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Excellence with Morality

ICoMCoS2020

INTERNATIONAL CONFERENCE on MATHEMATICS, COMPUTATIONAL SCIENCES and STATISTICS 2020

29th September, 2020 | Online Conference

"Mathematics, Computational Sciences and Statistics for Better Future"

BOOK OF ABSTRACTS

MATHEMATICS DEPARTMENT
FACULTY OF SCIENCE AND TECHNOLOGY
UNIVERSITAS AIRLANGGA

BOOK OF ABSTRACTS

ICoMCoS2020

Proceedings of International Conference on Mathematics, Computational Sciencesand Statistics

Universitas Airlangga

"Mathematics, Computational Sciences and Statistics for Better Future"

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FOREWORD FROM DEAN OF FACULTY OF SCIENCE AND TECHNOLOGY, UNIVERSITAS AIRLANGGA

Distinguished Participants, Speaker, Lectures, Students and All Guests
Assalamu' alaikum wa rahmatullahi wa barakatuh
Good Morning, ladies and gentlemen

First of all, I say Alhamdulillah, that at this time we are all in good health and can meet even though virtually. On behalf of all members of The Faculty of Science and Technology, Universitas Airlangga, It gives me a great pleasure to extend my sincere and warm welcome to the participants of The International Conference on Mathematic, Computational Science and Statistics (ICoMCoS) are conducted virtually. The current Covid-19 pandemic is a time that we did not predict before, but we must still have the spirit of working well and producing new innovations. As we are doing now, we can hold virtual international conferences. There are many countries in the world could join this conference, that mean, this webinar is actually easier for all countries in the world to join, than an offline international conference. Even though this event is held virtual, we hope that the speakers and participants can communicate both at this conference and via email on other occasions.

In theseoccasion I would like to thank to keynote speaker Assoc. Prof. Norhaslinda Kamarudin, from Malaysia; Prof. Yoshihiro Sawano from Japan; Prof. Haavard Rue from Saudi Arabia; and Prof. Martin Alan Bees from United Kingdom.

Finally let me congratulate to all of you once again for organizing and participating in this Conference. Also,to the committee members, speakers, moderators, and participants for your kind contributions, I would like to express my gratitude for all the hard work on the succeeding this Conference.
Thank to Allah SWT for His blessing so far. Wassalamu'alaikum Wr.Wb.

Prof. Win Darmanto, Ph.D.
Dean, Faculty of Science and Technology, Universitas Airlangga
Surabaya, Indonesia.

FOREWORD FROM CONFERENCE COMMITTEE CHAIR

On behalf of the Program Committee, it is our great pleasure to welcome all the participants to the International Conference on Mathematics, Computational Science and Statistics (ICoMCoS) 2020 hosted by Department of Mathematics, Universitas Airlangga.

2020 has been a very challenging year due to Covid-19 pandemic, in which for the sake of safety and well-being of all participants, our initial plan to held ICoMCoS 2020 in Surabaya, Indonesia, has been converted to be fully delivered virtually. Nevertheless, while we may all be physically distant, we hope we can still connect intellectually.

The theme of ICoMCoS 2020 is "Mathematics, Computational Sciences and Statistics for Better Future". With increasing complexities of our world today, Mathematics, Computational Sciences and Statistics have become powerful tools to elucidate all the complexities as well as provide the solution. ICoMCoS 2020, in a more detail outfit, is designed to provide a multidisciplinary forum for promoting and fostering interactions between mathematics (Analysis and Geometry, Algebra and Combinatoric, Applied Mathematics), computational sciences (algorithm analysis, network security and cryptography, artificial intelligence and machine learning, knowledge discovery and data mining, machine translation, image processing), and statistics (statistical theory, statistics modeling, forecasting methods, multivariate methods, econometrics, biostatistics, actuarial sciences) as well as related methodologies in studying various phenomena in the area.

To provide the maximum benefit for the participants, all sessions will be broadcast live and recorded and post-conference they will be made available for registered participants.

Finally, we wish all the participants having an enjoyable and thought-provoking conference at ICoMCoS 2020. We are sorry that during this conference you were not able to make a trip to Surabaya and experience a blend of the best Indonesian culture.

Cicik Alfiniyah, Ph.D.
ICoMCoS 2020 Program Committee Chair

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TABLE OF CONTENT

CONFERENCE SCHEDULE

INTERNATIONAL CONFERENCE on MATHEMATICS, COMPUTATIONAL SCIENCES AND STATISTICS

29th September 2020 | Online Conference

"Mathematics, Computational Sciences and Statistics for Better Future"

Time	Program	
08.30 - 09.00 AM	Participants Join The Zoom Webinar	
09.00 - 09.05 AM	Opening Ceremony	
09.05 - 09.30 AM	Opening Remarks	Chairman of The Committee **Cicik Alfiniyah, Ph.D**
		Dean of The Faculty of Science and Technology, Universitas Airlangga **Prof. Win Darmanto, Ph.D**
09.30 - 10.30 AM	Plenary Session	**Assoc. Prof. Norhaslinda Kamaruddin** (Computer Science, Universiti Teknologi MARA, Malaysia) Moderator: Dr. Eridani
		Assoc. Prof. Yoshihiro Sawano (Mathematics, Tokyo Metropolitan University, Japan) Moderator: Dr. Eridani
10.30 - 10.45 AM	Break Participants Move to The Zoom Meeting	
10.45 AM - 00.15 PM	Parallel Session I	
00.15 - 00.50 PM	Break Participants Move to The Zoom Webinar	
00.50 – 02.00 PM	Plenary Session	**Prof. Haavard Rue** (Statistics, King Abdullah University of Science and Technology, Saudi Arabia) Moderator: Dr. Rimuljo Hendradi
		Prof. Martin Alan Bees (Mathematics, University of York, United Kingdom) Moderator: Dr. Rimuljo Hendradi
02.00 - 02.15 PM	Break Participants Move to The Zoom Meeting	
02.15 – 03.45 PM	Parallel Session II	
	Closing	

TECHNICAL GUIDELINES AND REGULATIONS

INTERNATIONAL CONFERENCE on MATHEMATICS, COMPUTATIONAL SCIENCES AND STATISTICS

29th September 2020 | Online Conference

"Mathematics, Computational Sciences and Statistics for Better Future"

General:

1. All activities and communications in ICoMCoS 2020 are conducted in English.
2. Please make sure your computer or laptop is connected to the internet with a good connection (stable).
3. The virtual meeting application used is ZOOM. Participants must have Zoom that installed on their computer or laptop. In addition, participants are divided into WhatsApp Groups based on the parallel classes.
4. The ZOOM link, or meeting ID and passcode that have been provided by the committee is not to be shared with others.
5. If the participants have not received a ZOOM link or meeting ID and passcode before the event, participants can chat the ICoMCoS contact person by WhatsApp.
6. Entry access for participants to ZOOM plenary season, session 1 and session 2, is opened 30 minutes before the event starts. Participants are expected to be present 15 minutes before the event starts.
7. Entry access for participants to ZOOM parallel season, session 1 and session 2, is opened 10 minutes before the event starts. Participants are expected to be present 5 minutes before the event starts. Participants after leaving the ZOOM plenary season are expected to join the ZOOM parallel season soon. If there are problems about connection, participants contact the committee on the WhatsApp Group for parallel season.
8. Use the ZOOM account name with the format: Paper Code (as in abstract books) space followed by the Full Name to facilitate the moderator and committee for monitoring participants and presenters. For example: ST40 Fulan Putra Perdana
9. Participants do not activate the microphone during the event, except when presentation, and discussion with moderator permission.
10. Participants must follow the event from the beginning until the end, except very urgent condition, the participants can permit moderator in WhatsApp Group for parallel season.

11. During the plenary season, participants can give questions for keynote speakers by using the feature Q&A in ZOOM (chatting only, moderator will deliver selected question to the related keynote speakers)
12. MC, moderator plenary and parallel seasons have full rights to manage this event.
13. During the event, participants wear formal clothes, preferably batik.
14. During the event, participants must activate the video feature. Videos can be deactivated (non-active) briefly if there are other activities that are not long (less than 30 minutes).
15. Participants fill out the presence and evaluation form in a link that provided by the committee. This presence and evaluation form is required for making a certificate. The presence and evaluation form are filled once. The presence and evaluation form are informed in a time during the event.
16. The certificate will be given the day after the event. The certificate will be sent to email of each participant. So, please make sure that the name, the academic degree, and the email address are correct.
17. Other things that have not been arranged, can be discussed together by the WhatsApp group for parallel season.
18. The continuation of the publication in AIP proceedings, can be monitored in a WhatsApp group with members of all participants.

Parallel Session

1. Participants who will presentation enter the parallel season class according to the specified class (see the book abstract).
2. Participants who will presentation use provided power point template, except use LaTeX.
3. Presentation session is divided to some sub sessions. Every sub session consists 2 or 3 presenters. A presenter can presentation in 10 minutes followed by 5 minutes discussion, if there are questions from moderator and the other participants. Two minutes before the end of presentation time, the moderator will remind the presenter via chat or verbally. If it exceeds the presentation time, the moderator can stop the presentation, ask the presenter to read the conclusion or open a discussion session.
4. The presenter is allowed to share the presentation slide with share screen in ZOOM meeting, but if the participant has problems with internet connection during the presentation, the moderator takes over by sharing the presenter's presentation slide screen and can help explain with the presenter's permission. If the presenter's voice in discussion session is still constrained (trouble), questions and answers are carried out by chat.
5. Participants can give a question to the presenter with raise hand firstly, participants can active the microphone when moderator has given permission.

KEYNOTE SPEAKER BIBLIOGRAPHY

Assoc. Prof. Ts. Norhaslinda Kamaruddin

Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA (UiTM), Malaysia

She currently holds a post of associate professor in Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA (UiTM), Malaysia. She served UiTM since 2011 till now. She is also an adjunct professor in Faculty of Science and Technology, Universitas Airlangga, Indonesia. She received her bachelor's degree in Information Technology (Computer Science) from Universiti Kebangsaan Malaysia in 2001 followed by her Master of Software Engineering from Malaya University in 2006. In 2013, she is awarded with Doctor of Philosophy (Computer Engineering) from Nanyang Technological University (Singapore). Nanyang Technological University has been named the world's 11th best university in the world in the QS Ranking 2020. Assoc. Prof. Ts. Dr. Norhaslinda is very active in conducting studies on computational intelligence focusing on affective computing by examining detailed emotions in speech (emotional speech) as well as brain signal patterns captured from electroencephalogram (EEG) that will then be able to give insight to stress and anxiety level, as well as the effect of emotions towards various neurological disorder diseases such as dysphoria, autism spectrum disorder (ASD), deficit hyperactivity disorder (ADHD), dyslexia and other related learning disabilities. She is also working in big data analytics especially in learning analytics that focusing on student profiling and talent development as well as health analytics concerning about mental health. She had published more than 65 indexed publications and her publication list can be accessed through the SCOPUS website,https://www.scopus.com/authid/detail.uri?authorId=24733901100, Publons, https://publons.com/researcher/3036708/norhaslinda-kamaruddin/ or Google Scholar, https://scholar.google.com/citations?hl=en&user=aTdODe8AAAAJ. Assoc. Prof. Ts. Dr. Norhaslinda can be contacted using email address, norhaslinda@tmsk.uitm.edu.my.

Assoc. Prof. Yoshihiro Sawano
Department of Mathematics and Information Sciences, Tokyo Metropolitan University

Yoshihiro Sawano is an associate professor in Department of Mathematics and Information Sciences at Tokyo Metropolitan University since April 2012. He completed his education, from bachelor's degree until doctoral's degree, at the same college, namely Department of Mathematics, The University of Tokyo.

Prof. Haavard Rue

Department of Statictics, King Abdullah University ofScience and Technology (KAUST), Saudi Arabia

Havard Rue is a Professor in statistics at King Abdullah University ofScience and Technology (KAUST), Saudi Arabia. His research interests are within computational Bayesian statistics and spatial statistics, and he is the PI for the research group "Bayesian Computational Statistics & Modelling" at KAUST. Most of his research is centred around the R-INLA project. He is currently one of the Editors for the ISI journal Stat, and is a Highly Cited Researcher according to the Highly Cited Researchers 2019 list from the Web of Science Group.

Prof. Martin Alan Bees
Mathematics, University of York, United Kingdom

Professor Martin A. Bees was appointed the 50th Anniversary Chair of Mathematics at the University of York in the UK in 2012. He is currently the Head of Section for Applied Mathematics and Acting Deputy Head of Department, Research. Martin obtained his MA in Mathematics from the University of Oxford (Balliol) and PhD in Applied Mathematics from the University of Leeds, leading on to postdoctoral positions at the University of Warwick (Biology) and the Danish Technical University/Neils Bohr Institute, Copenhagen (Physics). Before York he held permanent positions at the University of Surrey and then the University of Glasgow.

Martin's research is highly inter-disciplinary, and he is well-known for combining technically challenging mathematical theory with laboratory experiments, particularly in biological fluid dynamics. Unusually for a mathematician he runs a wet laboratory. His research includes hydrodynamic instabilities induced by the biased swimming behaviour of microorganisms or interfacial chemistry, generalised Taylor dispersion, modelling biofuels, synchronisation dynamics in plankton ecosystem models, biocontrol of agricultural pests, bacterial interactions with surfaces, including swarming, quorum sensing and digital holographic microscopy, and high-throughput methods for measuring attributes of many swimming micro-organisms, such as differential dynamic microscopy. His recent interests include modelling anaerobic digestion and non-modal stability.

KEYNOTE SPEAKER SPEECH

Big Data Analytics: A Blessing in Disguise during COVID-19 Outbreak

Norhaslinda Kamaruddin

Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA (UiTM), Malaysia

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Abstract. The Covid-19 pandemic impacted us in so many unimaginable ways. Death, loss of job, total change of normal behaviors and other effects are the aftermath of this ongoing battle. The breakdown of the ordinary forces us to confront the ideas and expectations that lie at the basis of our understanding of the world in the first place. However, the danger of mental health is plaguing even before the eruption of this pandemic. The staggering statistics show the increase trend of people suffering from depression, anxiety, and stress. With the advancement of technology, data are shared freely using the internet especially through social media. The nature of human to communicate can be strongly observed in the number of users. From the January 2020 data, it has been reported that there are 3.8 billion active social media users globally. Looking at this situation, the new research opportunity arises to profile the users to understand better their mental states. Combination of virtual personal analytics and neurophysiological approach may give better insights for individual mental states profiling thus providing more effective intervention and early detection which unleash the power of big data analytics.

Morrey Spaces

Yoshihiro Sawano

Department of Mathematics and Information Sciences, Tokyo Metropolitan University, Japan

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Abstract. Based on the books published recentlyby the speaker, Di Fazio and Hakim, we will discussMorrey spaces. Here I will survey what is writtenin the book and then present some open problems.

