. The simulations are conducted for various value of period of gas feeding, switching time, cooling capacity and superficial velocity.

Keywords: Switching time, pseudo-homogenous model, periodic feed gas, cooling capacity

AM7 Model Order Reduction Based On General Orthogonal Polynomials For Greenhouse Cayenne Pepper Crop Production Model

Solikhatun Solikhatun[1], Radi Radi [2], Sri Markumningsih[3] and Rianti Utami[4],
Departments of Mathematics, Faculty of Mathematics and Natural Science, Gadjah Mada University: Yogyakarta, e-mail : solikhatun@ugm.ac.id[1], radi-tep@ugm.ac.id[2], markumningsih@ugm.ac.id[3], riantisiswi.u@ugm.ac.id[4]

In this paper, the dynamic model of the greenhouse cayenne pepper crop production will be discussed. The cayenne pepper crop is one of plants which susceptible to the micro climate alteration. The dynamic model of greenhouse cayenne pepper crop production have a high order which it makes difficult in analyze the model and design a controller. Therefore, model order reduction based on general orthogonal polynomials for the model will be done. The properties of the reduced linear model is similar with the original model.

Keywords: model order reduction, greenhouse, cayenne pepper, orthogonal polynomials