ISCPMS 2016

UNIVERSITAS INDONESIA

FMIPA

2nd International Symposium on Current Progress in Mathematics and Sciences 2016

PROGRAM & ABSTRACT BOOK

ISMART 2016

International Science and Mathematics Academics Research Talks 2016

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Veritas, Probitas, Iustitia

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FOREWORD

Dear symposia participants,

It is our pleasure to welcome you to the 2nd International Symposium on Current Progress in Mathematics and Sciences 2016 (2nd ISCPMS 2016) in Depok, Indonesia. The first event began in 2015. The scope of the symposium includes mathematics and its applications, theoretical and applied physics, chemistry, biology, and geosciences. This year, another symposium for fresh graduate and undergraduate students in mathematics and sciences called the International Science and Mathematics Academics Research Talks (ISMART), held in conjunction with this symposium. With ISMART, fresh graduate and undergraduate students get the experience to present their research findings to a larger audience. They also get the opportunity to meet and discuss with other researchers who attended the symposium.

The two-day scientific program will begin on Tuesday morning with the keynote lectures. The remaining program is organized in seven parallel sessions each day with a total of 8 invited talks, and 221 contributed presentations to the 2nd ISCPMS coming from six countries, namely Indonesia, the Netherlands, Australia, Taiwan, Malaysia, and Pakistan. There will be 51 presentations of mathematics and its applications, 73 of theoretical and applied physics, 23 of chemistry, 28 from the biological sciences, and 46 presentations of geoscience. There are about 44 papers submitted to the ISMART. We hope the program and pleasant environment will help to stimulate the exchange of ideas, identification of common problems across different areas, and cross-border solutions, as well as new collaboration and friendship.

Finally, the committee would like to express our sincere thanks to the numerous students, friends, and colleagues who helped make these symposia a success. We are very grateful to the efforts of the scientific committee to review of the abstract and DRPM UI to monitor the preparation of the symposia. We are deeply thankful to the Rector and Vice-Rectors of the Universitas Indonesia especially Vice-Rector of Research and Innovation for the generous financial support, Dean and Vice-Deans of the Faculty of Mathematics and Natural Sciences, Universitas Indonesia on their full support and our sponsors FEI Instruments and PAN Analytical for their contributions. Enjoy all the things offered by these symposia and look forward to sharing these with you in Depok.

On behalf of the committee,

Dr.Djoko Triyono
Chairman of the symposia

COMMITTEES

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Herman P. Spaink, The Netherlands
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Dicky Rahmadi A., HAGI
L.T. Handoko, LIPI
Hartono, IGI

CONFERENCE PROGRAMS

2nd ISCPMS 2016 AND ISMART PROGRAM

TUESDAY, NOV 1, 2016			
07.30-08.15	**RE-REGISTRATION**		
08.15-08.25	**OPENING CEREMONY** Welcoming Remarks by The Dean of FMIPA Universitas Indonesia Dr.rer.nat. Abdul Haris		
08.25-08.35	Opening Remarks by The Rector of Universitas Indonesia, Prof. Dr. Ir. Muhammad Anis, M.Met		
08.35-08.50	PHOTO SESSION		
08.50-09.20	**PLENARY 1**: . Dr. Muhammad Dimyati Director General of Research and Development Strengthening The Ministry of Research and Technology, and Higher Education		
09.20-10.00	**PLENARY 2**: Prof. Dr. Geert de Snoo *Biodiversity and Sustainability in Rural Areas*		
10.00-10.40	**PLENARY 3**: Prof. Dr. Thomas Palstra *Electrical Detection of Spiral Spin Structures in Pt/Cu2OSeO3 Heterostuctures*		
10.40-11.00	COFFEE BREAK		
11.00-11.40	**PLENARY 4**: Prof. Dr. Katja Loss *Enzymatic Polymerizations-Novel Ways to (New) Polymer Systems*		
11.40-12.20	**PLENARY 5**: Prof. Dr. Hubertus Irth *Bioscience: The Science Base of Health*		
12.20-13.20	LUNCH BREAK		
13.20-14.00	**PLENARY 6:** Prof. Dr. Phill Pollett *A Metapopulation Model Incorporating Landscape Dynamics*	**PLENARY 7:** Prof. Dr. Terry Mart *Hunting for Nucleon Resonances*	**PARALLEL SESSION 1 (5 ROOMS)**
14.00-15.00	**PARALLEL SESSIONS 2 (7 ROOMS)**		
15.00-15.30	COFFEE BREAK		
15.30-17.00	**PARALLEL SESSIONS 3 (4 ROOMS)**		
17.00-18.30	EVENING BREAK		
18.30-20.00	**GALA DINNER**		

WEDNESDAY, NOV 2, 2016		
07.30-08.00	RE-REGISTRATION	
08.00-08.40	**PARALLEL SESSIONS 4 (9 ROOMS)**	
08.40-09.20	**PLENARY 9:** Prof. Dr. Hsiang-Lin Liu *Optical Properties of Two-Dimensional Materials*	**PARALLEL SESSIONS 5 (8 ROOMS)**
09.20-10.00	**PLENARY 10:** Prof. Dr. Kuo-Chen Liu *Organic Electronics Research and Its Applications*	
10.00-10.15	COFFEE BREAK	
10.15-11.55	**PARALLEL SESSIONS 6 (9 ROOMS)**	
11.55-12.55	LUNCH BREAK	
13.00-15.40	**PARALLEL SESSIONS 7 (9 ROOMS)**	
15.45-16.00	COFFEE BREAK	
16.00-17.00	**PARALLEL SESSIONS 8 (9 ROOMS)**	
17.00-17.30	CLOSING REMARKS	

TUESDAY, NOV 1, 2016

13.20-14.00 — PLENARY

PLENARY

PLENARY

14.00-15.00

M1

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2123	Stock Portofolio Optimization using Priority Index and Genetic Algorithm	Very Dwi Vasiani, Bevina D. Handari, Gatot F. Hertono
2434	One Prey-Two Predator Model with Prey Harvesting in a Food Chain Interaction	Irsha Marditya Sayekti, Dipo Aldila, Maulana Malik
2971	Application of Machine Learning on Brain Cancer Multiclass Classification	Vinezha Panca, Zuherman Rustam
3457	Lungs Cancer Classification using Kernel Based Selection of Gene Function	Melati Vidi, Zuherman Rustam
937	Differential Cryptanalysis on 8 Rounds KLEIN-64	Sofyan Reza Ferianto, Annisa Dini Handayani

P1

1884	Kaon Photoproduction in Field Theoretical and Multipoles Approaches	Terry Mart
4066	The Diagonal Hopping Dependent I-V Characteristics of Periodic DNA Molecule	Efta Yudiarsah
2888	Neutrino Oscillation Parameters in A Two-Loop Neutrino Mass Model with Leptoquarks	J. Julio
3989/5135	Mathematical Modeling of Photovoltaic Thermal PV/T System with V-groove Collector	Muhammad Zohri, Ahmad Fudholi, Mohd Hafidz Ruslan, Kamaruzzaman Sopian
5046	The Influence of Fe_2O_3 Extracted from Iron Sand on MgH_2 Thermal Properties of MgH_2 for Hydrogen Storage Material Application	Zulkarnain Jalil, Mustanir, Adi Rahwanto

B1

3757	Physiology Response on Indigenous Cattle Breeds In West Sumbawa, Indonesia	S.B. Aritonang, R. Yuniati, Abinawanto, M. Imron, A. Bowolaksono
3055	Assessment and Mapping of Land Use Trade-Off in the Orangutan Habitat	Pahrian G. Siregar, Raldi A. Koestoer, Djoko Harmantyo, Jatna Supriatna
3213	Comparative Study of Freshwater Crayfish, Cherax sp. (Crustacea: Decapoda: Parastacidae) from Papua, Indonesia based on Length-Weight Analyses	H. Hamidah, Abinawanto, A. Laksono, Kadarusman
3899	Determination and Arrangement of Enzyme Lactate Dehydrogenase Isozyme *Bacillus sp. Strain* BG as A Device Identity Important Bacteria Agent Compost	Dalia Sukmawati
3734	The Local Knowledge of Edible Plants used by Karo Ethnic in Semangat Gunung Village, Karo Regency, North Sumatra, Indonesia	Nisyawati, Rani Nur Aini, Marina Silalahi, Endang Christine Purba, Nur Avifah
3224	The Total Body Length and Body Weight Examination among Gudgeon Fish Population, Oxyeleotris heterodon, Weber, 1907 (Pisces: Eleotridae) of Sentani Lake, Papua, Indonesia	E. D. Sriyani, Abinawanto, A. Laksono, Kadarusman
4027	Bioeconomy Overview of Fish Resources Ikan Tembang (Sardinella fimbriata, Valenciennes 1847) in Kota Tegal and Rembang in Central Java Province	Eka Kurniadi

C1

2874	Identification of Nonvolatile Compounds in Clove (*Syzygium aromaticum*) from Manado	Ahmad Fathoni, Endang Saepudin, Antonius Herry Cahyana, Dyah Utami Cahyaning Rahayu, Jamal Haib
3308	Cytotoxic Chalcones from Some Indonesian Cryptocarya	Fera Kurniadewi, Yana M. Syah, Lia D. Juliawaty, Euis H. Hakim, Kiyotaka Koyama and Kaoru Kinoshita
3551	Molecular Interaction Study of Commercial Cyclic Peptides and MERS-COV Papain-Like Protease PLPRO as Novel Drug Candidate for MERS-COV	Mochammad Arfin Fardiansyah Nasution, Muhammad Ghaazi Azzuhdi, Usman Sumo Friend Tambunan
2876	Analysis of Chemical Constituents in Clove Bud Oil (Syzgium aromaticum) Java and Manado	Bunga Amelia, Endang Saepudin, Antonius Herry Cahyana, Dyah Utami Cahyaning Rahayu, Jamal Haib
3773	Efficient Dynamic Molecular Simulation using QSAR Model to Know Inhibition Activity in Breast Cancer Medicine	Eysa Kusumowardani, Adina Zharifah, Akbar Saputro, Dewi Sarwinda
2878	Effect of Oven Drying and Storage on Essential Oil Content and Composition of Clove (Syzygium aromaticum) from Bali and Toli-toli	Vegi Wahyu Murni, Endang Saepudin, Antonius Herry Cahyana, Dyah Utami Cahyaning Rahayu, Jamal Haib
3554/5004	Preparation of Demipermanent and Semipermanent Hair Dyes Gels from ethanol Extract of Caesalpinia sappan L. Using Carbomer as Gelling Agent	Teti Indrawati, Alfi Syahrin, Irpan
3812	Chemical Constituents and Potential Cytotoxic Activity of Myristica fatua Houtt Leaves	Sofa Fajriah, Megawati, Sumi Hudoyono, Soleh Kosela, Muhammad Hanafi
3877	Study of the Effect of Ammonia Source on the Sensitivity of Modified Hybrid Cu^{2+}/NaY/ZSM-5/IDC Zeolite Ammonia Gas Sensor	Elsita Lisnawati, Yuni K. Krisnandi, Djoko Triyono

G1

1826	Separation Method of Anomaly Source on the Time Lapse Microgravity Data	Supriyadi, Sarkowi
1883	Spring Characteristics in Rawapening Watershed	Annisa Dwi Hafidah
1960	Geological History of Mengkarang Formation for Enhancing the Geodiversity of Merangin Geopark	Aditya Dwi Prasetio, Reza Syahputra, Twin H. W. Kristyanto, Albert S. Tempessy, Rokhmatuloh
3983	The Return of "Gasoline Station-Park" Status into Green-Open Space in DKI Jakarta Province	Lady Hafidaty Rahma Kautsar, Tarsoen Waryono, Sobirin
2078	Continuity of Permian Mengkareng Formation through GPR Interpretation in Merangin Geopark	Fitra Hanif, Reza Syahputra, Twin H. W. Kristyanto, Albert S. Tempessy, Rokhmatuloh
2255	Organic Shale Analysis Using Geochemical Data and Seismic Attributes: Case Study of Talang Akar Formation, South Sumatera Basin	Prima Erfido Manaf, Supriyanto, Abdul Haris, Alfian Usman
2793	Spatial Habitat of Eel Larva Habitat at Cimandiri Estuary, West Java	Noverita Dian Takarina, Supriatna
2185	Shale Gas Characterization based on Geochemical and Geophysical Analysis: Case Study in Brown Shale, Pematang Formation, Central Sumatra Basin	Nadia Nastria, Abdul Haris, Dindot Soebandrio
2896	Application of Seismic Attribute Method to Identify Strike Slip Fault Structure Carbonate Reservoir Basin Area East of Java	Fitria Yunov, Supriyanto, Wahdanadihaidar
2931	Stratigraphic Trap Potential Bekasap Formation on High Basement, XYZ Field, Central Sumatra Basin, based on Stratigraphic Analysis and Seismic Attribute	Hidayattul Hendra, Abdul Haris
2220	Geochemistry Analysis of Shale Gas based on Log and 3D Seismic in Pematang Formation XY Well, Sumatera Tengah Basin	Martogu Benedict Marbun, Abdul Haris