The R-INLA Project: Overview and Recent Developments

Haavard Rue

Department of Statictics, King Abdullah University ofScience and Technology (KAUST), Saudi Arabia

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Abstract. The R-INLA software package implements Bayesian analysis of a class ofmodels named latent Gaussian models. This sounds pretty boring, butlatent Gaussian models are nothing else than an abstract formulation ofa huge class which covers most statistical models that are in regularuse. In my view, it is the most important class of statistical models.The R-INLA package is based on some key methodological developments, like integrated nested Laplace approximations for the approximateBayesian inference, and stochastic partial differential equations torepresent (spatial) Gaussian fields, a model formulation based onGaussian Markov random fields and computations based on numericalmethods for sparse matrices. All this gets somewhat technical, but theend result from the users perspective is simply easy access to advancedhierarchical models with fast computing time that scale well with thedimension of the model. In this talk, I will give an introduction to R-INLA and the basic ideas, and discuss some recent developments andcurrent directions of research within the 'R-INLA project'.

Biological Fluid Dynamics of Swimming Micro-organisms in Shear Flow

Martin Alan Bees

Mathematics Department, University of York, United Kingdom

Corresponding author: martin.bees@york.ac.uk

Abstract. Dilute suspensions of swimming microorganisms behave differently to standard fluids, with the cells providing an internal source of energy that can drive hydrodynamic instabilities, termed bioconvection. The microorganisms, such as algae and bacteria, aim to swim in directions that improve their environment. For example, cells can swim against gravity or towards nutrients or light, all of which will be biased by shear flows. This biased swimming behaviour together with differences in physical properties of the cells compared to the fluid can initiate large scale flows, sometimes resulting in cells accumulating in counter-intuitive regions of the suspension. Furthermore, in a shear flow the cells disperse very differently to nutrients. Here, I shall describe experiments that aim to disentangle some of the mechanisms and explain how one can scale up from the hydrodynamics of individuals to models of dilute suspensions. I shall introduce examples from bioconvection, the dispersion of swimming cells in Poiseuille flow and the surprising transport of cells in oscillatory shear flows due to helical resonant alignment.

ALGEBRA AND COMBINATORIC (AC)

The Clean *R*-Coalgebras and Clean Comodules of Finitely Generated Projective Modules

Nikken PrimaPuspita[1,a)], Indah Emilia Wijayanti[2,b)], and Budi Surodjo[2,c)]

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Abstract. Let R be a ring which is commutative and hasan identity over multiplication.If$P$is a finitely generated projective R-module and P^* is the set of all$R$-module homomorphisms from P to R, then the tensor product $P^*\otimes_R P$ can be considered to be an R-coalgebra. Furthermore, P and $P^*$are a comodule over coalgebra $P^*\otimes_R P$. By using the Morita context, weget the sufficient conditions of a clean R-coalgebra $P^*\otimes_R P$. Moreover, we alsoshow that$P$ and its dual is a clean comodule over R-coalgebra $P^*\otimes_R P$ if the ground field ring R is clean.

Some Results of Non-Coprime Graph of The Dihedral Group D_{2n} for n A Prime Power

Wahyu Ulyafandhie Misuki[1,a)], I Gede Adhitya Wisnu Wardhana[1,b)], Ni Wayan Switrayni[1,c)], and Irwansyah[1,c)]

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Abstract. A graph of a finite group G whose vertices are all elements of G except the identity element, and edgesdefined as $(u, v) \in E(G)$ if and only if $(|u|, |v|) \neq 1$ is called a non-coprime graph of G and denoted by $\overline{\Gamma_G}$. In thispaper we give some properties of non-coprime graphs of a dihedral group D_{2n}, when n is a prime power. One mainresult of this paper shows that $\overline{\Gamma_G}$is either a complete graph or can be partitioned into two complete graphs.

On the (Pseudo) Super Edge-Magic of 2-Regular Graphs and Related Graphs

Vira Hari Krisnawati[1,a)], Anak Agung Gede Ngurah[2, b)], Noor Hidayat[1], and Abdul Rouf Alghofari[1]

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Abstract. Let $G = (V, E)$ be finite and simple graphs with vertex set $V(G)$ and edge set $E(G)$. A graph G is called *super edge-magic* if there exists a bijection $f: V(G) \cup E(G) \longrightarrow \{1, 2, \cdots, |V(G)| + |E(G)|\}$ and $f(V(G)) = \{1, 2, \cdots, |V(G)|\}$such that $f(x) + f(xy) + f(y)$ is a constant for every edge $xy \in E(G)$. A graph G with isolated vertices is called *pseudosuper edge-magic* if there exists a bijection $f: V(G) \longrightarrow \{1, 2, \cdots, |V(G)|\}$ such that the set $\{f(x) + f(y) : xy \in E(G)\} \cup \{2f(x) : deg(x) = 0\}$ consist of $|E(G)| + |\{x \in V(G) : deg(x) = 0\}|$ consecutive integers. In this paper, we construct(pseudo) super edge-magic 2-regular graphs from a super edge-magic cycle by using normalized Kotzig arrays. We alsoshow that the graph $C_3 \cup C_n \cup K_1$ is pseudo super edge-magic for $n \equiv 1 (mod\ 4)$. By this result, we obtain some newclasses of super edge-magic 2-regular graphs. In addition, we show that union of cycles and paths are super edge-magic.

On Comb Product Graphs with Respect to the Complement Metric Dimension

Nirmala Mega Rosyidah[1, a)], Siti Zahidah[1, b)], Utami Dyah Purwati[1, c)], and Liliek Susilowati[1, d)]

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Abstract.The complement metric dimension of graph is one of the recent topics in graph theory. The concept came fromthe metric dimension which is a topic that has developed very rapidly. The complement metric dimension of graph G is denoted by $\overline{dim}(G)$. The goal of this research is to determine complement metric dimension of comb product of special graphs, such as path graph (P_n), star graph (S_n), and complete graph (K_n). Furthermore, we find complement metric dimension of comb product of any graphs G and H. We get that complement metric dimension of comb product of graph G and H depends on the order of both graph and complement metric dimension of graph H.

Properties of Adjacency Matrix of the Directed Cyclic Friendship Graph

Nanda Anzana[1,a)], Siti Aminah[1,b)], Suarsih Utama[1,c)]

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Abstract. Abundance of information about the structure of a graph can be derived from the eigenvalues of its matrixrepresentation. The eigenvalues are always connected to the characteristic polynomial of the matrix representation of agraph. In this paper, we discuss about the properties of adjacency matrix of the directed cyclic friendship graph, its cyclepart is clockwise-oriented. By adding the values of the determinants of all directed cyclic induced subgraphs, thecoefficients of the characteristic polynomial of the adjacency matrix of the directed cyclic friendship graph can be obtained.The real eigenvalues areobtained by factorization method, while the complex eigenvalues are obtained by root of complexnumber formula.

The Complement Metric Dimension of the Joint Graph

Liliek Susilowati[1,a)],Atmim Nurrona[1,b)], Utami Dyah Purwati[1,c)]

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Abstract. The complement metric dimension is one of the developments of the metric dimension concept. The aim of this research is to determine the complement metric dimension of the *joint* graph of two connected graphs G and H, denoted by $\overline{dim}(G+H)$. The results of this research are$\overline{dim}(G+H)$, for G and Harecomplete,cycle,star, and path graphs. Furthermore, we can obtain$\overline{dim}(G+H)$ for G or Hthat has the maximumcomplement metric dimension.

Some Characteristics of Cyclic Prime, Weakly Prime and Almost Prime Submodule of Gaussian Integer Modulo over Integer

Rina Juliana[1,a)], I GedeAdhitya Wisnu Wardhana[1,b)], Irwansyah[1,c)]

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Abstract. Cryptography is a branch of mathematics that used in digital security systems. Some cryptographic algorithms, such as RSA, depend on prime factorization of integers. However, quantum computers might be a threat to some algorithms in cryptography. One of the mathematicians' efforts in finding alternatives to create new security technologies in cryptography is to study the abstraction of prime numbers. Prime submodule is one of the prime numbers abstraction which was introduced by Dauns in 1978. Lately, prime submodules were generalized into weakly prime submodules and almost prime submodules. This study will examine the characteristics of prime, weakly prime, and almost prime of cyclic submodules on $\mathbb{Z}-$ modul $\mathbb{Z}_n[i]$.The results are if n is a prime number then the cyclic submodule is prime submodule on $\mathbb{Z}-$ modul $\mathbb{Z}_n[i]$ and the cyclic almost prime submodule equivalent with cyclic weakly prime submodule on $\mathbb{Z}-$ modul $\mathbb{Z}_n[i]$.

ANALYSIS AND GEOMETRY (AG)

Morrey Spaces and Boundedness of Bessel-Riesz Operators

Saba Mehmood[1,a)], Eridani[1,b)], and Fatmawati[1,c)]

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Abstract. The key purpose of this paper to show the boundedness of Bessel-Rieszoperators in Morrey spaces defined on quasimetric measure spaces. To attain theresult, we also investigate an influence of its kernel with different measures. Theboundedness of Bessel-Riesz operators on Morrey spaces will be reproved by usingdifferent measure and a particular case of the Young inequality for convolutions.

Necessary Conditions for a Norm Estimate of Riesz Potential on Morrey Spaces Over Hypergroups

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Abstract.Necessary condition for a norm estimate of Riesz potential will be presented on Morrey spaces over commutative hypergroups by taking into account the upper Ahlfors condition. This norm estimate is the Hedberg type estimate. By assuming that the weak estimateof maximal operator holds in Morrey spaces over commutative hypergroups, the Hedberg typeestimate leads to the weak estimate of the Riesz potential.

APPLIED MATHEMATICS (AM)

Stability Analysis and Optimal Control of Mathematical Epidemic Model with Medical Treatment

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Abstract. In this work, we analyze a mathematical epidemic model with vaccination. We assumed the vaccination has done on newborns and populations of susceptible individuals who have not vaccinated. We also study the model with medical treatment as a control variable. From the model without control, we show that the model has two equilibria, namely the disease-free equilibrium and endemic equilibrium. The local stability of the equilibrium and the existence of the endemic equilibrium depend on the basic reproduction number. Thus, the optimal control problem is solved by using Pontryagin's Maximum Principle. The simulation results show that the implementation of the cure treatment as a control variable can reduce the number of exposed and infectious by 99.99% in 20th year after the intervention.

Modeling Pipes Using Pipes' Center Curves of Quadraticand Cubic Spline Interpolation

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Abstract. Pipeline modeling needs considering the length and the shape of pipes. It requires as well the calculation of the used data number and pipes' curvature. This paper aims to model the pipelines of long pieces by using its center curves of quadratic and cubic spline interpolation. Relating to the purpose, we use this method. We evaluate some introduced formulas to defining the quadratic and cubic spline interpolation curves. Then, we present a new technique to formulate the pipes via its center curves. Finally, we offer the procedure to construct the pipe models. As a result, we report that using the quadratic and cubic curves of spline interpolation makes it easy to build the pipeline system frame of many curvatures and multiple tracks. The quadratic spline can produce the curves in fewer oscillations; meanwhile, the cubic spline can generate the curves tighter C2. In general, the computations are handy and straightforward to design the pipes.in the model with the Holling type III decreased more significantly than the model with the Holling type II.

Solving some Ordinary Differential Equations NumericallyUsing Differential Evolution Algorithm with a SimpleAdaptive Mutation Scheme

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Abstract. Differential equations have been used to describe phenomena in many fields. However, not all of differential equations can be solved in analytic ways so there are some approaches being made to solve them numerically. One of the approaches is using Fourier series expansion to approximate solutions of linear and nonlinear ordinary differential equations (ODEs). The coefficients of Fourier series expansion are estimated by an optimization method using Differential Evolution (DE). In this case, differential evolution will be used to minimize the residual function of the Fourier series that are implemented into the ordinary differential equations. A modification from the original DE is made by putting a simple adaptive scheme into the mutation part of the DE algorithm. The results show good performance of DE in solving various ODEs.

Mathematical Model of Cancer Cell: The DynamicalAnalysis

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Abstract. Cervical cancer is thought that caused by Human Papilloma virus infection. Mathematical research on cervical cancer usually focuses on transmission between individuals. In contrast to existing research, the population discussed here is at the micro level. How healthy cells develop into cancer cells due to HPV infection. Through mathematical models and analysis, there are efforts which can be made to prevent cervical cancer. There are two types of equilibrium points, namely disease-free and endemic equilibrium points. Using the next-generating matrix, a basic reproduction number is obtained to determine secondary infections.

Transformation Method for Solving Interval LinearProgramming Problem

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Abstract. Linear programming model has been successfully implemented in various fields such as industrial manufacturers, agriculture, transportation, medical and military. But in many cases in reality, parameter values of in the model could not be determined precisely. Therefore, the parameters might be estimated using an interval. In this paper, interval linear programming problem (linear programming problem with parameters / coefficients and decision variables in the form of interval is discussed. The interval linear programming problem is transformed into linear programming problem.

Chaos and Multiple Attractors in Fractional Financial model

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Abstract. Chaotic models in recent days have become very crucial to _financial sector around the globe. This study presents novel attractors in financial model using power-law, exponential-decay and Mittag-Leffler law. The uniqueness and existence of the solutions of each operator is established. Numerical simulation results for each operators present novel attractors. The graphical representation indicates that the fractional order and parameter values have influence on the nature of attractor. The results of the financial model with fractional operator are far better than the classical model type.

Mathematical Model of Deforestation Effects on Wildlife with Holling Type-II and Type-III Functional Response

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Abstract. Deforestation is the consequence of large growth in human population. The increasing human population has resulted in increasing demand for forest resources. As the forest land decreases, wildlife species that are fully dependent on forest resources will lose their food sources and natural habitat. In this paper, we present a mathematical model to study the impact of deforestation on wildlife species. The model consists of two types, namely using the Holling type II and type III functional response on interaction between wildlife and forest resources. From the result, each type of model has six equilibrium points. The extinction equilibrium point, the extinction of both human population and wildlife species equilibrium point, and the extinction of human population equilibrium point. Those three equilibrium points are unstable, while the extinction of forest resource and wildlife species equilibrium point, the extinction of wildlife species equilibrium point, and the coexistence equilibrium point are locally asymptotically stable with some conditions. Furthermore, a numerical simulation was performed to determine the comparison of population growth in the forest resources and wildlife species from both the models. Based on the analysis of the model, it can be concluded that wildlife has a level of utilization of forest resources following the Holling type III descend slower than wildlife that have utilization rates following the Holling type II. This happens because wildlife with predation level following the Holling type III will look for other forest resources if the forest resources that they normally consume are running out, as a result the forest resources in the model with the Holling type III decreased more significantly than the model with the Holling type II.