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4361	Ca-doped LTO using Waste Eggshells as Ca Source with Improve of Discharge Capacity for Anode Material of Lithium-ion Battery	Dedy Setiawan, Achmad Subhan, Sitti Ahmiatri Saptari
6031	Effect of Sr Substitution on the Electrical Properties of $La_{1-x}Sr_xFeO_3$ Nano-Crystalline Materials	Christopher Alexander Kafa, Djoko Triyono, Heidi Laysandra
6041	Photo-, Sono-, and Photosonocatalytic Activity of Metal Oxide Nanocomposites TiO2/CeO2 for Degradation of Dye	Afifah Muzaki, Hendry Tju, Ardiansyah Taufik, Rosari Saleh
6034	Discoloration of Organic Dyes using Zeolites Supported Fe-doped ZnO under UV Light Irradiation	Margaretha Indra Pratiwi, Nur Afifah, Rosari Saleh
6044	Sonocatalytic and Photosonocatalytic Activity of Ternary Fe3O4/CeO2/ZnO for Waste Water Removal	Faurul Fitri Harno, Ardiansyah Taufik, Rosari Saleh
6048	Design of Human Controlled 1 DOF Right Hand Exoskeleton using Electromyography Signal	Muhammad Azzam, Sastra Kusuma Wijaya, Prawito
6036	Magnetic LaMnO3/Fe3O4 as Reusable Catalyst for Photocatalytic Degradation of Methylene Blue	Yulia Dwi Susanti, Nur Afifah, Rosari Saleh
6033	Photocatalytic Performance of Fe_3O_4/TiO_2/Ag Nanocomposites for Photocatalytic Activity under Visible Light Irradiation	Malleo Fauzian, Ardiansyah Taufik, Rosari Saleh
6038	Enhanced Photo-, Sono- and Photosonocatalysis of Methylene Blue via SnO2 Nanoparticle Supported on Nanographene Platelets (NGP)	Valentinus Paramarta, Ardiansyah Taufik, Rosari Saleh
6040	Photo-, Sono- and Sonophotocatalytic Degradation of Methylene Blue using Fe3O4/ZrO2 Composites Catalysts	Yogi Kristianto, Ardiansyah Taufik, Rosari Saleh
6042	Degradation of Methylene Blue (MB) Using ZnO/CeO2/Nanographene Platelets (NGP) Photocatalyst: Effect of Various Concentration of NGP	Hesni A. Shabrany, Hendry Tju, Ardiansyah Taufik, Rosari Saleh

UC

6029	Unexpected Synthesis of Cinnamaldehyde-Dimedone Adduct using Samarium (III) Chloride	Antonius Herry Cahyana, Aisyah Nadila, Bayu Ardiansah
5158	Ultrasound-Assisted Synthesis of Curcumin Analogs Promoted by Activated Chicken Eggshells	Lina Mardiana, Bayu Ardiansah, Ayu Septiarti, Ridla Bakri
4837	Green Synthesis of Silver Nanoparticles (AgNP) using Red Dragon Fruit Peel (Hylocereus polyrhizus)	Heru Darmaga Putra, Yoki Yulizar
4194	Study of Synthesis Ligand 2-(1,5-diphenil-4,5-dihydro-1H -pyrazol-3-yl)pyridine as Fluorosensor Heavy Metal Ions Cu2+, Cd2+ dan Pb2+	Hastin Setiani, Agustino Zulys
4033	Identification of Non-volatile Compound in Cloves (Syzygium aromaticum) From Java	Erlina Mei Rahmawati
4744	Synthesis and Characterization of Pyrazoline [4,5-dihydro-1H-pyrazole-3,5-diyl] from Chalcone Compound using Activated Chicken Eggshell	Nuraini Pahlawati Aziza
4737	Synthesis and Characterization of Pyrazoline Compound (4-[3-(2-hydroxyphenil)-4,5-dihydro-1H-pyrazol-5-il]-2-metoxyphenol) from Chalcone Compound using Activated Chicken Eggshell Impregnated Natrium (Na-ACE) Catalyst	Siti Sarah Qomariah

15.00-15.30 — COFFEE BREAK

15.30-17.00

C2

3957	Identification of Novel Ebola Virus (EBOV) VP24 Inhibitor from Indonesian Natural Products by using In Silico Drug Design Approach	Usman Sumo Friend Tambunan, Mochammad Arfin Fardiansyah Nasution
3992	Synthesis of 2-(1,5-Difenil-4,5-Dihydro-1H-Pyrazole-3-yl)Pyridine Iron (II) Complexes as a Fluorosensor for Cyanide Ion	Rustikawati, Agustino Zulys
4003	Characterization of Superabsorbent Hydrogel based on Epichlorohydrin Crosslink and Carboxymethyl Functionalization of Cassava Starch	Salih Muharam, Lela Mukmilah Y, Maryam Rachmawati S
4015	Synthesis of ZSM-5 Zeolite from Bayat Natural Zeolite as Silica and Alumina Sources	Rohayati, Yuni K. Krisnandi, Riwandi Sihombing

G2

2045	Seismotectonic Study to Improve the Awareness of Earthquake in Merangin National Geopark, Jambi	Adhinda Maharani, T. H. W. Kristyanto, Reza Syahputra, Albert S. Tempessy, Rokhmatuloh
2794	The Degradation Level of Mangrove at Lhokseumawe, Aceh	Dewi Susilowingtyas, Tuty Handayani, Naila Amalia, Ghesa Meilinda Rachmawati
2995	Lithofacies Characterization of Sandstone of Gumai Formation using Poisson Impedance in Nenggala Field, Jambi Sub-Basin	Yudha Nenggala, Supriyanto, Abdul Haris, Rusalida Raguwanti
3533	Spatial Pattern Local Wisdom Education of Mangrove at Lhokseumawe City, Aceh	Naila Amalia Dewi Susiloningtyas, Tuty Handayani, Ghesa Meilinda, Rachmawati
2899	Analysis Geothermal Prospect of Endut Mountain used Gravity and Geochemistry Methods	Robi Sobirin, Supriyanto
2956	Fracture Modeling for Basement Reservoir: Case Study at North East Betara Gas Field, South Sumatra Basin	Mohammad Risyad, Abdul Haris
2894	The Importance of Bulk Density Determination in Gravity Data Processing	Dadan Wildan, Agie Maliki Akbar, KMS Novranza, Supriyanto

UG

3636	Identification of Hydrothermal Alterations using Dar-Zarouk Parameters and Concept of Anisotropy for 2D Resistivity Data	Adilla Okita Permatasari, Supriyanto, Agus Kuswanto
5130	Spatial Pattern of Water Scarcity Area in Lebak, Banten	Rhefita Ardhana Riswari, Sobirin, Ratna Saraswati
5751	Subsurface Structure Identification on the South Lampung using Horizontal Gradient (HG), Euler Deconvolution (ED) and Second Vertical Derivative (SVD) Method on the Gravity Data	Supriyanto, Tasmika, Thowwafi
6030	Study of Spatial Changes in Delta Ci Punagara Year 1972-2015 using Landsat Satellite Imagery Data	Aji Wicaksono, Supriatna, Astrid Damayanti
3702	Thematic Parks: Revival of Bandung's Identity as Flower City	Devina Widya Putri

UB

4687	Study of bcl-2 and bax mRNA Expression to Apoptosis Incidence in Granulosa Cells of Endometriosis Patients	Naylah Muna, Anom Bowolaksono, Budi Wiweko
4741	Composition and Diversity of Fish Species in Seagrass Bed Ecosystem at Muara Binuangeun, Lebak, Banten	Noer Kholis, Mufti Petala Patria, Titi Soedjiarti
4753	The Ontogeny Studies of Tarebia granifera (Lamarck, 1822) from Indonesia (Gastropoda: Cerithioidea: Thiaridae)	Nur R. Isnaningsih, Adi Basukriadi, Ristiyanti M. Marwoto
6035	Identification of Maturase K (matK) Gene on Cacao (Theobroma cacao L.): Trinitario (from Lampung and Sumatera Barat) and Forastero (from Sulawesi and Intoduction)	Sarah Imanissa, Irvan Faizal, Andi Salamah, Indah Anita Sari, Agung Wahyu Susilo
4681	Subacute Toxicity Test of Ethanol Estract Artocarpus camansi Leaves on Kidney Male Rats (Rattus norvegicus L.) Sprague-Dawley Strain Reviewed from Chreatinine Levels	Lutfia Hasyim Ikramani
4658	Subacute Toxicity Test of Ethanol Extract Artocarpus camansi Leaves on Hepar of Male Rats (Rattus norvegicus L.) Sprague-Dawley Strain Reviewed From Serum Glutamic Pyruvic Transaminase (SGPT) and Serum Glutamic Oxaloacetic Transaminase (SGOT) Levels	Indah Permatasari
3422	Identification of Maturase K (*mat K*) Gene in Trinitario Cocoa Plant (Theobroma cocoa L.) From Lampung and Central Java	Lestari Putri Dermawan

WEDNESDAY, NOV 2, 2016

08.00-08.40

ROOM 1 - ISCPMS	C3	
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3918	Carbon Dioxide Capture by Methyl Diethanol Amine Impregnated Mesoporous Carbon	Novie Ardhyarini, Yuni K. Krisnandi
3941/5075	Purification of Aflatoxin B1 Antibody for the Development of Aflatoxin Biosensor	Eko Anjang Budi Prihantoro, Endang Saepudin, Tribidasari A. Ivandini
4069	Isolation, Amplification and Characterization of Foodborne Pathogen Disease Bacteria Gene for Rapid Kit Test Development	Muktiningsih Nurjayadi, Imam Santoso, Irma Ratna Kartika, Fera Kurniadewi, Vira Saamia, Winda Sofihan, Dini Nurkhasanah

ROOM 2 - ISCPMS	G3	
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2838	Determining Fault Structure using First Horizontal Derivative (FHD) and Horizontal Vertical Diagonal Maxima (HVDM) Method: A Comparative Study	Mohammad Syamsu Rosid, Hasrianti Siregar
2885	The Mapping of Distribution Reservoir based Stochastic Inversion Method Integration with Seismic Multiattribute MZ Fields, Central Sumatra Basin	Muzi Novriyani, Supriyanto, Rizky Hidayat
2170	Pore Pressure Prediction in Laminated Shally Sand Reservoir: A Case Study of Bintuni Basin	Efendy Parlindungan, Abdul Haris

ROOM 3 - ISCPMS	M2	
2983	(Strong) Rainbow Connection on the Splitting of 3-Path	Fendy Septyanto, Kiki Ariyanti Sugeng
3451	Forecasting Indonesian Stock Market using A Hybrid Fuzzy Time Series Model Based on ANFIS and Integrated Nonlinear Feature Selection	Zuherman Rustam, Anita Setianingrum
4110	Data Acquisition System of 16-Channel EEG Based on ATSAM3X8E Arm Cortex-M3 32-Bit Microcontroller and ADS1299TI	Sastra Kusuma Wijaya, Prawito, Arief Sudarmaji, La Ode Husein Z Toresano, Cholid Badri
4113	Analysis of Health in Health Centers Area in Depok Using Correspondence Analysis and Scan Statistic	Choirul Basir, Yekti Widyaningsih, Dian Lestari

ROOM 4 - ISCPMS	P2	
1906	Kaon Photoproduction Processes (Symbol) and (Symbol) from Thresholds up to W = 2 GeV	Ahmad Rusli, Terry Mart
3021	Parameterization of Form Factor of K-P Interaction Model Based on One Hadron Exchange	Abdul Lathiif A Alam, Agus Salam, Imam Fachruddin
1902	Hyperon Resonances with Spin-5/2 in Kaon Photoproduction	Adnan Isnain N, Terry Mart
3032	K-P One-Hadron-Exchange Potential Model	Khairi Trisnayadi, Imam Fachruddin, Agus Salam

ROOM 1 - ISMART	UM1	
3814	Encrypting the Compressed Image by Arithmetic Coding with Logistic Map	Raditya Rinaldi, Suryadi, Yudi Satria
4048	Model for Influenza Spread using Continuous Time Markov Chain	Udut Damero, Fevi Novkaniza, Dipo Aldila
4711	Courses Scheduling in Mathematics Department Universitas Indonesia	Andini Ika Fitri, Samsul Rahmadani, Kevin Pradipta, Rendi, Silmi Karmila, Olivera Siti Nataza, Kiki Ariyanti Sugeng
4729	Determinant of Antiadjacency Matrix of Union and Join Operation from Two Disjoint of Several Classes of Graphs	Marisa Edwina, Kiki A. Sugeng

ROOM 5 - ISCPMS	M3	
2682	Improved Ant Colony Optimization Algorithm to Solve Scheduling Batching Machines Problem	Muhammad Wildan, Dipo Aldila
2696	Graceful Labeling for Some Supercaterpillar Graph	Regina N. Pakpahan, Ichsani Mursidah, Ika Dwi Novitasari, Kiki Ariyanti Sugeng
2864	A Fuzzy Logic Model to Forecast Stock Market Momentum in Indonesia's Property and Real Estate Sector	Hulyani Kin Penawar, Zuherman Rustam
2948	Qualitative Study of National Education Standard in National Education System using KSIM Cross-Impact	Fadli Arridjal, Dipo Aldila, Alhadi Bustamam

ROOM 6 - ISCPMS	P3	
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2959	Electrical Properties of $La_{0.67}Sr_{0.33}Mn_{0.7}Ni_{0.3}O_3$ Synthesized by Sol-Gel Method	Utami Widyaiswari, Budhy Kurniawan, Rachmat Andika, Wahyu Dian Laksanawati, Indah Fauziyah, Agung Imaduddin
2961	Physical and Microwave Characterization of Barium Hexaferrite Nanoparticles in Conductive Pani Matrix	Banu Nursanni, Mas Ayu Elita Hafizah, Azwar Manaf
2992	The Influence of Ca-Doping on Structure and Microstructure of $La_{0.7}(Ba_{1-x}Ca_x)_{0.3}MnO_3$	Budhy Kurniawan, Suci Winarsih, Athessia Naomi N, Wilujeng Laksmi

ROOM 7 -ISCPMS	P4	
2963	Control System of Hexacopter using Color Histogram Footprint and Convolutional Neural Network	Ricky Nauvaldy Ruliputra, Surya Darma
1959	Build A Water Tank Shape with Maximum Velocity of Flow of Water: Quantitative Analysis	A. Kevin, F. F. Addini, N. H. Ramadan, T. Rachmansyah, A. F. Natoras, M. R. Adha, D. Aldila
2873	A Simple Method for Obtaining BPS Equations of Vortices	Ardian Nata Atmaja
1841	Design of Very Low Frequency Vibration Exciter with Single Degree of Freedom	Muhammad Haekal Habibie, Ghufron Zaid, Prawito

08.40-09.20

ROOM 1 - ISCPMS	C3	
3305/5076	Bioethanol Production by Simultaneous Saccharification and Fermentation (SSF) using Agricultural Waste Corn Cobs	Octaviany M, Endang S, Apridah C D, Yopi
3993	Composite Photocatalys Synthesis of TiO_2/CNT and Its Capability of Degrading 1.4-Dioxane Compound	Mohamad Junaedi, Ridla Bakri
3949	Synthesis and Characterization of Mesoporous ZSM-5 Zeolite using PDDA-Cl and CTABr as Secondary Templates: Effect of Template Polarity	Tahta Muslim Karim, Yuni K. Krisnandi

ROOM 2 - ISCPMS	G3	
4416	Shale Characterization on "RK" Field, Barito Basin, Southeast Kalimantan for Shale Hydrocarbon Exploration	Taufan Amersia Sumotarto, Abdul Haris, Alfian Usman
2022	Combination of Well Data Analysis, Seismic Inversion and Amplitude Versus Offset for Reservoir Characterization in B-1 Field, South Palembang Sub Basin	Muhammad Ardian Pratama, Supriyanto
4013	Calculation the Highest Leak Level of Water Pipe Lines Region at PDAM Tirta Kahuripan using Fuzzy C–MEANS and ARCGIS Method Analysis	Diyan Parwatiningtyas, Erlin Windia Ambarsari, Selli Mariko

ROOM 3 - ISCPMS	M2	
2718	Robust Control of A Brushless Servo Motor using Sliding Mode	Radita Arindya
3960	Fuzzy Kernel K-Medoids Algorithm for Anomaly Detection Problems	Zuherman Rustam, Aini Suri Talita
4119	Numerical Analysis on Determinant Some Centrosymmetric Matrix	Nur Khasanah, Farikhin, Bayu Surarso

ROOM 4 - ISCPMS	P2	
1948	Photoproduction of $K^+\Lambda$ in A Multipole Approach Revisited	S. Sakinah, T. Mart
3013	Form Factor Parametrization for A Model of K^+p One-Hadron-Exchange Potential	Fitya Fikriyah, Imam Fachruddin, Agus Salam
1941	Contribution of Spin-7/2 and -9/2 Nucleon Resonances in Kaon Photoproduction Off the Nucleon	Samson Clymton, Terry Mart

ROOM 1 - ISMART	UM1	
4747	Extreme Value Theory (EVT) Application on Estimating the Distribution of Maxima	Fajri Anggraeni Ramadhani, Siti Nurrohmah, Mila Novita
6052	Credit Rating Calculation of Micro, Small and Medium Enterprises (MSMEs) using Fuzzy Logic System	Dini Agustini, Zuherman Rustam
5982	Strict Avalanche Criterion (SAC) Test on Lightweight Blockcipher Algorithms	Sofyan Reza Ferianto, Annisa Dini Handayani

ROOM 5 - ISCPMS	M3	
2865	The Determinant of An Antiadjacency Matrix of A Directed Cycle Graph with Chords	Ditya Diwyacitta, Adi Prasinda Putra, Kiki Ariyanti Sugeng, Suarsih Utama
2427	An Ant Colony Optimization Algorithm to Solve Fixed Destination Multi-Depot Multiple Traveling Salesman Problem with Non-Randomly Parameters	Tara Ramadhani, Gatot F. Hertono, Bevina D. Handari
2781	Algebraic Connectivity Optimization in Flight Routes Addition Problem using Tabu Search Method	Esther Monique Ulita Lumbanraja, Kiki Ariyanti Sugeng, Nora Hariadi

ROOM 6 - ISCPMS	P3	
4127	Effect of Addition of Butyl Benzyl Phthalate Plasticizer and Zinc Oxide Nanoparticles on Mechanical and Thermal Properties of Cellulose Acetate Butyrate/Organoclay Biocomposite	Bimo Ary Pujangga Putra, Ariadne L. Juwono, Nurul Taufiqu Rochman
2982	Performance of Optical Biosensor using Alcohol Oxidase Enzyme for Detection of Formaldehyde	Ayu Puspita Sari, A Rachim, Nurlely, Vivi Fauzia
2977/5174	The Effect of Gold Nanoparticles on the Range of Detection of Formaldehyde Biosensor Based on Alcohol Oxidase Enzyme	Anita Eka Putri, Ni Made Manik Savitri Narayani, Nurlely, Vivi Fauzia

ROOM 7 -ISCPMS
PLENARY

09.20-10.00

ROOM 1 - ISCPMS	C3	
2882	Influence of Sun Drying Process and Prolonged Storage on Composition of Essential Oil from Clove Buds (*Syzygium aromaticum*)	Lisnawati Tri Hastuti, Endang Saepudin, Antonius Herry Cahyana , Dyah Utami Cahyaning Rahayu, Jamal Haib
2320	In Vitro Study of DNA Adduct 8-OHdG Formation from 2'-Deoxyguanosine-5'-monophosphate with Benzene through Fenton Reaction	Budiawan, Rismayanti Erlindah, Intan Cahaya Dani
2723	Green Synthesis of Gold Nanoparticles with Polyciasfruticosa Leaf Extract for Reduction Methylene Blue	Yoki Yulizar, Qurrota Ayun

ROOM 2 - ISCPMS	G3	
3882	Assessment of Soil Erosion Risk in Komering Watershed, South Sumatera, using SWAT Model	Annisa Salsabilla, Eko Kusratmoko
4114	Brittleness Analysis from Well Log and 3D Seismic Data in Pematang Formation, Central Sumatera Basin	Muhammad Bimo Wicaksono, Abdul Haris, Andang Bachtiar
4230	Stratigraphic and Seismic Attribute Analysis: Case Study of Bekasap Formation on High Basement, Central Sumatra Basin	Hidayattul Hendra, Abdul Haris

ROOM 3 - ISCPMS	M2	
2987	The Application of Network Flow Optimization in Distributing Relief Goods at Disaster Area	Zainul Alfan, Dipo Aldila, Kiki Ariyanti Sugeng
4115	Infant Mortality and Lack of Health Service in Depok: An Application of Hotspot Detection using Spatial Scan Statistic	Dita Irmayani Siregar, Yekti Widyaningsih

ROOM 4 - ISCPMS	P2	
4084	Comparison of Leaf and Stem Bark Extract of *Diospyros discolor* as Reduction Agents in Biosynthesis of Silver Nanoparticles	Mifa Nurfadilah, Windra Suffan, Khari Secario, Windri Handayani, Cuk Imawan
4085	Absorption Characteristics of Silver Nanoparticle Biosynthesized by *Diospyros discolor* Wild.	Intan Nolia, Khari Secario, Windri Handayani, Cuk Imawan

ROOM 1 - ISMART	UM1	
5721	Dengue Hemorrhagic Fever and Typhoid Fever Association based on Spatial Standpoint using Scan Statistics in DKI Jakarta	Hervind, Yekti Widyaningsih
5599	Conditional Value at Risk for Continuous Loss Random Variable	Nabila Adzhani Putri, Mila Novita, Siti Nurrohmah

ROOM 5 - ISCPMS	M3	
2913	Application of Fuzzy Logic for Making Decision in Stock Trading	Lintang Arief Mahmuda Pertiwi, Zuherman Rustam
3003	Eigenspace-Based Fuzzy C-Means for Sensing Trending Topics in Twitter	Triyana Muliawati, Hendri Murfi

ROOM 6 - ISCPMS	P3	
2950	Fabrication Optimisation of Optical Biosensor using Alcohol Oxidase Enzyme for Formaldehyde Detection	Abdul Rachim, Ayu Puspita Sari, Nurlely Ayat, Vivi Fauzia
2974	The Performance of Formaldehyde Biosensor on Gold Nanoparticles and Alcohol Oxidase Enzyme	Ni Made Manik Savitri Narayani, Anita Eka Putri, Nurlely, Vivi Fauzia
2997	Magnetic Properties of Polycrystalline $La_{0.7}Ba_{0.3}MnO_3$ for Magnetocaloric Effect Application	Budhy Kurniawan, Suci Winarsih, Candra Kurniawan, Fardiman Ruli

ROOM 7 -ISCPMS
PLENARY

10.00-10.15 COFFEE BREAK

10.15-11.55

ROOM 1 - ISCPMS	B2	
3446	Kinship Study of Mantis Shrimps (Harpiosquilla harpax) from Pelabuhan Ratu and Cirebon Waters based on Length-Weight Analyses	D. Iftitah, Abinawanto, W. Wardhana
3864	The Local Knowledge of Medicinal Plants by Minangkabau Ethnic in Guguak Sarai, West Sumatera, Indonesia	Ardian Khairiah, Nisyawati, Marina Silalahi
3904	Studies of Adaptive Traits of Bali Cattle in Buleleng District, Bali and Barru District, South Sulawesi	S.B. Aritonang, R. Yuniati, Abinawanto, M. Imron, A. Bowolaksono
3929	Comparative Leaf Anatomy of Lowland and Highland Nepenthes (Nepenthaceae) Species	Nuri Qulby Arimy, Nisyawati, Destario Metusala
3938	Leaf and Root Anatomical Characteristics of Two Dendrobium Species (Orchidaceae) in Relation to Their Potential Adaptation to Drought Stress	Destario Metusala, Jatna Supriatna, Nisyawati, Didy Sopandie
4036	Effect of Thermal Stress on HSP90 Expression of Bali Cattle in Barru District, South Sulawesi	S. B. Aritonang, R. Yuniati, Abinawanto, M. Imron, A. Bowolaksono
4492	Catch Rate Analysis of Raw Material for Fish Smoke Processing at Fish Smoke Processing Centers Probolinggo City, East Java	Suci Chandra Rini, Abinawanto, Abdul Rachman
3694	Analysis of Physical and Chemical Effluent Vaname Shrimp (Litopenaeus vanname) in Production Business Service Center of Aquaculture Karawang, West Java	Andrean Alberto
2952	Content of Polyphenol Compound on Mangrove and Macroalga Extracts	Noverita Dian Takarina, Mufti Petala Patria
1952	Identification and Screening of Rare Actinomycetes Isolated from Neesia altissima Bl.	Rina Hidayati Pratiwi, Iman Hidayat, Muhammad Hanafi, Wibowo Mangunwardoyo
5725	Eurycoma longifolia Extract Increases Intracellular Production Activity of Luteinizing Hormone (LH) in Pituitary	Hurip Pratomo

ROOM 2 - ISCPMS	G4	
2216	Mapping Lacustrine Syn-Rift Reservoir Distribution Using Spectral Attributes: A Case Study of the Pematang Brownshale Central Sumatra Basin	Resky Yustiawan, Abdul Haris, Resha Ramadian
2174	Spectral Decomposition Application to Delineate Laminated Shaly Sand of Gas Bearing Reservoir of Steenkool Formation in Bintuni Basin	Gana Surya Pradana, Abdul Haris
4051	Impact of Sand Mining Activities on the Environmental Condition of the Komering River, South Sumatera	Vicki Lusiagustin, Eko Kusratmoko
2842	Carbonate Reservoir Characterization and Pore Fluid Identification using Extended Elastic Impedance (EEI) Inversion at Field "A"	Alexander Sitompul, M. Syamsu Rosid, M. Wahdanadi Haidar
2910	Application of Remote Sensing Analysis and MT Method to Identification Mt. Endut Geothermal Prospect Zone	Agie Maliki Akbar, Aditya Permadi, Dadan Wildan, Supriyanto
4063	Assessment of Low to Moderate Geothermal System over Mt. Pancar Area (Bogor) based on Remote Sensing and Geochemical Studies	Yunus Daud, Syamsu Rosid, Adilla Armando, Tri Widjaya Putranto, Fitriyani Mustika Ruslita
4091	Application of Continuous Wavelet Transform (CWT) and RMS Amplitude Seismic Attributes against Sandstone Reservoirs Distribution Field "Silk" North Sumatra Basin	Syayid Anwar Sukarno, Abdul Haris
4061	Mt. Pancar Geothermal System: Structure Assessed from Gravity and Hydrogeological Interpretations	Yunus Daud, Syamsu Rosid, Adilla Armando, Tri Widjaya Putranto, Fitriyani Mustika Ruslita
2976	Optimize of Distribution and Characterization of Sand Reservoir by using Extended Elastic Impedance (EEI) Method in "G" Old Field	Galih Dika Pranata, M. Syamsu Rosid, Deny Martian
2886	Reservoir Distribution of Stratigraphy Trap using Red Green Blue (RGB) Blending from Spectal Decomposition in "TS Field"	Tri Wulan Sari, Supriyanto, Leonard Lisapaly, Rossi Andi Saputro, Sujito