Modeling of Global Warming Effect on the Melting of PolarIce Caps with Optimal Control Analysis

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Abstract. This paper describes the impact of increasing carbon dioxide gas emissions on the growing threat of global warming and its effect on melting polar ice caps using a mathematical model. The stability analysis of three equilibria, namely human and forest absence, forest absence, and co-existence is presented in which all of the equilibria are conditionally stable. Further, the optimal control problem is formulated in the form of clean technological options and reforestation as control variables. The control variable problem is solved analytically through Pontryagin's Maximum Principle. The simulation shows that the combinations of two controls give a significant impact to reduce the concentration of carbon dioxide and the rate of melting polarice caps.

Global Analysis of a Dengue Hemorrhagic Fever Transmission Model with Logistics Growth in Human Population

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Abstract. Dengue Hemorrhagic Fever (DHF) is a contagious disease and can cause death. Almost half of the world's population is at risk of DHF. In this paper, the SIR (susceptible-infectious-recovered) DHF transmission model is analyzed with human populations following the logistical growth model. Global analysis is carried out at a disease-free equilibrium and endemic equilibrium by constructing Lyapunov functions. The results of the analysis showed globally asymptotically stable at the two equilibriums.

Stability Analysis of SIVS Epidemic Model withVaccine Ineffectiveness

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Abstract. Vaccination is the act of getting a vaccine to help the immune system develop protection from a disease. Vaccination is a good and efficient step to protect population from epidemic. However, vaccines do not necessarily provide perfect immunity to body because not all type of vaccines have 100% effectiveness. The ineffectiveness of a vaccine affects the dynamics of the spread of an infectious disease. The dynamics of the spread of infectious diseases with vaccine ineffectiveness can be approached by mathematical models. This paper aims to analyze the stability of SIVS epidemic model with vaccine ineffectiveness. Based on model analysis result, the model obtained two equilibrium points namely, the disease free-equilibrium point (E_0) and endemic equilibrium point (E_1). In addition, the basic reproduction number (R_0) also obtained, which determines the existence and stability of equilibrium point. Disease free-equilibrium point (E_0) local asymptotically stable if $R_0 < 1$, then through phaseplane simulation it conclude that endemic equilibrium point (E_1) local asymptotically stable if $R_0 > 1$. Based on numericalsimulation results, it shows that vaccine ineffectiveness affects the high spread of disease.

On Mathematical Model Approach to Competition Dynamic of Shipping Companies in Surabaya

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Abstract. Indonesia has a vast sea area and consists of many islands, so shipping companies are very beneficial for Indonesia's people. This study aims to estimate parameters and analyze mathematical models of shipping company competition between three shipping companies in Surabaya. This model is a differential equation and uses the Lotka-Volterra mathematical model. In this study, the estimation of model parameters is done using the genetic algorithm method based on the number of container production transported by shipping companies. The mathematical model is then analyzed by finding the equilibrium point and checking its stability by substituting the parameter value from the estimation results. The results of this mathematical simulation model show that the three companies exist in the future, and competition between the three companies still occurs.

Comparison of Characteristic of Furrow IrrigationInfiltration in Various Types of Soils Using Dual ReciprocityBoundary Element Method

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Abstract. This research discusses the infiltration system surface irrigation channels on four types of soil, namely Regosol,Alluvial, Latosol, and Podsolik. Mathematical model of irrigation channels is initially in the form of Darcy's basic lawand Richard's Equation which is then transformed into a modified Helmholtz equation. Next, a numerical solution isformed using Dual Reciprocity Boundary Element Method (DRBEM) formed from the modified Helmholtz equation.This method is used to solve infiltration problems with trapezoidal channels in soil types. The numerical solutionproduces values of water absorption and water content which have a proportional relationship. In addition, the resultingvalues of water absorption and water content are also vary depending on the texture of the soil type. The types of soil thatcontain the most water are Sand (Regosol Order sandy soil type), Gila Fine Sandy Loam (Order Podsolik sandy claytype), Latene Clay Loam (Alluvial Order clay loam type), and Yolo Clay (Order Latosol type of clay soil).

Convergence of Solution Function Sequences of Non-Homogenous Fractional Partial Differential EquationSolution Using Homotopy Analysis Method (HAM)

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Abstract. The fractional partial differential equation is an equation with non-integer partial derivative which is now widelyused in solving various problems so that in recent years, many researchers are interested to study fractional partialdifferential equation. The equation which is used in this paper is the non-homogeneous fractional partial differentialequation. The aim of this study is to determine general solution of the partial differential equation through three differentorder equations (α; 1), (β; 2) and (α; β), where $0 < \alpha \leq 2$ and $0 < \beta \leq 1$ by using Homotopy Analysis Method (HAM).Furthermore, by taking a convergent sequence, it will be analyzed that the convergence of the sequence of differentialequations results in the sequence of solutions of partial fractional non-homogeneous partial differential equationsconverging to the solution function of the fractional partial differential equation.

Mathematical Model of Malaria Transmission with Seasonal Factors and Its Optimal Control

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Abstract. Malaria is a type of infectious disease caused by Plasmodium parasites in the blood. This disease is spread around the world and is still a global health problem. This paper aims to analyze the malaria model with seasonal factors and apply optimal control variables in the form of insecticide, prevention, and treatment efforts. The malaria model without seasonal factors has two equilibriums, namely, the disease-free and the endemic equilibriums. Local stability and the existence of endemic equilibrium depend on the basic reproduction number. Thus, we analyze the sensitivity of parameters to determine which parameters are the most influential in this mathematical model. Based on the simulation results, seasonal factors tend to be more influential in the dynamics of changes in mosquitos' populations, whereas for the dynamics of changes in human populations, the seasonal factor does not significantly influence. Furthermore, the problem of control variables in the mathematical model with seasonal factors is determined through the Pontryagin Maximum Principle method. Numerical simulation results show that providing control variables in the form of insecticide, prevention, and treatment efforts simultaneously is quite effective in minimizing the number of infectious mosquitoes population, human population are exposed to short incubation periods, human population are exposed to long incubation periods, and infectious human population.

Parameter Estimation and Analysis of $SEIS$ Model on the Dynamics of Tuberculosis Transmission

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Abstract. In this paper, we perform the parameter estimation of tuberculosis (TB) model using the performance index approach method in the optimal control theory and genetic algorithm. We use the data on TB patients in Indonesia and East Java Province. The analysis of the spread of the TB model was conducted for $SEIS$ (Susceptible – Latent – Infectious – Susceptible) type. The model has two equilibriums namely the disease-free and endemic equilibriums. The basic reproduction number (R_0) was obtained as well. The local stability of the equilibriums depends on the basic reproduction number. Based on the parameter estimation results, the value of is greater than one which means that there is an endemic condition for the spread of TB both in Indonesia and in East Java Province. The simulation is carried out using the parameter estimation results which confirm that the spread of TB will still occur both in Indonesia and in East Java Province.

COMPUTATIONAL SCIENCES (CS)

Machine Learning Pipeline for Online Shopper Intention Classification

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Abstract. Nowadays people prefer to buy online rather than buy on the spot. Online transactions make people's lives easier. This condition requires the seller to understand the characteristics of the intention of the prospective buyer. This research proposes a machine learning pipeline to predict the customer behavior for e-commerce products. We compared several machine learning algorithms to find the best algorithm to solve the problem then we deployed model on web application. Based on the experiment, the Random Forest algorithm can predict online shopper intention with 90% of accuracy.

Crowdsourcing as a Tool to Elicit Software Requirements

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Abstract. Requirements elicitation is a crucial process in software development since the results affect the quality of thesoftware. There are several challenges in gathering requirements, for example, a limited perspective of the system analystin the ability to understand the problem domain. In this paper, we propose the gathering process of software requirementsutilizing a crowdsourcing approach. We develop a system to facilitate the process of software requirements gatheringfollowing the crowdsourcing workflow. The system is built on the web platform using the Python programming languagewith the Django framework and SQLite database to make it easy for users to access this system. System evaluation isachieved through testing the system to decide the validity of the input and the generated output, then proceeded bycontinuing the discussion of the RE process' result carried out through the crowdsourcing system. The results support theinitial hypothesis that crowdsourcing can provide system analysts with broad perspective and efficiency in terms of costand time in the ability to understand the problem domain compared to the traditional methods.

Fuzzy Sentiment Analysis using Convolutional Neural Network

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Abstract. Sentiment analysis is one part of natural language processing. Sentiment analysis can be done by lexicon based,or machine learning based. Sentiment analysis based on machine learning has advantage of dynamism to meet with newlanguage datasets or new vocabulary. Sentiment analysis seeks to understand the sentiments contained in a sentence. Asentence can be positive, neutral or negative, based on its sentiments. (A sentence can have positive, neutral or negativesentiments.) However, the fact is each sentence does not always have positive, negative or neutral sentiment clearly. Wetry to develop a sentiment analysis method that can show the sentiment degree of a sentence. Fuzzy sentiment analysisusing convolutional neural network are introduced in this paper to produce more accurate sentiment analysis results.Convolutional neural networks are a popular machine learning method for sentiment analysis. The concept of fuzzy sets isused to express the sentiment degree of a sentence. Euclidean distance analysis to determine the proximity of two vectorsis used to show that this method is better than the standard method. The method we propose successfully produces a valuethat indicates the degree of sentiment of a sentence. Comparison of the euclid distance between the results of the standardsentiment analysis and our method shows that the results of the fuzzy sentiment analysis using convolutional neural networkhave a distance that is relatively close to the true sentiment value. Fuzzy convolutional neural network analysis sentimentis proven to be able to produce better and smoother sentiment analysis results than standard methods.

Stochastic Fractal Search Algorithm in Permutation Flowshop Scheduling Problem

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Abstract. In this paper, permutation flowshop scheduling problem is solved using stochastic fractal search (SFS) algorithm to find a sequence of jobs minimizing makespan. SFS algorithm is inspired by the phenomenon of successful growth which uses a mathematical concept called fractal. The performance of SFS algorithm to solve permutation flowshop scheduling problem was tested using standard benchmark problems of Taillard and compared with other optimization algorithms. The results shown that the proposed SFS algorithm performs better than other algorithms on given benchmark problems for finding the best solution found so far in minimizing makespan. Moreover, comparing with the best know result, SFS successfully provides solutions which are near-optimal solutions.

Public Health Insights on Social Media: Using Instagram Data for Investigating Dengue Hemorrhagic Fever in Indonesia

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Abstract. Dengue Hemorrhagic Fever (DHF), an acute capillary leak syndrome caused by dengue virus, is one of the majorpublic health problems in Indonesia. Several major DHF outbreaks have occurred, and the incidence rate has increasedfrom year to year. The increasing use of social media for health-related activities and the geolocation social media data canbe leveraged to improve and enhance the current surveillance system for controlling communicable diseases, includingDHF. This study explores Instagram, one of the most popular social media in Indonesia, to analyze posts about DHF towardimproving the surveillance system. We extract Instagram posts in 2017 – 2018 with geolocation and date-time value, thatcontained one or more DHF keywords in Indonesian language (i.e., *demam berdarah dengue*, *demam berdarah*, *dengue*,*Aedes aegypti*, and *fogging*), resulting in 665 posts in 2017 dataset and 976 in 2018 dataset. The preprocessing of the datasetincludes tokenization, word normalization, stopword removal, stemming, and building the term-document matrix. Thetraining dataset is labeled into *news*, *education and information*, and *other* classes, and the K-nearest neighbors (KNN) isapplied to classify the DHF posts. The accuracy of the KNN classifier is 71% for the 2017 dataset and 77% for the 2018dataset. The moderate performance is affected by the noisy data, the data extraction technique, and the keywords used toextract the relevant posts. For the deployment, we perform spatial analysis and compare the results with the actual DHFcases from the Ministry of Health of Indonesia. The spatial analysis results report that 17 provinces reveal similar changesbetween the number of DHF posts on Instagram and the number of actual cases from 2017 to 2018, while 17 other provincesreveal the opposing changes. The results and findings of this study show that Instagram posts may contribute to enhancethe current surveillance system. For example, the frequency of Instagram posts and its sharp increase may indicate unusualevents about the DHF situation in a specific location / province.

Classification of Mycobacterium Tuberculosis Based on Colour Feature Extraction Using Adaptive Boosting Method

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Abstract. Mycobacterium Tuberculosis is acid-resistant bacteria found in the sputum. This bacterium has a special colorlike red to purple. Color is a specialist of clinical pathology may know that the bacteria Tuberculosis (TB) in the sputumand calculate the amount of TB bacteria. In this study, we used the Adaptive Boosting (Adaboost) method to identify TBbacteria. Before identification, filtering is carried out using the median filter and extraction of color features using HSV(Hue Saturation Value) and Adaboost with the decision tree classifier for identification. The target of this study was todetermine the effect of color features in identifying TB bacteria. The results of this study indicate that the identificationof TB bacteria using the extraction of HSV color features on the Hue value can affect the accuracy value. In this study,we obtained the best accuracy value of the TB bacterial classification in testing process by using Adaboost method thatwas 81.7% when the hue in the color histogram was 64.

Expert System for Digital Single Lens Reflex (DSLR) Camera Recommendation Using Forward-chaining and Certainty Factor

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Abstract. The advance of technology in digital era have enabled the availability of numerous Digital Single Lens Reflex (DSLR) camera products in the market. However, this condition makes choosing a DSLR camera that matches consumer's preferences difficult. This paper proposes an expert system to help recommend suitable DSLR camera using Forward Chaining and Certainty Factor. Forward Chaining was implemented to infer a list of recommended DSLR camera and then, Certainty Factor was calculated to rank the DSLR camera recommendation list according to consumer's predefined specification priority. The evaluation was carried out using questionnaires to measure user's satisfaction towards the recommendation result and then represented in Mean Opinion Score (MOS) value. The evaluation produced MOS value of 3.5 out of 4, proving that the expert system could perform relevant recommendations.

Handwriting Character Recognition System in Documents Containing Abbreviations Using Artificial Neural Networks

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Abstract. Offline Handwriting Character Recognition (HCR) is more challenging than online HCR because of inadequate temporal information such as number and direction of the stroke, ink pressure, unpredictable and high handwriting variations. These difficulties cause low accuracy achieved. The purpose of this study was to perform handwriting pattern recognition on documents containing abbreviations using ANN. The document was written in Indonesian. Some steps are taken to detect abbreviations: collecting handwritten samples, doing image processing, practicing ANN. From the classification process, there are two indicators of accuracy used. Character accuracy based on classes and unusual abbreviations detected. Character accuracy based on class achieved is 60.47%, and for accuracy of abbreviations detected is 27.89%. Low accuracy results because the accuracy of the introduction of 9 of 26 letters is not more than 50%. This study contributes to providing knowledge about image processing and the application of ANN to pattern recognition problems, namely handwriting. In addition, this research also contributes in providing a model for the development of a system for detecting abbreviations in Indonesian written which can be applied in essay exams in education. In future research, adaptive thresholding can be applied to improve system performance. Besides, to minimize recognition errors caused by imperfect character segmentation, recognition is done in one word.