ROOM 3 - ISCPMS	M4	
3006	Comparative Study of Original Recover and Recover KL in Separable Non-negative Matrix Factorization for Topic Detection in Twitter	Hendri Murfi
2116	EEG Channels Reduction using PCA to Increase XGBoost's Accuracy for Stroke Detection	Nilam Fitriah, Sastra Kusuma Wijaya, Mohamad Ivan Fanany, Cholid Badri, Muhammad Rezal
3584	Development of Digital Image Encryption Algorithm using Composition Chaos Function	Suryadi MT, Mohammad Fachruddin, and Yudi Satria
3011	Modification of MSDR Algorithm and Its Implementation on Graph Clustering	Diah Prastiwi, Kiki Ariyanti Sugeng, Titin Siswantining
3384	Normed Kernel Function-Based Fuzzy Possibilistic C-Means (NKFPCM) Algorithms for High-Dimensional Breast Cancer Database Classification with Feature Selection is Based on Laplacian Score	Zuherman Rustam, Andi Wulan Lestari
4067	Data Preprocessing for Determining Outer/Inner Parallelization in the Nested-Loop Problem using OPENMP	Tri Handhika, Alhadi Bustamam, Ernastuti, Djati kerami
3932	A Mathematical Model of Predator-Prey Interaction between Seal, Herring and Steelhead Trout	Setiya Triharyuni, Dipo Aldila
4103	Spectrum Analysis on Fisher-Kolmogorov-Petrovsky-Pischunov Equation using Evans Function Approach	Ika Indah L., Alhaji A. Bachtiar, Arie Wibowo
2994	Application of Bron-Kerbosch Algorithm in Graph Clustering using Complement Matrix	Srava Chrisdes Antoro, Kiki Ariyanti Sugeng, Bevina Desjwiandra Handari
4120	Hypergraph Partitioning Implementation for Parallelizing Matrix-Vector Multiplication using CUDA GPU-Based Parallel Computing	Murni, Alhadi Bustamam, Ernastuti, Tri Handhika, Djati kerami

ROOM 4 - ISCPMS	P5	
3880	Hirota Bilinear Formalism and Rational Solution of Supersymmetric KDV Equation	Arifa Mirza, Bushra Haider
1085	Compactification of Higher Dimensional Spacetime with Maxwell Field	Annisa Nur Rasyida, Handhika S. Ramadhan
3028	A Model of K+P One-Hadron-Exchange Potential	M. R. Anggraini, I. Fachruddin, A. Salam
709	Some Blackhole and Compactification Solutions of Noncanonical Global Monopole in D-Dimensional Spacetime	Ilham Prasetyo, Handhika S. Ramadhan
4117	Simulating the Classical and Relativistic Equation of State of the Stars upon Variation of the Electron to Baryon Ratio	Tony Sumaryada, Erika Mattanzi, Agus Kartono
2947	Impact of Phase Transition to Hyperon Matter on Neutron Star Properties	Alrizal Alrizal, Anto Sulaksono
2943	Cracking on Anisotropic Neutron Stars	Agung Mulyo Setiawan, Anto Sulaksono
4086	Silver Nanoparticles Biosynthesis using *Pometia pinnata* J.R.FORST. & G.FORST: Comparing the Effect of Leaf Extract and Stem Bark Extract on Reduction Reaction	Aulia Suci Ningrum, Aninda P. Pridyantari, Khari Secario, Windri Handayani, Cuk Imawan
4087	Study of *Pometia pinnata* J.R.FORST. & G.FORST and *Diospyros discolor* Wild. Fruit Fleshes for Synthesizing Silver Nanoparticles	Refina Muthia Sundari, Intan Nolia, Khari Secario, Windri Handayani, Cuk Imawan

ROOM 1 - ISMART	UM2	
5559	Estimation of Shape Beta Parameter in Kumaraswamy Distribution using Maximum Likelihood and Bayes Method	Helen Giovani Simbolon, Ida Fithriani, Siti Nurrohmah
4784	The Relation Pattern of the Dominant Intelligence,the Dominant Learning Style, the Most Preferred Teaching Style to the Category of Average Achievement of "X" Junior High School Student.	Rosi Melati, Rianti Setiadi, Saskya Mary Soemartojo
3007	Digital Image Steganograhy by using edge Adaptive based Chaos Cryptography	Akbar Delmi, Suryadi, Yudi Satria
4006	Implementation of Random-key Cuckoo Search Algorithm with 3-Opt in Traveling Salesman Problem	Eka Widowati, Bevina D. Handari, Gatot F. Hertono
4722	Solving {0-1} Knapsack Problem Based on Amoeboid Organism Algorithm	Andri Priyono, Sri Mardiyati, Maulana Malik
4698	Implementation of Regularized Markov Clustering Algorithm on Protein Interaction Networks of Schizophrenia's Risk Factor Candidate Genes	Rizky Ginanjar, Alhadi Bustamam, Hengki Tasman
3442	A Time Series Model: First-order Integer-valued Autoregressive (INAR(1))	Desy Magdalena Simarmata, Fevi Novkaniza, Yekti Widyaningsih
5937	Application of Evolutionary Game Theory for Green Purchasing in Manufacturing Industry	Permatasari Silitonga
4458	Effect of the Quantity of Carbonate Components on the Formation of Carbonated Hydroxyapatite via Hydrotermal Synthesis	Armando Aldy Ruddyard, Djarwani S. Soejoko, Nurlely
4353	Comparative Study of Two Methods of Fractionation Bromelain from Pineapple Core Extract (Ananas comosus)	Karina Febriani, Isrina Wahyuni, Siswati Seatiasih, Sumi Hudiyono
4720	Analysis of Carbohydrate Content Obtained from Demineralization of White Snapper Scales (Lates sp.)	Noverita Dian Takarina
4731	Phytoplankton Distribution and Community Structure on Estuary and Fishpond at Subang, Blanakan, West Java	Eureka Amadea, Noverita Dian Takarina, Wisnu Wardhana

ROOM 5 - ISCPMS	M5	
3994	Analysis of Family of Dengue Virus Using Regularized Markov Clustering (R-MCL) Algorithm and Its Implementation	Alhadi Bustamam, Dian Lestari, Darno Raharjo, Wiwit Widhianto, Diyah Septi Andryani
3017	Application of Quaternion in Improving The Quality of Global Sequence Alignment Scores for an Ambigous Sequence Target in Streptococcus Pneumoniae DNA	Alhadi Bustamam, Teti Novianti, Gianinna Ardaneswari, Dian Lestari
3951	Application of Hybrid Clustering using Parallel K-Means Algorithm and Diana Algorithm	Khoirul Umam, Alhadi Bustamam, Dian Lestari
4004	Application of Hybrid Clustering Based on Partitioning Around Medoids (PAM) Algorithm and Divisive Analysis on Human Papillomavirus (HPV-DNA)	Alhadi Bustamam, Fatimah, Mentari Dian Arimbi
4011	Application of K-Means Clustering Algorithm In Grouping the DNA Sequences of Hepatitis B Virus (HBV)	Alhadi Bustamam, Nova Yuniarti, Frisca, Ichsani Mursidah
4071	Implementation Hierarchical Clustering Using K-Mer Sparse Matrix to Analyze Mers-CoV Genetic Relationship	Alhadi Bustamam, Eryawan D. Ulul, Hendy F. A. Hura, Titin Siswantining
4078	Clustering Protein Sequences of Herpes Virus Using Tribe Markov Clustering (Tribe-MCL)	Alhadi Bustamam, Titin Siswantining, Nurlaili Lisma Febriyani, Ika Dwi Novitasari, Rosalia D. Cahyaningrum
4049	Cancer Clustering using Hybrid Method of Fuzzy C-Means with Improved Particle Swarm Optimization and Locality Preserving Projection as Reducers Dimensional Microarray Data	Muhammad Abdul Rivai, Zuherman Rustam, Alhadi Bustamam
4100	Non-Negative Matrix Factorization as A Robust Feature Selection Method for Classification of Dementia with MRI Data	Devvi Sarwinda, Gianinna Ardenaswari, Alhadi Bustamam
4077	Parallelization Strategies for Continuum-Generalized Method of Moments on the Multi-Thread Systems	Alhadi Bustamam, Tri Handhika, Ernastuti, Djati kerami

ROOM 6 - ISCPMS	P6	
2880	The Influences of Mn Doping on the Structural, Morphological, Optical and Magnetic Properties of ZnO Nanorods Grown by A Simple Hydrothermal Method	Nur Ajrina Putri, Iwan Sugihartono, Vivi Fauzia, Djati Handoko, Yeni Febrianti
2632	Electrical Properties of $La_{0.7}Ba_{0.297}Ce_{0.003}MnO_3$ Derived from Low Temperature Sol-Gel Synthesis	Suci Winarsih, Budhy Kurniawan, Agung Imaduddin, Sitti Ahmiatri Saptari, Dwi Nanto, Azwar Manaf
2966	Improved Magnetic Properties of La Substituted Barium Hexaferrite $(Ba_{0.7}La_{0.3})Fe_{12}O_{19}$ Enhanced by Fe_3O_4 Nanoparticles	Kilat Permana Putra, Azwar Manaf
2883	Synthesis and Characterization of Co Doped Zinc Oxide Nanorods Prepared by Ultrasonic Spray Pyrolysis and Hidrothermal Methods	Yeni Febrianti, Nur Ajrina Putri, Iwan Sugihartono, Vivi Fauzia, Djati Handoko
3304	Electromagnetic Wave Absorbing Characteristics of Synthesized Barium Stronsium Titanate/Polyaniline Nanocomposites	Okti Mulyani, Mas Ayu Elita Hafizah, Azwar Manaf
4014	Materials Modification of $La_{1.4}Ca_{1.6}Mn_2O_7$ with Ag-Doped through Sol-Gel Methods as A Replacement for Conventional Cooling Machine	Athessia Naomi Nainggolan, Budhy Kurniawan, Djati Handoko, Wilujeng Laksmi, Fardiman Ruli, Candra Kurniawan
4099/5186	Fabrication and Structure of ZnO and Li-Doped ZnO by Sol-Gel Method	Laras Fadillah, Sri Budiawanti, Bambang Soegijono, Isom Muzakir
3005	Microwave Absorber Properties of $La_{0.67}Sr_{0.33}Mn_{0.8}Ni_{0.2}O_3$ with Sol Gel Synthesis Methods	Wahyu Dian Laksanawati, Budhy Kurniawan, Rachmat Andika, Utami Widyaiswari, Indah Fauziyah
2960	Improved Magnetic Properties of Barium Hexaferrite Enhanced by Nanoparticle of $CO_xFE_{3-x}O_4$ (X = 0.5 - 1) Magnets	Gemi Nastiti, Azwar Manaf
4102	Phase Transition of $Ni_{43}Mn_{41}Co_5Sn_{11}$ Heusler Alloy	Nastiti Elwindari, Candra Kurniawan, Azwar Manaf

ROOM 7 -ISCPMS	P7	
5508	Effects of Y and Lu Substitutions on the Low Temperature Structural Properties of $Tb_2Fe_2Si_2C$	R. A. Susilo, D. Triyono
4083	Electrical Properties Study as A Function of Temperature of Double Double Perovskite Sr_2FeTiO_6	Djoko Triyono, Ngia Masta
960	Effects of Post-Thermal Annealing on the Structural of ZnO Thin Films Deposited using Sol-Gel Spin Coating Method	Didik Aryanto, Rif'ul M. Maulana, Toto Sudiro, Masturi, Agus S. Wismogroho, Perdamean Sebayang, Masno Ginting, Sugianto, Putut Marwoto
4062	Studies on the Electrical Properties of Double-Perovskite La_2FeTiO_6 Prepared by Sol-Gel Synthesis Method	Djoko Triyono, Riza Enu Annisa Utami
1306	Structure, Magnetic and Electrical Properties of $Zn_{1-x}Mn_xO$ Material	Perdamean Sebayang, Selamat F. Hulu, Kerista Sebayang, Didik Aryanto, Chandra Kurniawan, Ahmad Subhan, Toto Sudiro, Masno Ginting
3650	Electrical Conductivity of $LaFeO_{3-x}Fe_3O_4$ (X=0.0, 0.1, 0.2, 0.3, and 0.4) Composites Materials	Heidi Laysandra, Djoko Triyono
1307	Preparation and Structure Characterization of Zinc Oxide Doped with Transition Metal Ferrite and Chromium	Masno Ginting, Saufa Taslima, Nasruddin, Didik Aryanto, Chandra Kurniawan, Ahmad Subhan, Toto Sudiro, Ayu. Y. Sari, Perdamean Sebayang
5509	Thermal Stability and Crystallization Kinetics of $Fe_{73}Al_5Ga_2P_{11-x}C_5B_4Si_x$ (X = 1, 3) Metallic Glasses	R. A. Susilo, D. Triyono
3739	Synthesis, Structural and Electrical Properties of $LaFe_{0.5}MO_{0.5}O_3$ Crystalline Materials	Heidi Laysandra, Djoko Triyono

11.55-13.00 LUNCH

13.00-14.40

ROOM 1 - ISCPMS	B3	
2953	The Effect of Maceration Length of Time on the Yield of Mangrove and Macroalga Extracts	Noverita Dian Takarina, Siti Aminatuh Juhriah
4735	Composition of Cyanobacteria in Kali Blanakan and Kali Malang as Klekap Constituent for Milkfish Feed Resources	Vergina Andini Putri, Noverita Dian Takarina, Wisnu Wardhana
3933	Leaf Anatomical Characterization of Five Nepenthes Species from Lingkat Lake and Gunung Tujuh Lake, Kerinci Seblat National Park, Jambi	Dee Dee Al Farishy, Nisyawati, Destario Metusala
3975	Ambient Temperature Effects on Growth of Milkfish at Aquaculture Scale in Blanakan, Subang	Noverita Dian Takarina, Qurrota A'yun
4116	Analysis of Heavy Metals (Pb and Zn) Concentration on the Sediments of Blanakan Fish Ponds, Subang, West Java	Arie Wiriawan, Noverita Dian Takarina, Tjiong-Giok Pin
4068	Relationship between Cyanobacteria Community and Water Quality Parameters on Intertidal Zone of Fish Ponds, Blanakan, West Java	Noverita Dian Takarina, Wisnu Wardhana
2985	Development of Dissolved Oxygen Model by using Gastropod as Bioindicator with Emphasis on Shell Length Distribution: A Case Study in Blanakan, West Java	Noverita Dian Takarina, Desi Octavia
5901	Morphology and Protein Analysis from Three Variant of Oil Palm Pollen; Dura, Pisifera, & Tenera	Rizky Priambodo, Arief Budi Witarto, Andi Salamah, Setiorini, Djoko Triyono, Anom Bowolaksono
2988	Characterization of Chitin and Chitosan Synthesized from Red Snapper (*Lutjanus sp*) Scale Wastes	Noverita D. Takarina, Agung Amirul Fanani
3666	Test Activities of Extract Anti-Plasmodium Tuber Bidara Upas (Merremia mammosa (Lour.) Hallier f)	Eka Gustiana
4090	An Alternative Simple Method for Preparing and Preserving Cross-Sections of Leaves and Roots in Herbaceous Plants: Case Study in Orchidaceae	Destario Metusala

ROOM 2 - ISCPMS	G5	
2867	Carbonate Reservoir Characterization with Pore Type Inversion using Differential Effective Medium (DEM) Model at "X" Field, East Java	Siska Dwi Wahyuni, M. Syamsu Rosid, M. Wahdanadi Haidar
2166	Identification of Shale Gas Characteristics in Telisa Formation, AH Field, South Sumatera Basin based on Geomechanical Analysis and Seismic Interpretation	Aldo Hutagalung, Abdul Haris
2195	Fault Seal Analysis to Predict the Compartmentalization of Gas Reservoir, Case Study of Steenkool Formation Bintuni Basin	Wildan Cahara Budi Ginanjar, Abdul Haris
3072	New Play Concept Analysis on Ngimbang Formation North East Java Basin	Riky Hendrawan Bayu Pandito
2188	Delineating Chalk Sand Distribution of Ekofisk Formation Using Probabilistic Neural Network (PNN) and Stepwise Regression (SWR): Case Study Danish North Sea Field	Muhammad Nafian, Abdul Haris, Agus Riyanto
2192	Characterization of Shale Hydrocarbon Potential in Tanjung Formation, Barito Basin, South Kalimantan	Taufan Amersia Sumotarto, Abdul Haris
2196	The Geochemical Assessment of Telisa Shale Gas Reservoir: Case Study of South Sumatera Basin	Abdul Haris, Aldo Hutagalung
2893	Subsurface Structural Modeling Manifestations of Mt. Endut using Vertical Electrical Sounding (VES) Method	Aditya Noor Permadi, Supriyanto
2936	Reservoir Hydrocarbon Identification using Spectral Decomposition: S-Transform and Empirical Mode Decomposition (EMD)	Abdul Harris, Vernando Morena, Shaska R. Zulivandama
2911	Analysis of Gravity Data beneath Endut Geothermal Field using Horizontal Gradient and Euler Deconvolution	Supriyanto, Tajudin Noor, Edi Suhanto

ROOM 3 - ISCPMS	G6	
2178	Geomechanics Assessment of Shale Gas Reservoir: A Case Study of Pematang Formation, Central Sumatera Basin	Iskandarsyah, Abdul Haris
3436	Reservoir Prospect Assessment in Northern Part of Exito Field Based on Seismic and Inversion Attribute Interpretation	Muhammad Kamal Fakhri, Abdul Haris
3280	Simulation of Land Use Change and Its Effect on Potential Deforestation using Markov-Chain Cellular Automata	Djoko Harmantyo, Tito Latif Indra, Mujiono, Iko Panji Rukmana, Zulfa Nadia
2793	Spatial Habitat of Eel Larva Habitat at Cimandiri Estuary, West Java	Noverita Dian Takarina, Supriatna
2840	Comparative Study between Kuster-Toksoz and Differential Effective Medium (DEM) Method for Determining Pore Type in Carbonate Reservoir	Yuri Nadia Candikia, M. Syamsu Rosid, M. Wahdanadi Haidar

ROOM 5 - ISCPMS	M6	
5040	Solving Multiple Traveling Salesman Problem (M-TSP) using K-Means Clustering-Genetic Ant Colony System (GACS) Algorithm	Sri Mardiyati, Lutfiani Safitri, Jihan
3577	Ordering Dually in Triangles (Ordit) Ranking Method on the Severety Level of the Citarum Watershed	Windy Setia Ningrum, Yekti Widyaningsih, Tito Latif Indra
3893	Observing the Trends of Criminal Occurrence Territory using Spatial Scan Statistic and Correspondence Analysis	Taruga Runadi, Yekti
2984	Pricing Unit-Linked Insurance with Guaranteed Benefit	Muhammad Iqbal, Fevi Novkaniza, Mila Novita
3910	Solving Cyclical Nurse Scheduling Problem using Preemptive Goal Programming	Vindawati Eka Sundari, Sri Mardiyati
3927	Application of Robust Kriging Method to Analyze Data Radon and Thoron	Miranti Verdiana, Yekti Widyaningsih
3973	Application of Spectral Clustering on Microarray Data of Carcinoma by using Partitioning Around Medoids (PAM) Algorithm	Rosalia Deviana Cahyaningrum, Titin Siswantining, Alhadi Bustamam
2958	On the Restricted Size Ramsey Number for Connected Graph with Diameter Two and Order at Most Six	Denny Riama Silaban, Edy Tri Baskoro, Saladin Uttunggadewa

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4053	Voltage Dependency of Transmission Probability of Aperiodic DNA Molecule-Voltage Dependency of Transmission Probability of Aperiodic DNA Molecule	Vandan Wiliyanti, Efta Yudiarsah
4070	The Effect of Intrastrand Hopping Term on Charge Transport Properties of An Aperiodic DNA Molecule	Refpo Rahman, Efta Yudiarsah
4108	Modeling of Half Heusler within Tight-Binding Approximation	Sugiyanto, Muhammad Aziz Majidi, Dwi Nanto
4059	Modeling of Full Heusler within Tight-Binding Approximation	Anugrah Azhar, Muhammad Aziz Majidi, Dwi Nanto
4024	Transmission Probability of Poly(DA)-Poly(DT) DNA in Electric Field	Kinanti Aldilla Rahmi, Efta Yudiarsah
4112	The Effect of Different Values of Inter-Strand Hopping on the Current and Transmission Probability of An Aperiodic DNA Molecule	Lenny Apriyanti, Efta Yudiarsah
4065	Theoretical Formulation of Optical Conductivity of La0.7Ca0.3MnO3 Exhibiting Paramagnetic Insulator – Ferromagnetic Metal Transition	Listiana Satiawati, Muhammad Aziz Majidi
4109	Charge Transport Properties of DNA Aperiodic Molecule: The Role of Interbase Hopping in Watson-Crick Base Pair	Esri Nawati Sinurat, Efta Yudiarsah
4060	Algorithm Implementation of Particle-Particle Ladder Diagram Approximation to Study Strongly-Correlated Metals and Semiconductors	Achmad Prayogi, Muhammad Aziz Majidi
4072	Effect of Watson-Crick Electronic Coupling on DNA Poly(dA)-Poly(dT) Transport Property	Andi Muhammad Risqi, Efta Yudiarsah
4064	Electric Field Influence on Electronic Transport in A Periodic DNA Molecules	Fathiya Rahmani, Efta Yudiarsah

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3209	Output Factor of Small Field Electron Beams Dosimetry Measurement	C. Wulandari, W.E. Wibowo, S. A. Pawiro
3721	Effect of Gamma Irradiation on Antioxidant and Acidity Levels of Arabica Coffee and Civet Coffee	Jepri Sutanto, Musaddiq Musbach
4029	Classification of Right-Hand Grasp Movement Based on Emotiv EPOC+	Tabita AMLT, Prawito, Sastra Kusuma Wijaya
3673	Dosimetry Audit Simulation of Treatment Planning System in Multicenter Radiotherapy	Suwandi Kasmuri, Supriyanto Ardjo Pawiro
4699	Design Warning System for Nuclear Preparedness Around Nuclear Area	Muhammad Muhyidin Farid, Prawito, I Putu Susila
4074	Analysing Power Spectral of Electroencephalogram (EEG) Signal to Identify Motoric Arm Movement Using EMOTIV EPOC+	Ahmad Bustomi
2964	Gamma Index Evaluation of IMRT Technique using *Gafchromic* Film EBT3 for Homogeneous and Inhomogeneous Material	Tutta Aurum Nisauf, Supriyanto Ardjo Pawiro, Wahyu Edy Wibowo
2112	Computer Aided Diagnosis toward Mammography by using Segmentation Watershed	Samsu Herawan, Prawito, Djarwani Soeharso
4009	Synthesis and Characterization of Nano-Sized $CaCO_3$ in Purified Diet	Neng N. Mulyaningsih, Della R. Tresnasari, Mutmainah N. Ramahwati, Ariadne L. Juwono, Djarwani S. Soejoko, Dewi A. Astuti
4054	Automatic Antimicrobial Effectiveness Measurement using Non-Metric Camera and Morphological Image Processing Technique	Endang Wahyuni, Adhi Harmoko Saputro, Windri Handayani, Iman Santoso, Cuk Imawan

14.40-15.10 CLOSING REMARKS

15.10-15.30 COFFEE BREAK

PLENARY SESSIONS

Electrical Detection of Spiral Spin Structures in Pt/Cu_2OSeO_3 Heterostructures

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ABSTRACT

We report the spin-Hall magnetoresistance (SMR) sensitive to the surface magnetization of the spin-spiral material, Cu_2OSeO_3. We experimentally demonstrate that the angular dependence of the SMR changes drastically at the transition between the helical spiral and the conical spiral phases. Furthermore, the sign and magnitude of the SMR in the conical spiral state are controlled by the cone angle. We show that this complex behaviour can be qualitatively explained within the SMR theory, initially developed for collinear magnets. In addition, we studied the spin Seebeck effect, which is sensitive to the bulk magnetization. It originates from the conversion of thermally excited low-energy spin waves in the magnet, into the spin current in the adjacent metal contact (Pt). The SSE displays unconventional behavior where not only the magnitude but also the phase of the SSE vary with the applied magnetic field.

Keywords: Magnetism, Transport, Spin-Hall, Magnetoresistance

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Enzymatic Polymerizations
Novel Ways to (New) Polymer Systems

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ABSTRACT

The *in vitro* enzymatic synthesis of polymers via non-metabolic pathways is a relatively old area of precision polymer synthesis. The enzymatic polymerization of polysaccharides was for instance already reported more than 50 years ago. However, other polymerization methods using cheap petroleum-based monomers soon replaced research on biocatalytic polymerization techniques.

These days fast depletion of the petroleum stock and increase in the cost of petroleum-based monomers puts a limit to their use in the future and enzymatic polymerizations are currently facing a Renaissance. Enzymes have excellent features (activity, selectivity, specificity) for designing synthetic processes to obtain a wide range of products under mild and environmentally friendly conditions. Typical characteristics of enzyme catalysis are high catalytic activity, large rate acceleration of reactions under mild reaction conditions, high selectivity of substrates and reaction modes, and no formation of byproducts. In the field of organic synthetic chemistry, enzymes are already used extensively for the production of chemical and pharmaceutical intermediates and end products.

At present, petrol-based monomers are still predominately used in enzymatic polymerizations. By combining biobased monomers and enzymatic polymerizations in polymer synthesis, not only the research field of enzymatic polymerization could be greatly accelerated but also the utilization of renewable resources will be promoted. This will provide an essential contribution to achieving sustainability for the polymer and coatings industry, which will eventually play an important role in realizing and maintaining a sustainable society.

Keywords: enzymatic polymerizations; green chemistry; renewable resources; biobased monomers; polyester; polyamides

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A Metapopulation Model Incorporating Landscape Dynamics

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ABSTRACT

I will describe a model for populations that occupy several geographically separated patches of habitat, one which accounts for the evolution over time of landscape characteristics that affect the persistence of local populations. In particular, the probability of local extinction is allowed to evolve according to a Markov chain. This covers the widely studied case where patches are classified as being either suitable or unsuitable for occupancy. I will explain why, for large population networks, the persistence and equilibrium levels of the population are determined by the distribution of the life span of local populations, and not by the specific landscape dynamics.

This talk summarises work contained in the following papers:

1. McVinish, R., Pollett, P.K. and Chan, Y.S. (2016) A metapopulation model with Markovian landscape dynamics. Theoretical Population Biology 112, 80
2. McVinish, R. and Pollett, P.K. (2014) The limiting behaviour of Hanski's incidence function metapopulation model. Journal of Applied Probability 51, 297
3. McVinish, R. and Pollett, P.K. (2013) The limiting behaviour of a stochastic patch occupancy model. Journal of Mathematical Biology 67, 693

Hunting for the Nucleon Resonances

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ABSTRACT

It is well known that a hydrogen atom can be excited from its ground state because the hydrogen atom is a composite object. The proton or neutron, which is the nucleon with different isospin state, is also a composite object; it contains three quarks. Therefore, a nucleon can be excited to a spectrum of excited states called nucleon resonances. Different from atomic physics, in the hadronic or particle physics these excited states are sometimes considered as new particles. These new particles have been theoretically predicted by the constituent quark models. However, at present the number of the particles *seen* and listed by the Particle Data Group (PDG) is much less than that predicted by the quark models. The rest are *unseen* and called *missing resonances* because they do not decay to the pion channels, which are the standard tools used by PDG for determining the existence of nucleon resonances. Fortunately, some quark models predict that these *missing resonances* decay mainly to the strangeness channels, such as kaon-hyperon channels. This talk will deal with the modeling of the kaon-hyperon photoproduction process and its use for searching the *missing resonances*. Our approach will be the fully-covariant field-theoretic model, constructed from suitable Feynman diagrams. We will also touch on the narrow resonance *N*(1685), the resonance that has very small decay width compared to the conventional ones, predicted by the soliton model as one of the family member of pentaquark.

Citation: K.A. Olive *et al.* (Particle Data Group), Chin. Phys. C, **38**, 090001 (2014) and 2015 update

$N(1685)$ $?^?$

$I(J^P) = \frac{1}{2}(?^?)$ Status: *

OMITTED FROM SUMMARY TABLE

There is a small literature (which we do not try to cover) on this possible narrow state. See KUZNETSOV 11A, MART 11, and the other papers for further references. This state does not gain status by being a sought-after member of a baryon anti-decuplet.