Solving Bi-Objective Quadratic Assignment Problem with Squirrel Search Algorithm

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Abstract. The simplest model of multi-objective quadratic assignment problems, bi-objective quadratic assignment problem, is discussed in this paper. Weighted sum method is used in order to change the multi-objectives model into single-objective model.An algorithm inspired from the foraging strategy and gliding mechanism called squirrel search algorithmisproposedtosolvethisproblem.Thesquirrelsearchalgorithmparameters,such asnumberofiterations,numberofflyingsquirrelsand controlparameter, predator presence probability, are observed by managing computational experiment tosolve bi-objective quadratic assignment problem. The computational results show that general parameters, number ofiteration and flying squirrels, affect the performance of the algorithm in solving this problem. Moreover, probability ofpredator presence which is as control parameter in this algorithm can bring better result when using smaller value ofprobability.

Evaluating the Quality of a Help-Desk Complaint Management Service using Six-Sigma and COBIT 5 Framework

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Abstract. Help-desk plays an important role in a company to maintain customer satisfaction. To ensure help-desk's solutions effectiveness, the service quality must be evaluated and monitored periodically. In this study, we evaluated the quality service of help-desk service by finding out the sigma level to discover the root of the problems. We used complaint data from a help-desk service of an IS/IT department in a public university between 2016 and 2017. We performed sub-methodology DMAIC (Definition, Measurement, Analysis, Improvement, and Control) in Six-Sigma and adopted COBIT 5 framework in the improvement phase to enhance the service quality. The SIPOC diagram shows that the help-desk service was at a high-level. The DPMO value in 2016 was 30,153and it rose to 80,155 in 2017. It caused the sigma level to drop from 3.37σ in 2016 to 2.90σ in 2017. From the Pareto chart, we know that complaints regarding SIAD and network account for as much as 51.72% and 23.82%, respectively. Therefore, the cause of the problem must be found, according to the Pareto principle. The root causes of this problem are categorized into policy, procedure, plant/technology, and people. Meanwhile, COBIT 5 presents solutions to policy and procedure problems by providing best-practices on standard operating procedures through domain DSS02 Manage Service Requests and Incidents and domain DSS03 Manage Problems. The combination of Sig-Sigma and COBIT 5 is able to evaluate the service quality of the help-desk service. The method in this research can be used to evaluate service quality in other organizational divisions.

The Analysis of Coffee Productivity and Production Improvement Strategies in Indonesia: A System Thinking Approach

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Abstract. Coffee is one of the productive sectors of agriculture in Indonesia that is known worldwide. Massive coffee production has made this country the number four coffee producers in the world. However, this coffee production does not increase continually due to fluctuations. The problems faced in the coffee production system are involved in terms of the various aspects that affect it. In this study, we use a system thinking approach to develop and simulate the computational model with system dynamics (SD) to explore the interactions of coffee production systems in Indonesia. This study uses this model to evaluate each trigger's role in determining the causal role of each influential variable, including the land sub-model, productivity sub-model, and coffee post-production. This modeling results produce a causal loop diagram (CLD) of the mapping of strategies that are right on target and can be considered for decision-makers and farmers. The contribution found that the potential strategy that can be applied in coffee production is to increase its productivity with a variety of efforts both to improve human resources, proper management of plant resources, and the use of agricultural technology by the appropriate investment modeling. Whilethis study presents a stand-alone contribution to knowledge and practice in a production sub-sector this could encourage future research in the coffee plantation sector that uses simulation system based methods and specific scenarios based on information systems to support strategic policy.

Unified Theory of Acceptance and Use of Technology Model for User Acceptance Analysis of Bitcoin

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Abstract. Bitcoin is a virtual currency that has advantages in terms of security because every transaction is governed by a cryptographic algorithm. Bitcoin can be considered a global currency because its use is distributed throughout the country via the internet. Bitcoin is still not very popular in Indonesian society, therefore it will be analyzed how much Bitcoin acceptance in Indonesia uses the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The measured variables are Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition, Behavior intention, Use Behavior. The results of the study can be said that the acceptance of Bitcoin among Indonesian people is still low because the results are still below 50%. This study aims to determine the factors that influence the use of Bitcoin on user behavior.

Hybrid Neural Network Extreme Learning Machine and Flower Pollination Algorithm to Predict Fire Extensions on Kalimantan Island

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Abstract. The forest and land fires are one of the environmental problems that often occur in several regions of Indonesia, one of which is the Kalimantan Island. Ecologically, forest fires result in loss of nutrients, low soil infiltration, and high erosion. Therefore, rehabilitation needs to be done to improve and re-increase land productivity after a forest fire. One effort that can be done in preparing for the rehabilitation process is to predict the extent of forest fires. The purpose of this study is to predict the extent of fires on the island of Kalimantan using a hybrid artificial neural network method of extreme learning machine (ELM) and flower pollination algorithm (FPA). The flower pollination algorithm is one of the algorithms used in optimization problems. In the Extreme Learning Machine training process, this algorithm plays a role in optimizing the weight so that the optimal weight is obtained. The optimal weight used to predict is the best interest value (GBest) flower pollination algorithm. The stages of predicting the area of fire on the island of Kalimantan use the flower pollination algorithm and extreme learning machine, including data normalization, training process, validation test process, data denormalization, and error value calculation using mean square error (MSE). Based on the training process, obtained the smallest MSE of 0.016753377 with the MSE validation test of 0.017989928.

Signature Image Identification Using Hybrid Backpropagation with Firefly Algorithm and Simulated Annealing

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Abstract. Signature pattern identification is a process of identifying pattern recognition because the signature is the primary mechanism for the authentication and authorization process in legal transactions. In this study the identification of signature images using hybrid backpropagation with firefly algorithm and simulated annealing. There are three main stages in the backpropagation training method, namely feedforward, back propagation of error, and updating weights and bias. Firefly algorithm and simulated annealing replace the backpropagaton training process at the backpropagation of error stage and the weight and bias update stage, while for feedforward still use the existing algorithms in backpropagation training. The stages in the signature image identification process include image processing, namely the grayscale process, binary image, segmentation process, training process, and validation test process. Based on the results of the training process, the best weights and biases are obtained with a mean square error value of 0.00608. The results of the signature image identification show that the system has been able to recognize the image pattern well with a percentage of 93%.

Prediction of Pneumonia COVID19 using a Custom Convolutional Neural Network with Data Augmentation

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Abstract. COVID19 is a pandemic of infectious diseases caused by a corona virus. This virus is a new variant found in Wuhan, China, in December 2019. Symptoms felt by COVID patients19, in general, are cold, the body feels tired, and dry cough. However, some patients may experience nasal congestion, runny nose, sore throat, or diarrhea. Medically, to identify this disease, visual radiological observation is carried out. The development of computer technology helps to process data through image processing. At this stage, the convolutional neural network is the latest and in-depth machine learning machine that can be used to classify images. Observations were made on X-Ray Image with four classes, namely lung condition in 234 health files, exposed to COVID 43 files, exposed to 242 bacterial files, and exposed to 148 virus files. Pre-processing is done using auto contrast to improve image sharpness. Data augmentation is done to increase the amount of data variation. In addition to the X-Ray dataset, this research also uses two classes of COVID and NON-COVID on the CT-Scan dataset. The results were using 34-layers, resulting in an average accuracy of 99.25% and on 26-layer an average accuracy of 97.86%. The training time needed is 1 minute and 15 seconds. Average Error results for 34-layer is MSE 0.0237, RMSE 0.1441 and MAE 0.0120. It is 50% better than the 26 layer shows an average MAE of 0.00351.

Evaluation of E-learning: A Case Study of PsyCHE

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Abstract. The objective of this study is to measure the quality of the e-learning website based on the level of quality and the significance of user perception. The study also examined challenges and solutions to the implementation of the e-learning platform. The subjects of this study were the PsyCHE e-learning application and 305 students using e-learning for more than six months. This research was conducted through a WebQual4.0 dimension approach. The data collected was then analyzed using the Importance Performance Analysis (IPA) to determine the level of student satisfaction, which is the gap between importance and performance. Based on the IPA analysis, it shows that all gaps in the webqual attribute are negative; this illustrates that the performance of the PsyCHE website cannot meet the expectations of its users. The IPA quadrant provides results for six indicators in quadrant 1, 7 indicators in quadrant II, four indicators in quadrant III, and five indicators in quadrant IV. The Wilcoxon test is used to determine whether there is a difference between the level of expectation and the level of perception of the respondent; in this study, the Wilcoxon test shows that there is a difference between the two. This study recommendsthe Faculty to take urgent action to improve e-learning performance and to update their strategic plans by prioritizing attributes with the most significant gaps in their user satisfaction.

Decision Support System for Novel Recommendation Using Analytical Hierarchy Process and Vikor

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Abstract. Fake news or often called hoaxes have been circulating which has caused unrest in the community. One way to combat hoaxes is by cultivating literacy, especially novel literary works. Periodically, several websites contain novel recommendations that are sourced from other readers' judgmentsthat tend to be subjective. The purpose of this research is to build a web-based novel recommendation application using the AHP-VIKOR integration method. The criteria for evaluating novels used in this research are novel rating value, author rating value, author popularity value, and total award value. This research has six stages, namely data collection, data processing, system analysis, system design, system implementation and system evaluation. The results of the system evaluation showed that 81.8% of the respondents agreed that the system was easy to operate, 72.7% agreed with the ease of understanding the language of the system, 45.5% agreed and 54.5% strongly agreed with the results generated according to user expectations.

Range of Motion Measurement of *Articulatio cubiti* Based on Hough Transformation

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Abstract. Range of Motion (ROM) is one of the movement parameters for evaluating physical rehabilitation. *Articulatio cubiti* or elbow is one of the most important organs in the human body that is most commonly injured in some accidents happens. A physical test is needed using ROM measurement to see the severity of the injury and the effectiveness of rehabilitation. Therefore, accurate and precise ROM measurements are needed to decrease error value while diagnosing injury severity and can represent the actual condition of the joints, so the effectiveness of rehabilitation can be evaluated properly. So far, ROM measurement is still using manual devices, named goniometer. However, this device has several disadvantages: it requires human intervention, requires high clinical experience from a therapist or doctor, and goniometer cannot be used for ROM measurement in certain joints. Therefore, we need a device to do ROM measurement automatically, precise, and flexible. In this research, ROM measurements were taken on *Articulatio cubiti dextra* using Hough transformation method based on kinect sensors and *Python* programming language. There are three variations of the distance between human subject and kinect sensor; 140 cm (first distance), 220 cm (second distance), and 300 cm (third distance), and there are 10 variations of ROM values from 4° to 120°. The obtained results showed that the best ROM measurement at a first distance with a linearity of 99.59%, a sensitivity of 97.38%, an accuracy of 96.64%, and a relative standard deviation of 1.65%, followed by ROM measurement result at the second distance with a linearity of 99.46%, a sensitivity of 92.28%, an accuracy of 92.51%, and a relative standard deviation of 5.92%, and the lowest ROM measurement results are at a third distance with a linearity of 99.27%, a sensitivity of 91.68%, an accuracy of 90.25%, and a relative standard deviation of 7.28%. It can be concluded that the farther distance between the human subject and kinect sensors, the lower linearity, sensitivity, and accuracy value of Range of Motion measurement by using the Hough transformation method based on kinect sensors.

The Impact of Confirmation of Expectations, Technology Compatibility, and Customer's Acceptance on Continuance Intention to Use E-Wallet

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Abstract. The adoption of e-wallet service is on the rise among Indonesian customers. People use e-wallet because it is convenient, more secured, and offers advantages over physical cash. In line with the growth of e-wallet adoption, thenumber of e-wallet services in Indonesia has increased to more than 50 providers in 2020. This situation leads to acompetitive market in e-wallet service. This study examines key factors affecting customer satisfaction and continuanceintention to use e-wallet services and applications based on the integration of Diffusion of Innovations (DOI) theory,Technology Acceptance Model (TAM), and Expectation-Confirmation Theory (ECT). The data collected from 663participants were analyzed based on structural equation modeling partial least square. The results show that confirmation,perceived ease of use, compatibility, and trial ability have positive impacts on customer satisfaction, and perceivedusefulness, satisfaction, and habit contribute to continuance intention on e-wallet. In addition, customers prioritize securityover ease of use when using e-wallet and consider it part of e-wallet usefulness. Based on findings, this study recommendsstrategies to maintain customer's satisfaction and to increase continuance intention, such as security prioritization on e-wallet, a customized promotion for each customer, application update based on customers' feedbacks, and market expansion to include small and medium enterprises (SMEs).

Development of Lung Cancer Classification System for Computed Tomography Images Using Artificial Neural Network

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Abstract. An automatic digital classification system for lung cancer detection of Computed Tomography Images using Artificial Neural Network (ANN) and Self Organizing Map (SOM) method is presented. The image samples used in this study are CT Thorax images showing lungs that are healthy and those infected with cancer stage I and II. Before feature extraction, the images are subjected to segmentation by thresholding to obtain the lung and cancer areas. This is followed by morphological operations such as erosion and dilation. Three features extracted are area, perimeter, and shape and they are fed into the ANN classifier. SOM training showed 87% accuracy, where 29 out of 31 images that were used had been successfully identified. Results of program validation test obtained by data testing showed accuracy level as high as 100% for healthy lung, 80% for stage I lung cancer, and 100% for stage II lung cancer. Based on these results, system designed by using Self Organizing Map is capable of identifying lung cancer stage. This prediction system is useful for the doctors to take an appropriate decision based on patient's condition

STATISTICS
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Analysis of Anti-Dumping Policy on Steel Imports Using Multi-Input ARIMA InterventionModel

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Abstract. Krakatau Steel, the largest steel producer in Indonesia, has been in loss for several years. One of the reasons is the flow of imported steel to the domestic market. In 2010, Krakatau Steel filed an anti-dumping petition against several countries. The petition was followed up with the initiation of an anti-dumping investigation by the Anti-Dumping Committee of Indonesia (KADI) since June 2011 and the application of the anti-dumping policy for CRC/S product from 2013 to 2016. This study aims to find out the magnitude of the impact due to the policy application using the ARIMA Multi-Input Intervention method for three-step functions. The study shows that the initiation of an investigation by KADI had not been able to decrease import, but the import itself was declining during the time the policy was applied. The application of anti-dumping policy starting to affect import from South Korea in May 2013, which decrease by 59.93%, from China in April 2013 decrease by 89.37%, and from Taiwan decreased by 80% in August 2013. Moreover, the Krakatau Steel market share was also increased during the time the policy was applied. However, imports started increasing, and the market share was decreasing once the policy was no longer applied.