N(1685) MASS

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1670±5	WERTHMUEL..14		CRBT	$\gamma d \to \eta n\,(p)$
1670±5	WERTHMUEL..13		CRBT	$\gamma d \to \eta n\,(p)$, $\gamma\,{}^3\mathrm{He} \to \eta n\,(pp)$
~ 1670	JAEGLE	11	CBTP	$\gamma d \to \eta n\,(p)$
~ 1685	KUZNETSOV	11	GRAL	$\gamma d \to \gamma n\,(p)$
~ 1680	KUZNETSOV	07	GRAL	$\gamma d \to \eta n\,(p)$

N(1685) WIDTH

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •				
28± 5	WERTHMUEL..14		CRBT	$\gamma d \to \eta n\,(p)$
30±15	WERTHMUEL..13		CRBT	$\gamma d \to \eta n\,(p)$, $\gamma\,{}^3\mathrm{He} \to \eta n\,(pp)$
~ 25	JAEGLE	11	CBTP	$\gamma d \to \eta n\,(p)$
<30	KUZNETSOV	11	GRAL	$\gamma d \to \gamma n\,(p)$
<30	KUZNETSOV	07	GRAL	$\gamma d \to \eta n\,(p)$

N(1685) REFERENCES

WERTHMUEL...14	PR C90 015205	D. Werthmueller *et al.*	(A2 Collab. at MAMI)
WERTHMUEL...13	PRL 111 232001	D. Werthmueller *et al.*	(Crystal Ball/TAPS Collab.)
JAEGLE 11	EPJ A47 89	I. Jaegle *et al.*	(CBELSA/TAPS Collab.)
Also	PRL 100 252002	I. Jaegle *et al.*	(CBELSA/TAPS Collab.)
KUZNETSOV 11	PR C83 022201	V. Kuznetsov *et al.*	(GRAAL Collab.)
KUZNETSOV 11A	JETPL 94 503	V. Kuznetsov, M.V. Polyakov, M. Thurmann	(INRM+)
MART 11	PR D83 094015	T. Mart	(U. Indonesia)
KUZNETSOV 07	PL B647 23	V. Kuznetsov *et al.*	(GRAAL Collab.)

REFERENCES

1. K.A. Olive *et al*. (Particle Data Group), Chin. Phys. C **38**, 090001 (2014) and 2015 update

Optical Properties of Two-Dimensional Materials

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ABSTRACT

Monolayers of two-dimensional materials, including graphene and transition metal dichalcogenides (TMD), have received much attention in recent years because of their unique physical and chemical properties and potential practical applications. For many of these applications, knowledge of the optical properties of these monolayer thin films is essential. We combine a spectroscopic ellipsometry with a series of monolayer materials to more deeply explore their complex optical constants ranging from the near-infrared to the deep-ultraviolet. These monolayer thin films were deposited on different substrates by using chemical vapor deposition. There are several important findings in our study. First, the optical absorption spectrum of monolayer graphene is characterized by an asymmetric Fano resonance in the ultraviolet frequency range. Second, the extraordinary large value of the refractive index of monolayer TMD in the visible frequency range is obtained. The absorption response shows a strong correlation between the magnitude of the exciton binding energy and band gap energy. Third, the giant spin-orbit splitting energy of monolayer TMD is observed. These results advance our understanding of novel optical properties in these materials and provide a foundation of the technological development of monolayer graphene- and TMD-based optoelectronic devices.

Development of Portable SPR Sensor based Organic Light Source for Biomedical Applications and Luminance Enhanced by PEDOT:PSS-Au Nanoparticles Hybrid Film in Green Polymer Light-Emitting Diodes

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ABSTRACT

Surface plasmon resonance (SPR) sensor has been recognized as a modern breakthrough to monitor biomolecular binding. Optical micro structure was utilized for optical enhancement of white Organic LEDs (OLEDs) for portable SPR sensor. OLEDs have been noted to possess numerous advantages owing to their remarkable heat dissipation throughout the operation, high color contrast, and stability for extended operations. Moreover, solid-state lighting for biomedical devices and related applications have more advantages over conventional lighting (halogen or Xe lamps), such as low cost, disposability, portability, smaller size, and sensitivity. The optical enhancement of micro structure integration for white OLED light source demonstrated that the viewing angle of OLED light output was measured and BEF micro structure was able to improve the intensity and reduce the viewing angle of output light. On the other hand, the reflective polarizer, reduced the intensity around 50%. This developed SPR system has detected the bulk refractive index sample with limit of detection (LOD) 3×10^{-6} RIU. For the biomolecular measurement, the mouse IgG protein interaction has been detected with LOD around 49 pg/mL. In addition, the portable SPR sensing has also been detected successfully for pathogenic DNA such as, Mycobacterium tuberculosis from clinical samples. The detection limit is around 50.6 pg/mL. Not only merely that, the SPR sensor also has been used for the quantification of viral particle of human enterovirus 71 with detection limit around 43 vpu/mL.

Recently, gold nanoparticles (Au NPs) have become popular for enhancing the efficiency of OLEDs, but the detail of the enhancement effect is still needed to investigate. According to the previous researches, the Au NPs can improve hole injection or enhance the luminance by using local SPR (LSPR) effect. In this article, the effects of Au NPs (12 nm) embedded in PEDOT: PSS on the properties of OLEDs were investigated by changing its volume concentration (5, 10, 15 vol.%). The PEDOT: PSS-Au NPs hybrid film can be easily formed by spin-coating and the density of Au NPs in hybrid film can be tuned by adjusting the volume ratio of PEDOT: PSS and Au colloids. The Au NPs in PEDOT: PSS layer can influence the electric properties of the device, the current density of OLEDs without Au NPs at 12.2 V is 0.578 A/cm^2, and decreased to 0.488 A/cm^2 as the concentration of Au NPs increased to 5 vol.%, this current reduction will become more obvious with further increase the concentration of Au NPs. However, the luminance for sample with 5 vol.% Au NPs is increased to 21510.0 cd/m^2 and the luminance enhancement will be further increase to 32% by incorporated with 15 vol.% Au NPs. The highly overlap of the absorption spectral of 12 nm Au NPs and the electroluminescence spectra of OLEDs indicates that the LSPR of Au NPs can be excited by the emission light of OLEDs. The coupling between the LSPR and excited emitter can enhance radiation according to the Fermi's golden rule.

Keywords: OLEDs, SPR, LSPR, sensors, Au NPs

PARALLEL SESSIONS

ISCPMS 2016

Differential Cryptanalysis Klein-64

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ABSTRACT

Cryptography is the study of mathematical techniques related to aspecet of information security. One concept which is absolutly fundamental to cryptography is that of a function in the mathematical sense, a function is alternately reffered to as a mapping or a transformation. Cryptography is not only means of providing information security, but rather one set of techniques. The goals of cryptography are confidentiality, data integrity, authentication and non-repudiation[1]. Cryptanalysis is the study of mathematical techniques for attempting to defeat cryptographic techniques and more generally information security services[1]. There are two type of crpytanalysis, they are Differential Cryptanalysis [2] and Linear Cryptanalysis[3]. KLEIN algorithm is one of the symmestic cryptographic systems which can be used in situations where low-power consumption and high chip efficiency is desired[4]. Diffrential cryptanalysis has been applied to the 8th round KLEIN-64 algorithm using a characteristic differential lower nibble $(00\ 00\ 0b/0e\ 00\ 00\ 00\ 00\ 00) \rightarrow (0y\ 0y\ 0y\ 0y\ 0y\ 0y\ 0y\ 0y), y \in \{1,2,\dots,f\}$ with probability $2^{33.90}$ [5]. In this paper, we found 16 characteristics differential higher nibble with probability $2^{34.435}$ and can be found 32-bit higher nibble of last subkey. Then we obtained 32-bit others using a characteristic differential lower nibble. Finally, we get all of last subkey (64-bit) and get master key of KLEIN-64 using invers of KeySchedule KLEIN-64.

Keywords: Cryptography, differential cryptanalysis, KLEIN-64

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EEG Channels Reduction using PCA to Increase XGBoost's Accuracy for Stroke Detection

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ABSTRACT

In Indonesia, based on the result of Basic Health Research 2013, the number of stroke patients had increased from 8.3‰ (2007) to 12.1‰ (2013). These days, some researchers are using electroencephalography (EEG) result as another option to detect the stroke disease besides CT Scan image as the gold standard. A previous study on the data of stroke and healthy patients in National Brain Center Hospital (RS PON) used Brain Symmetry Index (BSI), Delta-Alpha Ratio (DAR), and Delta-Theta-Alpha-Beta Ratio (DTABR) as the features for classification by an Extreme Learning Machine (ELM). The study got 85% accuracy with sensitivity above 86% for acute ischemic stroke detection. Using EEG data means dealing with a large number of data dimensions, and it can reduce the accuracy of classifier (the curse of dimensionality). Principal Component Analysis (PCA) could reduce dimensionality and computation cost without decreasing classification accuracy. XGBoost, as the scalable tree boosting classifier, can solve real-world scale problems (Higgs Boson and Allstate dataset) with using a minimal amount of resources. This paper reuses the same data from RS PON and features from previous research, preprocessed with PCA and classified with XGBoost, to increase the accuracy with fewer electrodes. The result has shown improvement in accuracy of stroke detection with a specific number of electrodes used. Our future work will examine the other algorithm besides PCA to get higher accuracy with less number of channels.

Stock Portfolio Optimization Using Priority Index and Genetic Algorithm

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ABSTRACT

Stock portfolio is a kind of investment which consists of several stocks. The aim of a stock portfolio is to minimize the risk of an investment and maximize the return on investment. To construct the optimum portfolio of stock, one needs a strategy of stock selection and must determine the percentage of investment in each stock selected. In this paper, both the priority index method and genetic algorithm are applied to optimize the stock portfolios in terms of the return. Priority index is used in stock selection based on some parameters: price/earnings (P/E), earnings/share (EPS), wealth creation, undervaluation, and price per earnings/growth (PEG). Stock selection in each sector is determined by choosing the stocks which have a priority index score at least equal to the minimum priority index score of the selected stocks. The minimum priority index score of the selected stock is determined by using a certain scale parameter. The percentage of investment in each selected stock is then determined by using a genetic algorithm. The results showed that the increasing value of scale parameter does not always increase the average return. Moreover, the stock selection with a wealth creation parameter has a higher average return than without a wealth creation parameter. Stock selection using daily data has a higher average return than annual data. The results also showed that the method has an optimum period up to five months to make an investment decision.

Keywords: Stock portfolio, priority index, genetic algorithm

An Ant Colony Optimization Algorithm to Solve Fixed Destination Multi-Depot Multiple Traveling Salesman Problem with Non-Randomly Parameters

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ABSTRACT

An extension of Traveling Salesman Problem (TSP) is the Multiple Traveling Salesman Problem (MTSP) in which, determining set of routes by m salesmen who all start from and return to a single home city (depot). If there is more than one depot and salesmen start from and return to the same depot, then the problem is called Fixed Destination Multi-depot Multiple Traveling Salesman Problem (MMTSP). In this paper, MMTSP will be solved using the Ant Colony Optimization (ACO) algorithm. ACO is a metaheuristic optimization algorithm which inspired by the behavior of ants in finding the shortest path from the nest to the food source. In solving the MMTSP, the algorithm is observed with respect to different chosen cities as depots and non-randomly three parameters of MMTSP, the number of salesmen (m), the minimum number of cities a salesman must visit (K), and the maximum number of cities that a salesman can visit (L) . The implementation is observed with four dataset from TSPLIB. The results show that both the different chosen cities as depots and the three parameters of MMTSP, in which m is the most essential parameter, affect the solution.

Keywords: Traveling salesman problem, multiple traveling salesman problem, fixed destination multi-depot multiple traveling salesman problem, optimization algorithm, metaheuristic, ant colony optimization

One Prey-Two Predator Model with Prey Harvesting in a Food Chain Interaction

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ABSTRACT

Interaction between mouse, snake and eagle as a mathematical model of one-prey and two predator system with periodic harvesting in mouse population will be introduced in this presentation. Their interaction might describe as a food pyramid, with mouse is in the lowest level of pyramid (prey), snake in the middle (secondary predator) and eagle in the top (primary predator). Periodic intervention to controlling mouse population is needed and will be analyze how this will effect on the existence of snake and eagle population. Equilibrium points and their local stability will be analyze to find a threshold that will be guarantee the coexistence of this system. Some numerical simulation will be given to illustrate analytical results.

Keywords: One-prey and two predator, periodic harvesting, equilibrium, stability

Improved Ant Colony Optimization Algorithm to Solve Scheduling Batching Machines Problem

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ABSTRACT

Scheduling batching machines problem is a combinatorial problem to arrange jobs thus the total of machines processing time become minimum. We assume that each jobs have their own arbitrary size and processing time, which will be assigned into batches. It is also assumed that total of jobs size in batches can't be more than machines capacity, and batch processing time is the longest jobs processing time inside the batch. The problem will be solved with improved ant colony optimization algorithm using metropolis criterion to prevent premature convergent solution. In implementation, parameter modification is made to see the sensitivity of the solutions. Based on the result, the modification of parameters showed a better solution.

Keywords: Scheduling, batching machines, ant colony optimization, metropolis criterion

Graceful Labeling for Some Supercaterpillar Graph

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ABSTRACT

Graceful labeling is one of the interesting topics in graph theory. Let $G(V,E)$ is a graph. The injective mapping $f:V \rightarrow \{0,1,...,|E|\}$ is called graceful if the weight of edge $w(uv)=|f(u)-f(v)|$ are all defferent for every edge uv. The famous conjecture in graceful labeling is "all trees are graceful". Previous research had proved that caterpillar graph is graceful. There also a research that has been introducing the supercaterpillar graph and already proving supercaterpillar satisfying certain conditions are also graceful. In this paper we generalised the concept of supercaterpillar and show subclass of supercaterpillar graph that has not been discussed earlier, is also graceful.

Keywords: Graceful labeling, Caterpillar, Supercaterpillar

Robust Control of A Brushless Servo Motor using Sliding Mode

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ABSTRACT

The application of sliding mode techniques the position control of a brushless servo motor is discussed. Such control laws are well suited for electric power inverter. However, high frequency commutations are avoided due to the mechanical systems. Various recent schemes are studied and operated to derive control solutions which are technically feasible. In spite of straightforward applications the resulting systems show robust performances to parametric variations and disturbances. Robustness studied with respect to rotor flux uncertainties and to stator resistance which varies with the temperature of the motor.

Keywords: Sliding mode, robust control, brushless servo motor

Algebraic Connectivity Optimization in Flight Routes Addition Problem using Tabu Search Method

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ABSTRACT

In graph theory, resilience (in terms of connectivity) to either removal of network vertices or edges can be measured by robustness of the network. One of the best metric to measure robustness of a network is algebraic connectivity. The higher value of algebraic connectivity of the netwok means the network is more robust. The goal of this work is to improve the robustness of an existing air transportation network. It can be accomplished by adding edges (routes) to the network. However due to limited budget and aircraft, the routes to be added have to be chosen carefully. The best routes to be added are the routes that will yield the highest algebraic connectivity when they were added to the network. The problem of choosing the best routes to be added is called flight routes addition. In this paper, the flight routes addition is solved using Tabu Search method. Furthermore, the sensitivity of Tabu Search method towards different initial solutions is analysed by conducting several trials.

Keywords: Air transportation, algebraic connecitivity, Tabu Search

A Fuzzy Logic Model to Forecast Stock Market Momentum in Indonesia's Property and Real Estate Sector

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ABSTRACT

Capital market has important role in Indonesia's economy. Capital market does not only support the economy of Indonesia, but also being an indicator Indonesia's economy improvement. Something that has been traded in capital market is stock (stock market). Nowadays, stock market is full of uncertainty. That uncertainty values make predicting stock market is all that we have to do before we make a decision in stock market. One that can be predicted in stock market is momentum. To forecast stock market momentum, it can use *fuzzy* logic model. In the process of modeling, it will be used 14 days historical data that consisting the value of open, high, low, and close, to predict the next 5 days momentum categories. There are three momentum categories namely Bullish, Neutral, and Bullish. To illustrate the *fuzzy* logic model, we will use stocks data from several companies that listed on Indonesia Stock Exchange (IDX) in property and real estate sector.

Keywords: Momentum, fuzzy logic, stock market

The Determinant of An Antiadjacency Matrix of A Directed Cycle Graph with Chords

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ABSTRACT

A directed graph can be represented by some matrices, one of the representasion matrices is using an antiadjacency matrix. An antiadjacency matrix B = (b_{ij}) of a directed graph is a matrix of order n, which is for i not equal to j, if there is an edge from i to j, then b_{ij} = 0, otherwise b_{ij} = 1 [1]. There are not many results have been known on determinant of an antiadjacency matrix. One of the results is if G is a directed, acyclic graph and B is the antiadjacency matrix of G then det B = 1 if G has a directed Hamiltonian path, otherwise det B = 0 [1]. In this talk, the determinant of an antiadjacency matrix of a directed cycle graph and a directed cycle graph with one or two chords will be discussed.

Keywords: Antiadjacency matrix, chords, determinant, directed cycle graph

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Electroencephalography Epilepsy Classifications Using Hybrid Cuckoo Search and Neural Network

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ABSTRACT

Epilepsy is a condition that affects the brain and causes repeated seizures. This seizures are episodes that can vary and nearly undetactable to long periods of vigorous shaking or brain contractions. Epilepsy often can be confirmed with an electrocephalogram. Electroencephalography (EEG) is the recording of electrical activity from the brain using noninvasive electrodes, which are placed on the scalp. EEG has proven useful for monitoring and diagnosing epilepsy. Neural Networks (NN) has been used in biomedic signal analysis, it has succesfully classify the biomedic signal. Cuckoo search algorithm is inspired by the obligate brood paratisim of some cuckoo species in combination with Levy flight behaviour of some birds and fruit flies in nature. In this paper, a hybrid cuckoo search and neural network is used to recognize EEG signal. The weight of the neural network is optimized by the cuckoo search algorithm based on its error. The aim of this methods is making the network faster to obtained the local or global optimal then the process of classification become more accurate.

Keywords: Electroencephalography, neural network, cuckoo search, classification

Application of Fuzzy Logic for Making Decision in Stock Trading

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ABSTRACT

Deciding the right strategy in stocks trading is not an easy thing to be done, a little mistake can lead a huge loss. To determine the appropriate decision, investors can analyze the behaviour of targeted stocks first. One of the method of analysis which can be performed is the technical stock analysis using various existing indicators. This paper will discuss about the combination of four indicators in technical analysis using the fuzzy logic method. The four indicators are Moving Average Convergence/Divergence (MACD), Relative Strength Index (RSI), Stochastic Oscillator (SO), and On-Balance Volume (OBV). By using this method, investors will find the recommended decision on stocks trading, such as sell, hold, or buy based on the four existing indicators.

Keywords: Technical analysis, fuzzy logic, technical analysis indicators

Qualitative Study of National Education Standard in National Education System Using KSIM Cross-Impact

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ABSTRACT

The Result of The Programme of International Student Assessment (PISA) on 2012 shows that Indonesia is on 64'th position from 65 countries. The Learning Curve Mapping 2013, Indonesia includes in category 10 countries with the lowest performance on cognitive skills aspect, i.e. 37'th position from 40 countries. Competency built by 3 aspects, one of them is cognitive aspect (Bloom's taxonomy theory). The low result of mapping on cognitive aspect, describe the low of graduate competences as an output of National Education System (NES). NES adopting concept Eight National Standards (ENS), one of them is graduate competency standard which connected directly with Indonesia's students. This research aims to modelling NES by using KSIM (Kane Simulation) cross-impact [1]. Linear regression models of ENS have constructed by using the data national accreditation of 1,321 Senior High Schools all around of Indonesia provinces. All parameter of regression on linear regression models of ENS then interpretated as impact value on the construction of KSIM cross-impact NES. The construction is used to analyze the interaction of ENS and doing simulation of public policy in education sector, i.e. stimulate the growth of education staff standard, standard of content, standard of process and infrastructure standard. The simulation of public policy do with 2 methods. The methods are multiplier impact by 20% and constant intervention with value 0.2 that implemented to the four standards above. The simulation result shows that stimulate the growth standard of content in the construction KSIM cross-impact ENS is the best option of public policy to maximize the growth of graduate competency standard.

Keywords: KSIM cross-impact, graduate competency standard, Indonesia National Education System Modelling

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Fuzzy Logic Application in Assessing Stock Based on the Financial Performance Evaluation

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ABSTRACT

For the purpose of gaining profit and avoiding the risk of loss when investing in stocks, it is recommended for the investors to do a stock analysis beforehand. By using the fundamental analysis where the indicators which are used are the indicators in the financial ratio and the fuzzy logic approach. Investors can analyze and assess the company's stock in which they're going to invest. Company stocks that will be analyze are the ones belong to the 26 companies that are listed on the Indonesian consumption sector in 2013, where in this companies' stocks were traded in Indonesian Stock Exchanges (IDX). The final result of this research is the rank of all 26 companies. They are ranked based on the value of the stocks regarding their financial performances in which the company with the most valuable stock is ranked the highest. This list is aimed as suggestion and consideration for the investors.

Keywords: Financial ratio, fundamental analysis, fuzzy logic, membership function

On the Restricted Size Ramsey Number for Connected Graph with Diameter Two and Order at Most Six

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ABSTRACT

Let F, G and H be simple graphs. For any pair of graphs G and H, a graph F is a (G,H) −arrowing graph if any 2-coloring of edges of F contain monochromatic G or H. The size Ramsey number $\hat{r}(G,H)$ is the minimum size of the (G,H) −arrowing graph can have. If the order of the (G,H) −arrowing graph is restricted to the Ramsey number $r(G,H)$, we called it the restricted size Ramsey number $r^*(G,H)$. The Ramsey number $r(G,H)$ itself is the minimum r such that K_r is the (G,H) −arrowing graph. In 1972, Chvátal and Harary gave the Ramsey number for P_3 versus any graph H with no isolates. In 1983, Faudree and Sheehan gave the size and the restricted size Ramsey number for P_3 versus K_n. To continue Faudree and Sheehan's work, we investigate the restricted size Ramsey number for a pair of graph with diameter two and order at most six. In particularly, P_3 versus connected graph H of diameter two, obtain by removing some edges from a complete graph with six vertices.

Keywords: Restricted size Ramsey number, size Ramsey number, path, connected graph

Application of Machine Learning on Brain Cancer Multiclass Classification

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ABSTRACT

Classification of brain cancer is a problem of multi-class classification. This multi-class problem is transformed into several binary problems using one-versus-one method. The microarray gene expression dataset has the two main characteristics of medical data: extremely many features (genes) and only few number of samples. The application of machine learning on microarray gene expression dataset mainly consists of two steps: feature selection and classification. In this paper, the features are selected using a method based on support vector machine recursive feature elimination (SVM-RFE) principle for multi-class classification, called multiple multi-class SVM-RFE. Instead of using only the selected features on a single classifier, this method combines the result of multiple classifiers. The features are divided into subsets and SVM-RFE is used on each subset. Then, the selected features on each subset are put on separated classifiers. This method enhances the feature selection ability of each single SVM-RFE. Twin support vector machine is used as the method of classifier to reduce computational complexity. It uses two non-parallel hyperplanes instead of single hyperplane used in ordinary SVM. The experiment on the brain cancer microarray gene expression dataset shows that this method of gives better results.

Keywords: Brain cancer, microarray gene expression dataset, multi-class classification, multiple SVM-RFE, twin SVM

(Strong) Rainbow Connection on the Splitting of 3-Path

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ABSTRACT

The minimum number of colors needed to color the edges of a graph G so that any two vertices are connected by a path whose edges all have different colors is called the rainbow connection number of G, and denoted by $rc(G)$. The minimum number of colors needed to color the edges of a graph G so that any two vertices are connected by a geodesic whose edges all have different colors is called the strong rainbow connection number of G, and denoted by $src(G)$. The m-splitting of a graph H is a new graph defined as follows. Let $V(H) = \{h_1, \dots, h_n\}$. First, for each h_i we introduce m new vertices $v_i^1, \dots, v_i^m$. Second, we join each new vertex v_i^j to all neighbors of the original vertex h_i in H. The resulting graph is denoted by $Spl_m(H)$. In this paper we determine the rc and src of $Spl_m(P_3)$, where P_3 is a path with three vertices, for all $m \in \mathbb{N}$.

Keywords: Rainbow connection, splitting, path

Pricing Unit-Linked Insurance with Guaranteed Benefit

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ABSTRACT

Unit-linked insurance is an investment-linked insurance, that is, the given benefit is the premium investment outcome. Recently, the most widely marketed insurance in the industry is unit-linked insurance with guaranteed benefit [1]. With guaranteed benefit applied, the insurance benefit form is similar with the payoff form of European call option [2]. Thereby, pricing European call option is involved in pricing unit-linked insurance with guaranteed benefit. The dynamics of investment outcome is assumed to follow stochastic interest rate. Hence, change of measure methods is used in pricing unit-linked insurance. The discount factor with stochastic interest rate needs to be modified as well to be zero coupon bond price. Eventually, the insurance premium is calculated by equivalence principle with guaranteed benefit and insurance period explicitly given [3].

Keywords: Unit-linked, European call option, pricing

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The Application of Network Flow Optimization in Distributing Relief Goods at Disaster Area

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ABSTRACT

In order to help the remaining victims of natural disaster, a strategy how to distribute relief goods such as food, medicine, or water to all disaster area as quick as possible is very needed. In addition, there's a possibility of damage to infrastructure, such as main road or bridge, that can severely affect the distribution process. For this reason, we will be using a mathematical model approach using transhipment problem. Monte Carlo simulation method will be used in this approach to implicate the possibility damage in road segment. After using this approach, we will acquire an optimal strategy how to distribute relief goods to all disaster area. To illustrate the results that obtained, we applied this approach into the case of West Sumatra earthquake in 2009. The mathematical approach that used in the main reference [1] is by formulating two mathematical models, which is named Network Flow Optimization Model (NFOM) and Demand Shortage Clearance Model (DSCM). NFOM's objectivity is to distribute all of the relief goods belong to the cities with excess supply to the city with the highest demand. On the contrary, DSCM's objective is to distribute relief goods from the supply centre to all remaining cities. In this paper we modified the flow conservation constraint at NFOM, and added some constraints on the order of vehicle batch in DSCM. Further, there will be a little bit different probability approach, that involve the road segment's accessibility.

Keywords: Natural disaster, transshipment problem, monte carlo simulation

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Application of Bron-Kerbosch Algorithm in Graph Clustering Using Complement Matrix

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ABSTRACT

Maximal clique enumeration is a graph clustering method for finding all vertices that have the most influence in a graph. The Bron-Kerbosch algorithm is one of the fastest algorithms to find all maximal cliques. Hence, this paper will focus on that algorithm to find all maximal cliques. Counting all maximal cliques of a graph usually uses an adjacency matrix of the graph to find all vertices in the graph that have the most influence. But, in this paper, a complement matrix of a graph will be used in counting all maximal cliques. This research uses a graph that represents a domestic flight route of one of the airlines in Indonesia. By using Bron-Kerbosch algorithm, all maximal cliques of the graph will be listed, so that it will come up with the vertices which are the most influential in this graph. The graph will be represented in complement matrix. The result of applying the Bron-Kerbosch algorithm with the complement matrix of graph will determine vertices that have the most influence in the graph. Besides that, by using a complement matrix, the result gives more information on the vertices which are only connected to the vertices that have the most influence.