The Application of Fourier Series Estimator to Predictthe Number of Dengue and Malaria Sufferers in Indonesia

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Abstract. In statistical modeling, Fourier series estimator is frequently applied to time series data in nonparametric approach. Based on nonparametric regression study, Fourier series estimator has good flexibility to predict seasonal and the combination of trend and seasonal data pattern. This paper proposes an application of Fourier series estimator in biostatistics and epidemiology cases. One of the important problems in health science is disease prevention efforts. For prevention efforts, prediction the number of sufferers is determined. Fourier series estimator is applied to predict the number of sufferers for seasonal diseases like dengue fever and malaria that becomes a main issue in Indonesia. We used secondary data from the Ministry of Health of Indonesia to model and predict the number of dengue fever and malaria sufferer in Indonesia based on Fourier series estimator. A selected model that be chosen has met the goodness of model's criteria such as the small Generalized Cross Validation (GCV), Mean Square Error (MSE), and the large determination coefficient. The selected model also considered the model parsimony. Therefore, Fourier series estimator was able to predict the number of sufferers for seasonal diseases and the prediction produced small value of Mean Absolute Percentage Error (MAPE) and MSE. Thus, the result can be used to give recommendation to related policy maker.

The Semiparametric Regression Curve Estimation by Using Mixed Truncated Spline and Fourier Series Model (Case Study: Human Development Index in East Java)

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Abstract. In simple terms, semiparametric regression is a model that combines parametric and nonparametric models. The use of two different components in semiparametric regression practically makes this model broader and developed rapidly in theoretical respect. There are several estimators where two of them are truncated spline and fourier series. Spline has the characteristic of changing patterns at certain sub-intervals while fourier series are smooth and follow the pattern repeated at certain intervals. Furthermore, in multivariable nonparametric regression, it is possible to use different estimators for each predictor. This has encouraged researcher to develop studies with mixed or combined truncated spline and fourier series estimators. Ordinary Least Square (OLS) as one of the most common estimation methods in the regression model cannot be directly used in nonparametric regression because the shape of the curve is unknown. Hence, the OLS method is modified with conditional optimization and referred to Penalized Least Square (PLS). The semiparametric regression curve estimation obtained in this study applied to the Human Development Index (HDI) in 37 regencies across East Java in 2018. Based on data from BPS-Statistics of East Java Province, East Java's HDI is the lowest among six provinces on Java island and the same occurrence happened in the last three years. Even more, the HDI of East Java Province is slightly lower than Indonesia's HDI. Therefore, a further study on East Java's HDI becomes important as the basis of government evaluation in formulating policies to improve the quality of human resources. In this regard, the objective of this research is to obtain an estimator of multivariable semiparametric regression curve using mixed truncated spline and fourier series model and applying the data of HDI in East Java. The method of selecting smoothing parameter using minimum Generalized Cross Validation (GCV) and the best model was obtained with two knots-two oscillation with minimum GCV equals to 4.58531 which has R^2=89.20%. Model interpretations are generallydivided for each predictor variable and due to R^2obtained, it can also be said that the model obtained can explain therelationship between response and predictor variables.

Bayesian Hierarchical Model for Mapping Positive Patient Covid-19 in Surabaya, Indonesia

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Abstract. Covid-19 is a disease caused by the coronavirus and has infected the world population not only in developing countries like Indonesia but also in developed countries like the United States of America. The spread of the disease originating from Wuhan in China is evenly distributed throughout the world. Surabaya, as one of the major cities in Indonesia was also affected by Covid-19. The aim of this study was to map the relative risk of the spread of positive Covid-19 patients in Surabaya using the Bayesian Hierarchical Model with spatial analysis to deal with regional dependencies. The object used was spatial object as many as 154 villages in Surabaya. Meanwhile,a number of positive patients Covid-19 as of May 10th, 2020 was as many as 708 patients. The method used to estimate the relative risk was the Bayesian method with the Integrated Nested Laplace Approximation (INLA) approach. It was used after several studies have shown that the INLA approach is more accurate in providing estimated values compared to the Maximum-Likelihood estimation. The mapping results showed that there is a spatial dependence on the spread of Covid-19 disease in Surabaya.

Chi-Square Association Test for Microfinance-*Waqf*: DoesBusiness Units Ownership Correlate with Cash*Waqf*Collected?

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Abstract.Cash endowment (cash *waqf*) via microfinance-*waqf* institutions begins to be popular among Muslims. As managers, microfinance-*waqf* institutions are responsible for maximizing the *waqf*'s productivity development programs and its collection to achieve equitable welfare. The purpose of this study is to examine the correlation between business unit ownership and the amount of endowment funds collected by microfinance-*waqf* institutions. What are thedevelopment programs that are of interest to the community whileat the same time satisfying the donors (*waqifs*)?. Toachieve theobjectiveof the study, weuseda statistical analysis model of two categorical variableswithinmicrofinance-*waqf*institutions. A total of 27 microfinance-*waqf*institutionshave been interviewed about both their acquisition of cash*waqf* and their business unit licenses. Chi square test results show that microfinance-*waqf* institutions' ownership ofbusiness units do not correlate with theamount of*waqf*funds they collected.

Extending runjags: A tutorial on Adding Fisher's *z* Distribution to runjags

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Abstract. JAGS is an open-source package to analyze graphical model that is written with extensibility in mind. The runjags package includes many enhancements to JAGS, including a custom JAGS module that contains some additional distributions in the Pareto family. A very flexible set of statistical models based on the logarithm of an *F* variate, the standardized Fisher's *z* distribution, was introduced more than 90 years ago. However, the standardized Fisher's *z* distribution is not yet adaptive for modeling, since the mode cannot be shifted from 0. This paper introduces the Fisher's *z* distribution, i.e. the standardized Fisher's *z* distribution which added a location parameter and a scale parameter. The mode of the distribution lies in μ. In this paper, we provide step-by-step instructions on how to add Fisher's *z* distribution to the runjags package. In order to affirm the accuracy of our implementation, we ran a comprehensive numerical experiment, using linear regression model. We conduct a simulation study to investigate the model performance compared to the normal or Gaussian error regression (GER) model. The results show that the Fisher's *z* error regression (ZER) model outperforms the GER model.

Number of Flood Disaster Estimation in Indonesia usingLocal Linear and Geographically Weighted Regression Approach

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Abstract. Flood is an annual problem in Indonesia. Based on data from Badan Nasional Penanggulangan Bencana (BNPB)or National Disaster Management Agency in 2020, flood had an average incidence of 649 times in all regions of Indonesiafrom 2011 to 2019. One of the main factors causing this disaster is ecological damage, which is triggered by settlementsalongriverbanks. Refer to this problem, it is necessary to estimate the number of flood disaster based on the influence ofthis settlement factor. This is important to prepare appropriate mitigation efforts to reduce the number of disaster and theimpact of losses. The estimation was carried out using two types of approaches that are Geographically Weigthed Regression (GWR) and local linear nonparametric regression. This study used secondary data from Badan Pusat Statistik(BPS) or Central Bureau of Statistics that are the number of flood disaster and the number of settlements along riverbanksin 34 provinces in 2018. The results of this study showed that the nonparametric regression method with local linearapproach produces better estimation than GWR method in analyzing flood cases. It was based on the R^2 value of thenonparametric regression with local linear approach of 51,48%, which is greater than the GWR value of 46,52%; and theMSE value of the nonparametric regression with local linear approach of 24,26, which is less than the GWR value of 32,16.Although the local linear nonparametric regression method had better estimation ability, the use of this method is notenough to estimate the number of flood disaster. This relates to spatial effects that cannot be separated from thephenomenon of flood where disaster at a particular location can cause flood around the nearest location. The results canalso be used to develop alternative methods by combining GWR and nonparametric regression with local linear approach.

Modeling Bivariate Poisson Regression for the Number ofMaternal and Infant Mortality in Central Java, Indonesia

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Abstract.Regression analysis is an analysis of the relationship between dependent variables and independent variables. If thedependent variable is a count data and has Poisson distribution, a Poisson regression model is developed. At present the Poissonregression model is developed by the Bivariate Poisson Regression model. This model is estimated by using the ExpectationMaximization (EM) algorithm. The Bivariate Poisson model produces 3 models, namely the variances in the form of equations,constants and zero. In this study, we would like to apply bivariate poisson regression to model maternal and infant mortality inCentral Java. From this model, we know the factors that impact the increasing of maternal and infant mortality. The obtained ofresult study was that in the Bivariate Poisson, the best model is the second model which assumes that covariance is an equation. Inthis model, variables that significantly influence infant mortality are the percentage of pregnant women implementing K1 (X_1),percentage of pregnant women implementing K4 (X_2), percentage of pregnant women who received Fe3 tablets (X_3), percentageof birth helped by health personnel (X_4), percentage of obstretical complication handled (X_5), percentage of childbirth womenthat have puerperal health service (X_7) and percentage of household with clean and healthy behavior (X_8) and there are no variablesthat influence maternal mortality. The best model has AIC value in the amount of 1114.5763.

Application of Linear and Nonlinear Seasonal Autoregressive Based Methods for Forecasting Grojogan Sewu Tourism Demand

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Abstract. This paper discussed the application of linear and nonlinear seasonal autoregressive based methods to the monthly tourism demand in Grojogan Sewu. The linear seasonal method, i.e. Single Seasonal Autoregressive Integrated Moving Average (SARIMA) and Two Level SARIMA (TLSARIMA), and nonlinear seasonal method, i.e. Nonlinear Autoregressive (NNAR) and Two Level NNAR (TLSNNAR) were considered as appropriate methods to handle seasonal pattern in the discussed time series. in this study. The results showed that TLSARIMA and TLSNNAR are more accurate than SARIMA and NNAR in term of Root Mean Square Error (RMSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), and Mean Absolute Scaled Error (MASE). Based on the further examine using Diebold-Mariano test, it can be concluded that the 6 periods ahead forecast values obtained by TLSARIMA and TLSNNAR have similar performance accuracy.

Estimated Price of Shallots Commodities National Based on Parametric and Nonparametric Approaches

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Abstract. Shallots is one of the leading commodities that strengthen national food security. From 2013 to 2018 the development of shallots production had increased. Except in 2015 the production of shallots decreased by 0.39 percent compared to 2014. Prediction of shallots prices is needed in order to maintain price stability for supporting food security, economic stability, and trade. In predicting the price of shallots commodities, statistical modeling is carried out using parametric and nonparametric time series approaches. However, in this research the parametric approach did not meet the assumption of white noise. Therefore, the nonparametric approach of kernel estimator and Fourier series estimator was used with correlated error. Nonparametric approach is used because it has a flexible form and alternative solutions if the parametric approach does not meet the assumptions. The result was the best model to predict of shallots prices in Indonesia was modeled based on the nonparametric approaches with kernel estimator. The model met goodness criteria like the small MSE value is 757.7224 and the big determination coefficient is 99.95%. The goodness criteria for kernel estimator are better than Fourier series estimator. The kernel estimator has good performance to predict the price of shallots with small MAPE value is 1,088%.

Modelling Electronic Money Transaction Volumes Based onThe Intervention Analysis

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Abstract. People's life styles change continuously with increasing needs which must be fulfilled. People need an efficient,easy, and fast payment system. One of them is by using electronic money. By using electronic money, more control isneeded in order to create financial system stability. To support this condition, one of the ways is predicting and analyzing thevolume of e-money transactions using the intervention analysis approach. Intervention analysis is a time series model thatcan be used to model and predict data containing shocks or interventions from both external and internal factors. In thisstudy, The data is secondary data taken from the Bank Indonesia website on the volume of e-money transactions. Theresults obtained by the best intervention model is ARIMA (2, 2, 0) with order b = 0, s = 0, and r = 2. Then the modeling andprediction results show that the intervention model is good, with an Mean Absolute Percentage Error (MAPE) value of 12.24.

Robust Mean-Variance Portfolio Selection with Time Series Clustering

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Abstract. This study presents a robust portfolio selection with time series clustering. The stocks are firstly grouped into several clusters using Partitioning Around Medoids (PAM) time series clustering base on autocorrelation function (ACF) dissimilarity. After clustering process, stocks are chosen to represent each cluster to build a portfolio. The stock chosen from each cluster is the stock that has the best Sharpe ratio. The optimum portfolio is determined using the robust Fast Minimum Covariance Determinant (FMCD) and S estimation. Using this procedure, we can efficiently obtain the best portfolio when there are large number of stocks involved in portfolio formulation process. This procedure is also robust against the probability of outlier presence in the data. To measure the performance of portfolios that are formed we use the Sharpe ratio. For empirical study, we used the daily closing price of stocks listed on the Indonesia Stock Exchange, which included in the LQ-45 indexed for the period of August 2017-July 2018. Results of this study showed that the performance of portfolio generated by the use of PAM time series clustering combined with robust FMCD estimation was better than performance of portfolio generated by other methods that we tested.

On the Computational Bayesian Survival Spatial DHF Modeling with CAR Frailty

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Abstract. Dengue Hemorrhagic Fever (DHF) is one of the most common diseases experienced in Indonesia, especially ina rainy season. DHF caused by the dengue virus which is transmitted by female Aedes aegypti mosquitoes. The recoveryrate of DHF patients is influenced by several factors. In this study we are modeling how these factors can influence therecovery rate for DHF patients. Thus, we can provide advice to the hospital. Survival analysis is a method used to modelsurvival data. In this case, the survival model will be used to find the relationship between the recovery rate of DHF patientsand factors that can affect it. The environment of patient residence is one of the factors that need to be considered. Thiscase required analysis by considering the spatial effect of the proximity between one sub-district and another. The additionof a random effect can be done to avoid bias on estimation by using conditionally autoregressive (CAR) prior. The resultshowed that DHF in eastern Surabaya mostly occurred in Tambaksari and Gubeng sub-districts. Mean of survival time ofpatients is 4 days. In this study, the Weibull and Generalized Gamma distributions were used to modeling the patientrecovery rate. In this study, there are spatial autocorrelations cases which are measured with the Moran's I index. TheWeibull distribution with addition frailty using Normal CAR is the best model that can be used to modeling the recoveryrate of DHF patients.

Modeling the Percentage ofPneumonia Cases in Java Island using Two Estimators of Nonparametric Regression for Longitudinal Data

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Abstract. This paper provides a comparison between two estimators of nonparametric regression for longitudinal data, i.e., truncated spline and Fourier series. The main aim of this study is to investigate the performance of each estimator by applying the model to the pneumonia case. Pneumonia case in Indonesia is growing, considering the significant increase in the prevalence in just over the past ten years. The secondary data were collected from Indonesia Health Profile published by the Indonesian Ministry of Health. The predictors are the percentage of toddlers with vitamin A intake, the percentage of basic immunization coverage in infants, the percentage of poor population, and the percentage of households with proper sanitation access. This investigation shows that truncated spline nonparametric regression with three-knot points and the second type weighting method is the best estimator for modeling the percentage of pneumonia cases in Java Island. Further research could also be conducted to develop a new method by combining the truncated spline and Fourier series estimator.

Does US-China Trade War Affect The Brent Crude Oil Price? An ARIMAX Forecasting Approach

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Abstract. Trade tension or trade war between the U.S. and China has had a significant impact on many sectors in the world.The business sector is one of them. Trade tension began on March 22nd2018, after U.S. President imposed a $50 billionimport duty on Chinese goods entering the United States. In return, the Chinese central government also imposed importduty on more than 128 U.S. products. The import duty policy led to some decreases in productions and sales in China. Asa result, the level of consumption and the demand for crude oil in China have declined. The fall in crude oil demand from the largest oil consumer, coupled with excess oil supply is estimated to produce volatility at the Brent crude oil price.Therefore, this study aims to model the monthly average of Brent crude oil price with the influence of trade war. Themethod used in this study is the Autoregressive Integrated Moving Average with Exogenous Variable (ARIMAX), wherethe exogenous variable is a dummy variable from the trade war between the U.S. and China. The results show that tradewar has a significant effect on the monthly average of Brent crude oil price and the best model is ARIMAX(1,1,0), with a MAPE value of 13.6733 percent.

The Impact of US-China Trade War in Forecasting the Gold Price using ARIMAX Model

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Abstract. Global uncertainties have made many investors turn to gold investments that are classified as safe assets. Even so, the price of gold moved quite dynamically amid the conditions of the trade war between the US and China. The development of an accurate forecasting model for estimating gold price fluctuations is very important and useful for investors. For this reason, this study aims to determine whether the US-China trade war has a significant impact on the price of gold and predict the price of gold for the next several periods. This study found that the trade war between the US and China affected the price of gold significantly. Using the Autoregressive Integrated Moving Average with Exogenous Variable (ARIMAX) approach by considering the influence of the US and China trade war as an exogenous variable, an excellent ARIMAX model was obtained with the MAPE of 2.6 percent for training data. Moreover, this model has a good forecasting performance with the MAPE of 9.6 percent for testing data.

Prediction Concentration of PM2.5 in Surabaya Using Ordinary Kriging Method

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Abstract. Air Pollution is a very common problem in big cities in Indonesia, one of which is Surabaya, which is the second largest city in Indonesia. There are many indicators of air pollution, one of which is PM2.5. This pollutant has a size of less than 2.5 microns which can penetrate the lungs blocking and entering the blood system which can lead to the risk of developing cardiovascular disease, breathing to lung cancer. Because of this danger, researchers predict concentration of PM2.5 in the Rungkut Industri area. This area was chosen because in this area there are many factories that can increase PM2.5 levels in the air. The method used in this study is the ordinary kriging method because the PM2.5 concentration in the air can be influenced by PM2.5 concentrations in the surrounding areas. From the analysis results, we obtained the Mean Absolute Prediction Error (MAPE) of 5.6 % less than 10% so that the ordinary kriging method has high accuracy for predicting concentration of PM2.5 in Surabaya. Furthermore, prediction of PM2.5 concentration in industry area of Rungkut was 15.83$\mu gr/\mathrm{m}^2$ that is moderate air quality index category.

A Comparison Forecasting Methods for Trend and Seasonal Indonesia Tourist Arrivals Time Series

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Abstract. This study aimed to determine the accuracy of forecasting methods for trend and seasonal Indonesia visitor arrival. Three single methods, Seasonal Autoregressive Moving Average (SARIMA), Singular Spectrum Analysis (SSA), and Fuzzy Time Series (FTS) were used to model and predict the monthly arrival. We have also compared the three single methods with two hybrid approaches, SARIMA-FTS, and SSA-FTS. Results show that SARIMA-FTS is the most appropriate model to capture the trend and seasonal pattern of the series in term of Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE).

Z-Score Standard Growth Chart Design of Toddler Weight Based on Least Square Spline Estimator of Semiparametric Regression Model

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Abstract. Underweight is a nutritional status of toddlers characterized by a lack of weight based on anthropometric index weight-for-age. In Indonesia, the anthropometric index is recorded on a KMS (Card Towards Health) which refers to WHO-2005 Standard Growth Chart (WHO-2005 SGC). The toddler samples used by WHO-2005 SGC, i.e., from Ghana, Oman, Norway, the USA, Brazil, and India, are physically different from the Indonesian toddlers. This research aims to design Z-Score Standard Growth Chart (Z-Score SGC) of weight-for-age based on sample toddlers from East Java by using least square spline estimator in semiparametric regression model. The obtained Z-Score SGC would be used to assess the nutritional status of toddlers in East Java. Results showed that the highest average weight gain was achieved at interval of age $0 \leq t < 6$ for about 0.7045 kg, and growth of toddler boys was higher than girls with a difference of 0.4 kg. Also, Z-Score SGC gave a lower reference than WHO-2005 SGC such that percentage of malnutrition and less-nutrition status categories provided by Z-Score SGC was also lower than those by WHO-2005 SGC.

Bi-response Spline Smoothing Estimator for Modelling the Percentage of Poor Population and Human Development Index in Papua Province

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Abstract. The percentage of the poor population (PPP) and the Human Development Index (HDI) are important indicators to measure the success of a country's development. Papua is the province with the highest PPP and the lowest HDI in Indonesia. Therefore, these two indicators in Papua require special attention and appropriate methods, especially when analyzed with other variables as predictors. One of the predictor variables that affect PPP and HDI is the School Participation Rate (SPR). The bi-response Spline Smoothing estimator is applied to this data because there is a correlation between PPP and HDI and the relationship patterns between the two responses with SPR are unknown. The Model estimation is done by applying the Penalized Weighted Least Square method. The best model for PPP and HDI in Papua is a model with a minimum GCV value 8.4554, this model gives R^2=97.63% and *MSE*= 7.0153. The validation of this model produces MAPE value of 6.57%. These empirical results indicate that the bi-response Spline Smoothing is suitable for modeling the PPP and HDI simultaneously in Papua Province.

Bootstrap Based T^2 Chart with Hybrid James Stein andSuccessive Difference Covariance Matrix for Network Intrusion Detection

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Abstract. The conventional multivariate chart based on Shewhart approach will face a problem when used to monitor themultiple outliers. To overcome the situation, the James-Stein estimator and Successive Difference Covariance Matrix canbe employed to improve the estimated mean vector and covariance matrix, respectively. Attacks in the network have asimilar nature as the multiple outliers. Therefore, by improving its mean vector and covariance matrix, the multivariateHotelling's T^2 chart can be exploited for detecting network attacks as an intrusion detection system. In this paper,performance of the Hotelling's $T^2$is updated using the James-Stein estimator and Successive Difference CovarianceMatrix estimators in monitoring network anomalies. The control limit of the proposed method is calculated usingbootstrap resampling method. The reputable NSL-KDD dataset is used as standard in assessing of the proposed chartperformance. The proposed chart demonstrating a good performance for the training dataset with hit rate detection of0.9175. Meanwhile, for the testing dataset, the proposed method outperforms the other charts with hit rate detection of0.8557.

The Performance of Goodness of Fit Test Procedure on Geographically Weighted Polynomial Regression Model

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Abstract. A development of geographica1ly weighted regression (GWR) model has been builded, namely geographically weighted polynomial regression (GWPolR)model.Becauseofhavingmoreparameters, theGWPolRmodelhasgoodnessoffitmeasuresbetterthan the GWRmodel does. However,itis urgent totest statisticallywhethertheGWPolRmodel is significantly betterthan theGWR model indescribing a givendata set.There hasnotbeen aresearchto solvethis problem. The purpose of this research istodiscover agoodness of fittestprocedure and its performance. Based on the residuals sum ofsquares ofGWR andGWPolRmodels andthedistributions theory off quadraticforms, astatisticaltestapproachwasderivedhere. Furthermore, performance ofthegoodness offit testprocedure was investigated using some simulation studies. Thesimulations studiesshowed that theprocedureperformswellandprovides as feasibleways tochooseanappropriatedmodel foragivendata set.

Modify Alpha Value of EMA Method and Brown Method: a Data Forecasting Comparison of COVID-19

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Abstract. Forecasting is a process or method used to predict future uncertainty as an effort to make better decisions. The purpose of this research is to compare the proximity level of the quantitative measurement to the actual value (accuracy) between the Exponential Moving Average (EMA) method and the Brown method by modifying the alpha value between 0 and 1. The data used is the daily data dissemination of COVID-19 in NTB Province, which starts from 11 March-14 July 2020. Based on data simulation results, with alpha value modification obtained information that the Brown method, is more accurate than the EMA method. The alpha value with the least error in the Brown method amounted to 0.7 with the MAPE of 4.34%. Therefore, doing forecasting by using Brown should take the results of the smallest simulation value of the value of MAD, MAPE, or MSE because the smaller the value will be the better quality of objects or objects.

Classification Using Nonparametric Logistic Regression for Predicting Working Status

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Abstract. Logistic regression is classical and prominent method for classification, and it is used as benchmark forcomparing the alternative methods. However, logistic regression is not always superior compared to the other methods.The accuracy of logistic regression could be improved by incorporating nonparametric model. The response variable usedin this study is working status of housewife that categorized as working or not-working. Meanwhile the predictor variablesconsist of three variables, they are highest education level, age, and household expenditure. The result of fitting modelshows that by incorporating nonparametric model to the binary logistic regression model can improve the classificationaccuracy. This is indicated not only by accuracy percentage, but also by area under Receiving Operating Characteristic(ROC) curve. The dataset will be divided into two parts, 80% as training data and 20% as testing data. The classificationaccuracy resulted by the binary logistic regression model is 60.36% for training data and 59.30% for testing data.Meanwhile, the classification accuracy of nonparametric logistic model is 63.43% for training data and 64.94%. for testingdata. The classification accuracy and area under curve of nonparametric logistic regression is higher than those of binarylogistic regression.

The Determinant of Entrepreneurial Work for Elderly in Indonesia

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Abstract. The growth of the aging population continues to grow, it has become a global phenomenon because it occurs in almost all countries, both in developing and developed countries. This condition raises an important issue and policybecause they tend to live longer, healthier, and active. Some of the elderly population, besides being healthy, is alsoequipped with education, skills, financial capital, and time to do activities so that they can make an economic contributionby continuing to work, one of them through entrepreneurship. This paper aims to provide empirical evidence for thedeterminant on entrepreneurial activity, in particular for elderly hours of work. Findings from the paper that economicfactors (such as wages and non-labor income) as well as employment and other demographic variables affect olderpeople's availability of entrepreneurship. However, those factors have no real influence in certain age groups, such as age 75+. Our suggestion, the government needs to accommodate the elderly who still want to work. By creating conditionsand conducive situations, they should continue to contribute.

A Self-Exciting Point Process with Cyclic Component, Trend Component, Triggering Function, and Response Function

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Abstract. A point process is a collection of random points located in a particular area. A point process such that one event can trigger other events at a particular time is called a self-exciting point process. In a point process, an intensity function plays a crucial role in stating the probability of the number of events per time unit conditional on past events. The conditional intensity function can be estimated by considering the cyclic component, trend component, internal factor, and external factor impacting the occurrence of earthquakes. This research aims to derive the conditional intensity function of self-exciting point processes and to estimate the parameters of the conditional intensity function by using maximum likelihood implemented to the earthquake data for Java Island and Sumatra Island. Data analysis showed that earthquakes that occurred in Sumatra have the same probability of triggering aftershocks as earthquakes that occurred in Java.

Meta Regression Application for Detecting Publication Bias and Variation of Results in Economic Research

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Abstract. This paper briefly aims to introduce the meta regression application or better known as the Meta Regression Analysis (MRA). This tool is widely used to detect publication bias in the publication of scientific articles, including in the field of economics. Publication bias occurs because researchers tend to publish their research results that support certain hypotheses (significant). Research results that are not significant have a relatively small probability of being published. Publication bias can be detected by means of a relatively simple regression test. A set of quantitative studies on the same topic is tabulated and analyzed using meta regression. Meta regression is not only used to detect publication bias. This analysis tool can also explain the source of variations in the results of several studies due to differences in location, research year, methods, gender and measurement methods used by researchers. This paper uses meta-regression to examine the variation in outcomes in an intergenerational transfer study. The results showed that location differences had a significant effect on transfers. Meanwhile, the research period and the variation of methods used in the previous study did not have a significant impact.

Multivariate Adaptive Regression Spline (MARS) Methods with Application to Multi Drug-Resistant Tuberculosis (MDR-TB) Prevalence

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Abstract. Tuberculosis (TB) is the main public health problems in the world and Indonesia. The WHO report states that Indonesia is one of the countries contributing to TB in the world. If a TB patient is not successfully cured, it causes a double immunity of TB bacteria against Anti-TB Drugs (OAT), so-called multi-drug resistant (MDR). One of the Efforts to reduce the MDR-TB prevalence has been made based on information obtained from mathematical modeling, for example, using regression analysis that includes parametric, semi-parametric, and non-parametric approaches. Multivariate Adaptive Regression Spline (MARS) is one of the non-parametric regression approaches. The MARS model can overcome the problem of high dimensional data, produce an accurate prediction of response variables, and can overcome the weaknesses of recursive partition regression (RPR). The MARS has been built by a stepwise algorithm, which is a combination of forward and backward technique, according to a Generalized minimum Cross-Validation (GCV) value. The minimum GCV value 0.000015 is obtained from the best model that has a combination of Basis Function (BF) = 28, Minimum Interaction (MI) = 3, and Minimum Observation (MO) = 2. The result shows that all of the basis functions in the model have a significant effect on the response. The highest contribution of the basis function coefficient has given by BF_6, which means the coefficient of BF_6will be statistically significant when the ratio of primary health facilities is more than 28.44. If the ratio of primary health facilities is more than 28.44, then the increase of one unit (other variables is considered constant) the MDR-TB prevalence increase by 0.171.

An Approach of Vector Autoregressive with Exogenous Input in Forecasting the Effect of US-China Trade War on Gold and Oil Prices

Siti Maghfirotul Ulyah[1,a)], Christopher Andreas[1,b)], Ilma Amira Rahmayanti[1,c)]

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Abstract. Gold investment began to be popular among groups, especially millennial generation. This is because the price of gold tends to rise continuously despite uncertain global economy. The objective of this study is to obtain the forecasting model that accommodates the effect of US-China trade war. The model used is a multivariate model that can accommodate the contribution of other variables, which is the vector autoregressive with exogenous input (VARX). These variables consist of commodity prices (gold price, oil price) and political issue (US-China Trade War). The results of the study stated that the best fitted model is VARX(2,0)-I(1,0) in the form of reduced model with MAPE less than 12 percent. Moreover, there was no significant contribution of US-China trade war on gold and oil prices.

Prediction of Dengue Infection Severity Using Classic and Robust Discriminant Approaches

Toha Saifudin[1,a)], and Windarto[2,b)]

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Abstract. Dengue infection is one of feared diseases in the public because it often results in death in sufferers. Patients suspected of dengue infection are usually routinely drawn their blood to be checked in the laboratory examination.Unfortunately, death can be caused by a lack of speed and proper handling according to the severity of the patient. Referto this problem, it is necessary to predict dengue infection severity based on blood diagnose results. This is important toprepare the precise treatment according to the severity of patients in order to reduce the number of death from thisdisease. Because the patient's blood examination result is a multivariate dataset then in this paper the prediction wassolved using multivariate method, namely discriminant analysis. In this method, the parameter estimation was carried outusing Maximum Likelihood (ML) method. This leads to classic discriminant analysis. Unfortunately, the ML method isheavily influenced by outlier so the estimator becomes less precise when data has been contaminated by outliers. Toovercome this problem, a robust estimation method using Minimum Covariance Determinant (MCD) was used. Thisleads to the robust discriminant analysis. This study used a sample of dengue infection patient medical record data fromSurabaya Hajj Hospital. The result of this study showed that the appropriate analysis for sample data was the quadraticdiscriminant analysis. Furthermore, the robust quadratic model with MCD estimator produced better prediction than theclassic quadratic model with ML estimator. The robust quadratic model produced percentage of classification accuracy of87.2% in the male patient training data which is greater than the classic quadratic model accuracy of 85.7%. In the femalepatient training data, the robust quadratic model produced percentage of classification accuracy of 88.7% which is greaterthan the classic quadratic model accuracy of 80.7%. In addition, the MCD estimator was able to detect more outlier datathan the ML estimator.

Modeling the Number of Confirmed and Suspected Cases of Covid-19 in East Java Using Bi-response Negative Binomial Regression Based on Local Linear Estimator

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Abstract. The numbers of confirmed and suspected cases of Covid-19 are type of count data and they correlate each other. A popular regression model of two response variables for count data is bi-response Poisson regression. However, assumptions violation of Poisson regression that frequently occurs is over-dispersion. Negative binomial regression can overcome this over-dispersion case. The goal of this research is to model the number of confirmed and suspected Covid-19 cases affected by population density using bi-response negative binomial regression based on local linear estimator. The proposed method gave the optimal bandwidth of 609 based on maximum likelihood cross validation criterion, with deviance value of 1.537 which is less than 27.083 of the parametric regression approach. It means that the estimated model of the number of confirmed and suspected cases of Covid-19 affected by population density using bi-response negative binomial regression based on local linear estimator is better than the parametric model approach.

Co-Kriging Method Performance in Estimating Number of COVID-19 Positive Confirmed Cases in East Java Province

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Abstract. An increased rate of COVID-19 confirmed cases since the beginning of 2020 led World Health Organization (WHO) to finally declare COVID-19 as global pandemic on March 12th, 2020. COVID-19 in Indonesia was firstconfirmed on March 2nd, 2020, and it has quickly spread to many regions in Indonesia. East Java, which is one of theaffected provinces also experienced a significant increase in confirmed cases. The number of positive confirmed casesincreased to higher level at the end of June and the beginning of July 2020, and then it led East Java to become theprovince with the highest number of confirmed cases in Indonesia during the period. Based on these problems, it isnecessary to estimate the number of confirmed cases in several cities, such as Sidoarjo, Gresik, Pasuruan, Lamongan,Tuban, Malang, Sampang, Sumenep, and Mojokerto using co-kriging method. This study specifically contributed in theperformance analysis of co-kriging in the estimation of the number of COVID-19 cases. The use of co-kriging is suitablewith the pattern of the spread of COVID-19 cases, which also emphasized the rapid spread around the area of confirmedcases. It was based on the number of confirmed cases as primary variable and the number of suspect cases as secondaryvariable using updated data on July 21st, 2020. The result showed MAPE value of 18.17%, which is in the range of 10% – 20%. It means that co-kriging has good performance in the COVID-19 cases estimation in East Java.

Fourier Series Estimator for Predicting International Market Price of White Sugar

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Abstract. Global sugar industry and trade is expected to undergo a fundamental change with long-term impacts, marked by the elimination of agricultural subsidies agreed in 2013. Because of that, price of sugar in International market willrise and can affect Country's economy. The government must make regulation to maintain price of sugar for theircountry. Therefore, government need to predict price of white sugar in international market for make regulation The priceof white sugar on international market can be estimated and predicted using the Fourier series estimator that can analyzeperiodic data. The response variable is the price of white sugar on international and the predictor variable is the monthorder. Predicting international market price of white sugar by using Fourier series estimator gives mean absolutepercentage error (MAPE) value of 5.43% that is less than 10%. It means that Fourier series estimator has high accuracyfor predicting international market price of white sugar.

Fourier Series Estimator in Semiparametric Regression to Predict Criminal Rate in Indonesia

R. Kustianingsih[1], M. F. F. Mardianto[2,a)], B. A. Ardhani[2,b)], Kuzairi [1,c)], A.Thohari[1,2], R. Andriawan[2], T. Yulianto[2]

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Abstract. Regression is an analysis for determining relationship between response variables and predictor variables. There are three approaches to estimate the regression curve. Those are parametric regression, nonparametric regression, andsemiparametric regression. This study focused on the estimator form of semiparametric regression curve using Fourierseries approach with sine and cosine base (general); sine base; and cosine base. The best estimator, which is obtained usingordinary least square optimization, was applied to model the percentage of criminal incidents in Indonesia. The goodness-of-fit criteria of a model used are high coefficient of determination, minimum Generalized Cross Validation (GCV) andMean Square Error (MSE) value with determining parsimony model. In this study, the authors obtained the best Fourierestimator for predicting percentage of criminal incidents based on cosine Fourier series that had minimum GCV and MSEvalues, of 2.471 and of 0.0006, respectively, and determination coefficient of 77.545%. So, the estimator (cosine-fourierseries) was used for predicting the out-sample data and it met Mean Absolute Error (MAE) of 0.02.

Multi-predictor Local Polynomial Regression for Predicting the Acidity Level of Avomango (*Gadung Klonal 21*)

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Abstract. There are many studies on nondestructive evaluation using Near Infra-Red (NIR) Spectroscopy to determine the quality parameters of mangoes. The predictor variables used for predicting the mango quality parameters in the form of spectra values are generated from NIR spectroscopy. One parameter of the qualities of fruits is the fruit acidity. In general, the lower acidity of mangoes is the riper of the mangoes. Prediction of the acidity level of avomango by using one predictor still produces a high MAPE value of more than 40 percent, so that multi-predictor variables are needed to improve the prediction performance. This study aims to predict the acidity of Avomango (*Gadung Klonal 21*) by using the multi-predictor local polynomial regression approach and compare it with multiple polynomial regression. This study uses 100 divided samples into two parts, 80 in-sample data, and 20 out-sample data. The results showed that the multi-predictor local polynomial regression model gave highly prediction results for predicting acidity level of Avomango (*Gadung Klonal 21*) with MAPE value of 6.23 percent that is better than the MAPE value of MPR parametric approach of 10.79 percent.

Analysis COVID-19 in East Java using Some Basic Statistical Modelling

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Abstract. In Indonesia, the COVID-19 disease spreads very fast from one person to another. This causes the number of people with COVID-19 in Indonesia continues to grow every day. EastJava has become the new epicenter of the COVID-19 outbreak in Indonesia. An increase of new cases of COVID-19 per day would certainly be a challenge for the government of East Java. This is because Surabaya Raya, which is the largest contributor to cases in East Java, has conducted Large-Scale Social Restrictions (Pembatasan Sosial Skala Besar = PSBB) since the end of April 2020. The East Java Government has also taken precautions by isolating both the carrier and suspect COVID-19. The estimated rate and pattern of transmission or the pattern of spread of new cases is very important for the government to determine the policies that are visible and right decisions. Hence, to investigate the data more details using several relevant methods is essential. In this paper, we will explore some basic statistical approaches to analysis data COVID-19 in East Java. The methods are multiple regression, Poisson regression and capture recapture modelling. We will provide the outcome each method comprehensively.

PARALLEL SESSION SCHEDULES

Date : 29th September, 2020
Class : Mathematics
Moderator : **Dr. Liliek Susilowati**
Operator : 1. Eka Rahmawati
2. Putri Intan Permatasari

Time	Paper ID	Authors	Title
Parallel Session I			
10.45 – 11.00	AC01	Nikken Prima Puspita, Indah Emilia Wijayanti, and Budi Surodjo	The Clean Coalgebras and Clean Comodules of Finitely Generated Projective Modules
11.00 – 11.15	AC02	Wahyu Ulyafandhie Misuki, I Gede Adhitya Wisnu Wardhana, Ni Wayan Switrayni, andIrwansyah	Some Results of Non-Coprime Graph of the Dihedral Group $\boldsymbol{D_{2n}}$ when $\boldsymbol{n}$ is A Prime Power
11.15 – 11.30	AC04	Vira Hari Krisnawati, Anak Agung Gede Ngurah, Noor Hidayat, and Abdul Rouf Algho	On the (Pseudo) Super Edge-Magic of 2-Regular Graphs and Related Graphs
11.30 – 11.45	AC05	Nirmala Mega Rosyidah, Siti Zahidah, Utami Dyah Purwati, and Liliek Susilowati	On Comb Product Graphs with Respect to the Complement Metric Dimension
11.45 – 12.00	AC06	Nanda Anzana, Siti Aminah, Suarsih Utama	Properties of Adjacency Matrix of the Directed Cyclic Friendship Graph
Parallel Session II			
14.15 – 14.30	AC07	Liliek Susilowati, Atmim Nurrona, and Utami Dyah Purwati	The Complement Metric Dimension of the Join Graph
14.30 – 14.45	AC08	Rina Juliana, I Gede Adhitya Wisnu Wardhana, Irwansyah	Some Characteristics of Prime, Weakly Prime and Almost Prime Cyclic Submodule of Gaussian Integer Modulo Over Integer
14.45 – 15.00	AG01	Saba Mehmood, Eridani, Fatmawati	Morrey Spaces and Boundedness of Bessel-Riesz Operators
15.00 – 15.15	AG02	I Sihwaningrum, A Wardayani, and Sri Maryani	Necessary Conditions for A Norm Estimate of Riesz Potential on Morrey Spaces Over Hypergroups

PARALLEL SESSION SCHEDULES

Date : 29th September, 2020
Class : Applied Mathematics (1)
Moderator : **Asri Bekti Pratiwi, M.Si**
Operator : 1. Tiara Isna Rahmawati
2. Fidayanti Ayu Hariyono

Time	Paper IDE	Authors	Title
Parallel Session I			
10.45 – 11.00	AM01	Abdulloh Jaelani, Fatmawati, and Novi Dwi Yolanda Fitri	Stability Analysis and Optimal Control of Mathematical Epidemic Model with Medical Treatment
11.00 – 11.15	AM02	Kusno	Modeling Pipes Using Pipes' Center Curves of Quadratic and Cubic Spline Interpolation
11.15 – 11.30	AM11	Anita T. Kurniawati, Fatmawati and Windarto	Global Analysis of a Dengue Hemorhagic Fever Transmission Model with Logistics Growth in Human Population
11.30 – 11.45	AM17	Faishal Farrel Herdicho, Fatmawati, Windarto	Mathematical Model of Malaria Transmission with Seasonal Factors and Its Optimal Control
Parallel Session II			
14.15 – 14.30	AM06	Herry Suprajitno and Ismail bin Mohd	Transformation Method for Solving Interval Linear Programming Problem
14.30 – 14.45	AM07	Ebenezer Bonyah and Rahat Zarin	Chaos and Multiple Attractors in Fractional Financial Model
14.45 – 15.00	AM16	Deden Cahya Maulana, Fatmawati, Windarto	Parameter Estimation and Analysis of Model on the Dynamics of Tuberculosis Transmission

PARALLEL SESSION SCHEDULES

Date : 29th September, 2020
Class : Applied Mathematics (2)
Moderator : **Dr. Windarto**
Operator : 1. Puspita Dwi Lestari
2. Ahmad Fauzi

Time	Paper IDE	Authors	Title
Parallel Session I			
10.45 – 11.00	AM08	Titin Khilyatus Sa'adah, Cicik Alfiniyah, Fatmawati	Mathematical Model of Deforestation Effects on Wildlife with Holling Type-II and Type-III Functional Response
11.00 – 11.15	AM10	E. Andry Dwi Kurniawan, Fatmawati and Miswanto	Modeling of Global Warming Effect on the Melting of Polar Ice Caps with Optimal Control Analysis
11.15 – 11.30	AM04	Werry Febrianti, Kuntjoro Adji Sidarto, and Novriana Sumarti	Solving some Ordinary Differential Equations Numerically Using Differential Evolution Algorithm with a Simple Adaptive Mutation Scheme
11.30 – 11.45	AM05	Eminugroho Ratna Sari, Lina Aryati, and Fajar Adi Kusumo	Mathematical Model of Cancer Cell: The Dynamical Analysis
Parallel Session II			
14.15 – 14.30	AM13	Windarto, Fatmawati and Nadiyah Nurlaily Nuzulia	On Mathematical Model Approach to Competition Dynamic of Shipping Companies in Surabaya
14.30 – 14.45	AM14	Nur Inayah, Muhammad Manaqib, and Wahid Nugraha Majid	Comparison of Characteristic of Furrow Irrigation Inflitration in Various Types of Soils Using Dual reciprocity Boundary
14.45 – 15.00	AM15	Diska Armeina, Endang Rusyaman and Nursanti Anggriani	Convergence of Functional Functions of Non-Homogenous Fractional Partial Differential Equation Solution Using Homotopy Analysis Method (HAM)
15.00 – 15.15	AM12	Rosita Yuliana, Cicik Alfiniyah, Windarto	Stability Analysis of SIVS Epidemic Model With Vaccine Ineffectiveness

PARALLEL SESSION SCHEDULES

Date : 29th September, 2020
Class : Computational Sciences (1)
Moderator : **Eva Hariyanti, M.T**
Operator : 1. Dinda Salsabila Yaswi
2. Nazla Firqina R

Time	Paper ID	Authors	Title
Parallel Session I			
10.45 – 11.00	CS01	Faqih Hamami, Ahmad Muzakki	Machine Learning Pipeline for Online Shopper Intention Classification
11.00 – 11.15	CS02	Dyah Ayu Permata Sari, Araeyya Yenofa Putri, Manis Hanggareni, Annisa Anjani, M. Luthfan Oktaviano Siswondo, Indra Kharisma Raharjana	Crowdsourcing As A Tool For Elicit Software Requirements
11.15 – 11.30	CS03	Sugiyarto, Joko Eliyanto, Nursyiva Irsalinda, Meita Fitrianawati	Fuzzy Sentiment Analysis Using Convolutional Neural Network
11.30 – 11.45	CS05	Ira Puspitasari, Rohiim Ariful, and Barry Nuqoba	Public Health Insights on Social Media: Using Instagram Data for Investigating Dengue Hemorrhagic Fever in Indonesia
11.45 – 12.00	CS07	Tesa Eranti Putri, Rinno Novaldianto, Indah Werdiningsih, and Barry Nuqoba	Expert System for Digital Single Lens Reflex (DSLR) Camera Recommendation Using Forward-chaining and Certainty Factor
12.00 – 12.15	CS08	Kartono, Nania Nuzulita, Kenny Everest Karnama, and Indah Werdiningsih	Handwriting Character Recognition System in Documents Containing Abbreviations Using Artificial Neural Networks
Parallel Session II			
14.30 – 14.45	CS10	Army Justitia, Badrus Zaman, and Dony Kurniawan Putra	Evaluating the Quality of a Help-Desk Complaint Management Service using Six-Sigma and

Time	Paper ID	Authors	Title
			COBIT 5 Framework
14.45 – 15.00	CS11	Adjie Suryanendra and Erma Suryani	The Analysis of Coffee Productivity and Production Improvement Strategies in Indonesia: A System Thinking Approach
15.00 – 15.15	CS04	Ayomi Sasmito and Asri Bekti Pratiwi	Stochastic Fractal Search Algorithm in Permutation Flowshop Scheduling Problem
15.15 – 15.30	CS09	S. W. Ningtiyas, A. B. Pratiwi and A. Damayanti	Solving Bi-Objective Quadratic Assignment Problem with Squirrel Search Algorithm

PARALLEL SESSION SCHEDULES

Date : 29th September, 2020
Class : Computational Sciences (2)
Moderator : **Auli Damayanti, M.Si.**
Operator : 1. Daffa' Halif Muhammad
2. Gentur Rizky Arganta

Time	Paper ID	Authors	Title
Parallel Session I			
10.45 – 11.00	CS12	Purbandini, Army Justitia, Alberto Martin Hau	User Acceptance Analysis of Bitcoin Using Unified Theory of Acceptance and Use of Technology Model
11.00 – 11.15	CS13	N Nalaratih, A Damayanti and E Winarko	Hybrid Neural Network Extreme Learning Machine and Flower Pollination Algorithm to Predict Fire Extensions on Kalimantan Island
11.15 – 11.30	CS14	B M Pratama, A Damayanti, and E Winarko	Signature Image Identification Using Hybrid Backpropagation with Firefly Algorithm and Simulated Annealing
11.30 – 11.45	CS15	Budi Dwi Satoto, Mohammad Imam Utoyo and Riries Rulaningtyas	Prediction of Pneumonia COVID19 Using A Custom Convolutional Neural Network with Data Augmentation
11.45 – 12.00	CS16	Faried Effendy, Endah Purwanti and Rizaldy Firdaus Akbar	Evaluation of E-learning: A Case Study of PsyCHE
Parallel Session II			
14.15 – 14.30	CS17	Taufik, Barry Nuqoba, Ganang Bagus Prakoso	Decision Support System for Novel Recommendation UsingAnalytical Hierarchy Process and Vikor
14.30 – 14.45	CS18	Mastri Cahyaningtyas Pediyanti, Riries Rulaningtyas, Akif Rahmatillah, and Katherine	Range of Motion Measurement of Articulatio cubiti Based on Hough Transformation
14.45 – 15.00	CS19	Ira Puspitasari, Alvin Nur Raihan Wiambodo, and Purbandini	The Impact of Confirmation of Expectations, Technology Compatibility, and Customer's

Time	Paper ID	Authors	Title
			Acceptance on Continuance Intention to Use E-Wallet
15.00 – 15.15	CS20	R. Apsari, Yudha Noor Aditya, Endah Purwanti, Hamzah Arof	Development of Lung Cancer Classification System for Computed Tomography Images Using Artificial Neural Network

PARALLEL SESSION SCHEDULES

Date : 29th September, 2020
Class : Statistics (1)
Moderator : **M. Fariz Fadillah Mardianto, M.Si.**
Operator : 1. Idrus Syahzaqi
2. Rezky Auliyaa Kaisna

Time	Paper ID	Authors	Title
Parallel Session I			
10.45 – 11.00	ST01	Prisita Nallavasthi, Siskarossa Ika Oktora	The Impact of Anti-Dumping Policy on Steel Imports Using Multi-Input ARIMA Intervention Analysis
11.00 – 11.15	ST02	M. Fariz Fadillah Mardianto, Sri Haryatmi Kartiko, and Herni Utami	The Application of Fourier series Estimator to Predict the Number Sufferer for Dengue and Malaria in Indonesia
11.15 – 11.30	ST37	Millatul Ulya and Nur Chamidah	Multi-predictor Local Polynomial Regression for Predicting The Acidity Level of Avomango (Gadung Klonal 21)
11.30 – 11.45	ST06	Arifatus Solikhah, Heri Kuswanto, Nur Iriawan, Kartika Fithriasari, and Achmad Syahrul Choir	Extending runjags: A tutorial on Adding Fisher's z Distribution to runjags
11.45 – 12.00	ST07	M. F. F. Mardianto, Sediono, N. A. Aprilianti, B. A. Ardhani, R. R. Firdaus, S. M. Ulyah	Number of Flood Disaster Estimation in Indonesia Using Local Linear and Geographically Weighted Regression Approach
Parallel Session II			
14.15 – 14.30	ST09	Winita Sulandari, Sri Subanti, Isnandar Slamet, Sugiyanto, Etik Zukhronah, and Irwan Susanto	Application of Linear and Nonlinear Seasonal Autoregressive Based Methods for Forecasting Grojogan Sewu Tourism Demand
14.30 – 14.45	ST36	R. Kustianingsih, M. F. F. Mardianto, B. A. Ardhani, Kuzairi, A.Thohari, R. Andriawan, T. Yulianto	Fourier Series Estimator in Semiparametric Regression to Predict Criminal Rate in Indonesia

Time	Paper ID	Authors	Title
14.45 – 15.00	ST08	Alan Prahutama, Suparti, Dita Anies Munawaroh, Tiani Wahyu Utami	Modeling Bivariate Poisson Regression for the Number of Maternal and Infant Mortality in Central Java, Indonesia
15.00 – 15.15	ST12	La Gubu, Dedi Rosadi and Abdurakhman	Robust Mean-Variance Portfolio Selection with Time Series Clustering
15.15 – 15.30	ST10	M. F. F. Mardianto, N. Afifah, S. A. D. Safitri, I. Syahzaqi, and Sediono	Estimated Price of Shallot Commodities National Based on Parametric and Nonparametric Approaches

PARALLEL SESSION SCHEDULES

Date : 29th September, 2020
Class : Statistics (2)
Moderator : **Siti Maghfirotul Ulyah, M.Sc**
Operator : 1. Ilma Almira Rahmayanti
2. Antonio Nikolas Manuel Bonar

Time	Paper ID	Authors	Title
Parallel Session I			
10.45 – 11.00	ST24	Syaharuddin, Habib Ratu Perwira Negara, Malik Ibrahim, Ahmad, Muhammad Zulfikri, Gilang Primajati, Via Yustitia, Suvriadi Panggabean	Modify Alpha Value of EMA Method and Brown Method: a Data Forecasting Comparison of COVID-19
11.00 – 11.15	ST11	Sediono, Elly Ana, and Fajar Muhammad Ardhiansyah	Modelling Electronic Money Transaction Volumes Using The Intervention Analysis Approach
11.15 – 11.30	ST13	Dwi Rantini, Ni Luh Putu Ika Candrawengi, Nur Iriawan, Irhamah, and Musofa Rusli	On the Computational Bayesian Survival Spatial DHF Modelling with CAR Frailty
11.30 – 11.45	ST15	Ilma Amira Rahmayanti, Christopher Andreas, Siti Maghfirotul Ulyah	Does US-China Trade War Affect The Brent Crude Oil Price? An ARIMAX Forecasting Approach
11.45 – 12.00	ST17	Fitri, D. W., Afifah, N., Anggarani, S. M. D., and Chamidah, N.	Prediction Concentration of PM2.5 in Surabaya Using Ordinary Kriging Method
Parallel Session II			
14.15 – 14.30	ST16	Christopher Andreas, Ilma Amira Rahmayanti, Siti Maghfirotul Ulyah	The Impact of US-China Trade War in Forecasting the Gold Price using ARIMAX Model
14.30 – 14.45	ST30	Septia Devi Prihastuti Yasmirullah, Bambang Widjanarko Otok, Jerry Dwi Trijoyo Purnomo, and Dedy	Multivariate Adaptive Regression Spline (MARS) Methods with Application to Multi Drug-Resistant Tuberculosis (MDR-TB) Prevalence

Time	Paper ID	Authors	Title
		Dwi Prastyo	
14.45 – 15.00	ST38	A'Yunin Sofro, Fuad Yusuf and Dimas Maulana	Analysis COVID-19 in East Java using Some Basic Statistical Modelling
15.00 – 15.15	ST31	Siti Maghfirotul Ulyah, Christopher Andreas, Ilma Amira Rahmayanti	An Approach of Vector Autoregressive with Exogenous Input in Forecasting the Effect of US-China Trade War on Gold and Oil Prices

PARALLEL SESSION SCHEDULES

Date : 29th September, 2020
Class : Statistics (3)
Moderator : **Dr. Toha Saifudin**
Operator : 1. Putri Fardha Asa Oktavia Hans
2. Haydar Arsy Firdaus

Time	Paper ID	Authors	Title
Parallel Session I			
10.45 – 11.00	ST21	Dyah Putri Rahmawati, I Nyoman Budiantara, Dedy Dwi Prastyo and Made Ayu Dwi Octavanny	Bi-response Spline Smoothing Estimator for Modelling the Percentage of Poor Population and Human Development Index in Papua Province
11.00 – 11.15	ST33	Amin Tohari, Nur Chamidah and Fatmawati	Modeling The Number of Confirmed and Suspect Covid-19 Cases in East Java Using Local Linear Bi-response Negative Binomial Regression Approach
11.15 – 11.30	ST23	Toha Saifudin, Fatmawati and Nur Chamidah	The Performance of Goodness -of -Fit Test -Procedure on Geographically -Weighted-Polynomial -Regression Model
11.30-11.45	ST05	Siti Nur Indah Rofiqoh, Raditya Sukmana, Ririn Tri Ratnasari, Siti Maghfirotul Ulyah and Muhammad Ala'uddin	Cash Waqf development on microfinance-Waqf: Do they need entrepreneurship?
11.45 – 12.00	ST25	Wahyu Wibowo, Rahmi Amelia, and Fanny Ayu Octavia	Classification Using Nonparametric Logistic Regression
Parallel Session II			
14.15 – 14.30	CS06	Aeri Rachmad, Nur Chamidah, Riries	Classification of Mycobacterium Tuberculosis Based on Colour Feature Extraction Using Adaptive

Time	Paper ID	Authors	Title
		Rulaningtyas	Boosting Method
14.30 – 14.45	ST27	Hasih Pratiwi, Winda Haryanto, Sri Subanti, I Wayan Mangku, Kiki Ferawati	A Self-Exciting Point Process with Trend Component, Triggering Function, and Response Function
14.45 – 15.00	ST28	Mohtar Rasyid	Meta Regression Application for Detecting Publication Bias and Variation of Results in Economic Research
15.00 – 15.15	ST32	Toha Saifudin and Windarto	Prediction of Dengue Infection Severity Using Classic and Robust Discriminant Approaches

PARALLEL SESSION SCHEDULES

Date : 29th September, 2020
Class : Statistics (4)
Moderator : **Dr. Nur Chamidah**
Operator : 1. Bagus Adhi Wicaksono
2. Rheinata Saskya Aziizah Djohan

Time	Paper ID	Authors	Title
Parallel Session I			
10.45 – 11.00	ST03	Helida Nurcahayani, I Nyoman Budiantara, Ismaini Zain	The Semiparametric Regression Curve Estimation by Using Mixed Truncated Spline and Fourier Series Model (Case Study: Human Development Index in East Java)
11.00 – 11.15	ST14	Made Ayu Dwi Octavanny, I Nyoman Budiantara, Heri Kuswanto and Dyah Putri Rahmawati	Modeling the Percentage of Pneumonia Cases in Java Island Using Two Estimators of Nonparametric Regression for Longitudinal Data
11.15 – 11.30	ST18	Subanar, and Winita Sulandari	A Comparison Forecasting Methods for Trend and Seasonal Indonesia Tourist Arrivals Time Series
11.30 – 11.45	ST20	Nur Chamidah, Budi Lestari, Anies Y. Wulandari and Lailatul Muniroh	Z-Score Standard Growth Chart Design of Toddler Weight Based on Least Square Spline Estimator of Semiparametric Regression Model
11.45 – 12.00	ST22	Muhammad Ahsan, Muhammad Mashuri, Hidayatul Khusna, Wibawati	Bootstrap Based T2 Chart with Hybrid James Stein and Successive Difference Covariance Matrix for Network Intrusion Detection
Parallel Session II			
14.15 – 14.30	ST34	S. A. D. Safitri, F. A. Putri, B. A. Ardhani, N. Chamidah	Co-Kriging Method Performance in Estimating Number of COVID-19 Positive Confirmed Cases
14.30 – 14.45	ST04	Rudianto Artiono	Bayesian Hierarchical Model For Mapping Positive Patient Covid-19 in Surabaya, Indonesia

Time	Paper ID	Authors	Title
14.45 – 15.00	ST26	Sri Subanti, Arif Rahman Hakim, Winita Sulandari	The Determinant of Entrepreneurial Work for Elderly in Indonesia
15.00 – 15.15	ST35	N. Chamidah, S. D. Febriana, R. A. Ariyanto and R. Sahawaly	Fourier Series Estimator for Predicting International Market Price of White Sugar