Keywords: Maximal clique enumeration, Bron-Kerbosch algorithm, complement matrix, flight route

Eigenspace-Based Fuzzy C-Means for Sensing Trending Topics in Twitter

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ABSTRACT

As the information and communication technology are developed, the fulfillment of information can be obtained through social media, like Twitter. The enormous number of internet users has triggered fast and large data flow, thus making the manual analysis is difficult or even impossible. An automated methods for data analysis is needed, one of which is the topic detection and tracking. An alternative method other than latent Dirichlet allocation (LDA) is a soft clustering approach using fuzzy C-means. FCM meets the assumption that a document may consist of several topics. However, FCM works well in low-dimensional data but fails in high-dimensional data. Therefore, we propose an approach where FCM works on low-dimensional data by reducing the data using singular value decomposition (SVD). Our simulations show that this approach gives better accuracies in term of topic recall than LDA for sensing trending topic in Twitter about an event.

Keywords: Topic detection, topic modeling, clustering, fuzzy c-means, singular value decomposition

Comparative Study of Original Recover and Recover KL in Separable Non-negative Matrix Factorization for Topic Detection in Twitter

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ABSTRACT

Increasing the amount of information, especially on social media such as Twitter, requires an efficient way to find the topics, so that the information can be well managed. One of automated method for topic detection is polynomial-time nonnegative matrix factorization (P-NMF). P-NMF method that has been successfully developed is P-NMF with Arora, Ge, and Moitra algorithm (AGM algorithm) which assumes that each topic has at least one word that does not appear on other topics, and called as anchor words [1]. There are three steps of P-NMF with AGM algorithm, i.e, constructing matrix coocurance, finding anchor words, and recovering topic matrix. This research will apply two methods recover, namely original recover that using algebraic manipulation and recover KL that using the probability approach with Kullback Leibler divergen. Our simulation showed that recover KL provides better accuracy in term of topic recall than original recover.

Keywords: Topic detection, nonnegative matrix factorization, recover KL, Twitter

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Modification of MSDR Algorithm and Its Implementation on Graph Clustering

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ABSTRACT

Graph clustering is the grouping of vertices in a graph into clusters. There are various clustering algorithms for weighted graphs, for example a graph clustering algorithm which is based on MST (Minimum Spanning Tree). The advantage of MST-based clustering is that it allows the detection of clusters with irregular boundaries. In this paper, we discuss an MST-based clustering known as MSDR (Maximum Standard Deviation Reduction). There are two goals of MSDR. The first goal is to produce clusters such that in each cluster the edges have similar weights. The second goal is to prevent the formation of too many clusters. In MSDR, the second goal is met through a process that uses polynomial regression. In this paper, MSDR is modified by replacing the process that uses polynomial regression with a new process that is called ”largest jump”. A new algorithm is produced, which is called Modified MSDR (MMSDR). We show that when MMSDR is implemented on any connected graph with identical weights, the output always consists of only one cluster. The modified algorithm is tested on several Euclidean graphs, whose vertices are points in Euclidean space and the edge weights are distances between points, and the result shows that MMSDR is able to detect the clustering that matches visual identification. The modified algorithm is also implemented on a graph that models the domestic flight routes of an airline in Indonesia.

Keywords: Graph clustering, minimum spanning tree, standard deviation, largest jump

Deriving Explicit Formula of Chebyshev Polynomials by Using Composition of Generating Functions

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ABSTRACT

In this skripsi, the way of deriving explicit formula of Chebyshev polynomials is carried out by using composition of generating functions and a function called *composita*. *Composita* is needed to find the coefficients of the composition of generating function. From the coefficients, the explicit formula of Chebyshev polynomials are obtained. Explicit formula of Chebyshev polynomials of the first kind is derived by multiplying $(1-xt)$ to the composition of the generating function $F(x,t)=2xt-t^2$ and $G(t)=\frac{1}{1-t}$. Explicit formula of Chebyshev polynomials of the second kind is derived by using the composition of the generating function $F(x,t)=2xt-t^2$ and $G(t)=\frac{1}{1-t}$. In addition, explicit formula of Chebyshev polynomials of the third kind is derived by multiplying $(1-t)$ to the composition of the generating function $F(x,t)=2xt-t^2$ and $G(t)=\frac{1}{1-t}$ and fourth kind is derived by multiplying $(1-t)$ to the composition of the generating function $F(x,t)=2xt-t^2$ and $G(t)=\frac{1}{1-t}$.

Keywords: *Composita*, generating function, composition of generating function, Chebyshev polynomials

Application of Quaternion in Improving The Quality of Global Sequence Alignment Scores for an Ambigous Sequence Target in Streptococcus Pneumoniae DNA

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ABSTRACT

DNA sequence can be defined as a succession of letters, representing the order of nucleotides within DNA, using permutation of four DNA base codes including *adenine* (A), *guanine* (G), *cytosine* (C), and *thymine* (T). The precise code of the sequences are determined using DNA sequencing methods and technologies, which have been developed since 1970s and currently become highly developed, advanced and highly throughput sequencing technologies. So far, DNA sequencing has greatly accelerated biological and medical research and discovery. However, in some cases DNA sequencing could produces any ambiguous and not clear enough sequencing results that make them quite difficult to be determined whether these codes are A, T, G, or C. To solve these problems, in this study we can introduce other representation of DNA codes namely *Quaternion* $Q = (P_A, P_T, P_G, P_C)$, where P_A, P_T, P_G, P_C are the probability of A, T, G, C bases that could appear in Q and $P_A + P_T + P_G + P_C = 1$. Furthermore, using *Quaternion* representations we are able to construct the improved scoring matrix for global sequence alignment processes, by applying a dot product method. Moreover, this scoring matrix produces better and higher quality of the match and mismatch score between two DNA base codes. In implementation, we applied the Needleman-Wunsch global sequence alignment algorithm using Octave, to analyze our target sequence which contains some ambiguous sequence data. The subject sequences are the DNA sequences of *Streptococcus pneumoniae* families obtained from the Genebank, meanwhile the target DNA sequence are received from our collaborator database. As the results we found the *Quaternion* representations improve the quality of the sequence alignment score and we can conclude that DNA sequence target has maximum similarity with *Streptococcus pneumoniae*.

Keywords: Quaternion, scoring matrix, global sequence alignment, streptococcus pneumoniae

Application of Machine Learning on Brain Cancer Multiclass Classification

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ABSTRACT

Classification of brain cancer is a problem of multi-class classification. This multi-class problem is transformed into several binary problems using one-versus-one method. The microarray gene expression dataset has the two main characteristics of medical data: extremely many features (genes) and only few number of samples. The application of machine learning on microarray gene expression dataset mainly consists of two steps: feature selection and classification. In this paper, the features are selected using a method based on support vector machine recursive feature elimination (SVM-RFE) principle for multi-class classification, called multiple multi-class SVM-RFE. Instead of using only the selected features on a single classifier, this method combines the result of multiple classifiers. The features are divided into subsets and SVM-RFE is used on each subset. Then, the selected features on each subset are put on separated classifiers. This method enhances the feature selection ability of each single SVM-RFE. Twin support vector machine is used as the method of classifier to reduce computational complexity. It uses two non-parallel hyperplanes instead of single hyperplane used in ordinary SVM. The experiment on the brain cancer microarray gene expression dataset shows that this method of gives better results.

Keywords: Brain cancer, microarray gene expression dataset, multi-class classification, multiple SVM-RFE, twin SVM

Normed Kernel Function-Based Fuzzy Possibilistic C-Means (NKFPCM) Algorithms for High-Dimensional Breast Cancer Database Classification with Feature Selection is Based on Laplacian Score

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ABSTRACT

In the last decade, breast cancer became the center of world health attention because of the disease include the leading cause of death for women. Therefore, necessary precautions and treatment. In previous studies, it has been used Fuzzy Kennel K-Medoid algorithms for multiclass of data. In the paper, we propose a new algorithm to classify the high dimensional data of breast cancer using Fuzzy Possibilistic C-means (FPCM) and a new method based on the analysis of clustering using the effective fuzzy c-means by incorporating the membership function of fuzzy c-means, the typicality of possibilistic c-means approaches, normed kernel-induced distance, called normed kernel Possibilistic Function-based fuzzy C-means (NKFPCM). The purpose of this paper is to get the best accuracy in the classification of breast cancer data. To improve the accuracy of the two methods, the features candidate will be evaluated using feature selection. For the feature selection methods used Laplacian Score. The results obtained showed the comparison accuracy, running time, and the number of iterations of FPCM and NKFPCM use and without feature selection.

Keywords: Breast Cancer, classification, NKFPCM, laplacian score

Application Kernel Modified Fuzzy C-Means for Gliomatosis Cerebri and Brain Infection

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ABSTRACT

Differences in treatment of diseases Gliomatosis Cerebri and Brain Infection is crucial to the healing process. This time to determine the content of metabolites in patients with glioma Astrocytoma brain or brain infections do Magnetic resonance spectroscopy (MRS). An analysis of the MRS can not be used as a reference for determining a patient suffering from brain glioma or brain infection. In this paper will discuss the process of classifying the data MRS to determine the disease suffered by a patient. The ultimate purpose of writing this final mentukan MRS data classification accuracy using Modified Kernel Fuzzy C-Means. Modified Kernel Fuzzy C-Means is the development of methods of Fuzzy C-Means and use of kernel functions as a function of distance. The accuracy of the classification is very dependent on the parameters contained in kernel algorithm Modified Fuzzy C-Means.

Keywords: Classification, cancer, kernel function, Modified Fuzzy C-Means, *gliomatosis cerebri*

Forecasting Indonesian Stock Market using A Hybrid Fuzzy Time Series Model Based on ANFIS and Integrated Nonlinear Feature Selection

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ABSTRACT

Forecasting stock price is a challenging task due to the complex time series of the data. The complexity arises from many variables affecting the stock market. Many time series models have been proposed before, but those previous models still have some problems: 1) put the subjectivity of choosing the technical indicators, and 2) rely upon some assumptions about the variables, so it is limited to be applied to all datasets. Therefore this paper proposes a novel ANFIS (Adaptive Neuro Fuzzy Inference System) time series model based on INFS (Integrated Nonlinear Feature Selection) for forecasting Indonesian stock market, specifically on sub sector telecommunication that gives a great impact since the beginning of 2016. In order to evaluate the performance of proposed models, stock market transaction data on sub sector telecommunication from January 2011 to July 2015 are collected as experimental datasets. As the result, the proposed method has outperformed its counterparts in terms of accuracy, profit evaluation and statistical test.

Keywords: Stock forecasting, fuzzy time series, ANFIS

Lungs Cancer Classification using Kernel Based Selection of Gene Function

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ABSTRACT

Cancer is one of disease that needs proper treatment. The side effects of improper treatment will appear, so it needs particular concern in cancer classification. Currently, Many research on cancer classification method. This was done to reduce these side effects. Gene selection problem in the cancer classification becomes important, because it can reduce the high dimensionality of microarray data, that is one form of cancer data. In this final assignment, will be used a gene selection method based clustering with kernel fuction to get dissimilarity measure. Microarray that has been selected will then be classified using Support Vector Machine and as well will be compared with some feature selection like Fisher Discriminant analysis, two sample t-test and χ^2-statistic.

Keywords: Classification, cancer, lung, kernel function, SVM

Classification Data of Cancer using Tangent Fuzzy Possibilistic C-Means

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ABSTRACT

Cancer classification based on microarray data has been able to cure cancer with cancer therapy that can be maximized and with toxicity that can be minimized. In this paper, classification process of colon cancer data will be discussed further to determine whether the data is a cancer data or normal data. The purpose of paper is to obtain the accuracy of colon cancer data classification using Tangent Fuzzy Possibilistic C-Means (TFPCM). The accuracy depends on the parameters in TFPCM algorithm, so the optimal value of those parameters are needed. The method in this paper using Robust Fuzzy Possibilistic C-Means technique (RFPCM) where the Kernel function that is being used is hyper tangent Kernel Bray Curtis. The purpose of using this Kernel function is to obtain important information from high dimension cancer data. The selection of the initial cluster center is using prototype initialization method mathematically to improve the accuracy.

Keywords: Classification, colon cancer, Tangent Fuzzy Possibilistic C-Means, microarray data, kernel function, prototype initialization method

Ordering Dually in Triangles (ORDIT) Ranking Method on The Severety Level of The Citarum Watershed

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ABSTRACT

Handling environmental issues are not things that could be done at once, especially in Citarum watershed as the largest watershed in West Java where about 15 million people resides in. Areas that considered highly vulnerable certainly require immediate attention in order to avoid adverse impacts to communities in the area. One way to determine the priority areas is using Ordering Dually in Triangles (ORDIT). ORDIT ordering is a method to rank some instance based on Hasse diagram. The objective of this researh is to rank the upper Citarum subwatersheds to determine which areas are a top priority that require immediate attention. The result of ORDIT ranking method is a place rank of subwatersheds where the area that get the first rank is the most vulnerable. The top five most vulnerable area is Ci Patahunan (ORDIT=1548), Nanjung Leutik (ORDIT=6429), Ci Kukuk (ORDIT=6786.018), Cilampeni (ORDIT=7024), and Cibodas (ORDIT=7262.016). The precedence plot give a visualization of the rank of subwatersheds in 'trapezoidal triplet' of subordination schematic.

Keywords: ORDIT, watersheds, Hasse diagram, partial order

Development of Digital Image Encryption Algorithm Using Composition Chaos Function

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ABSTRACT

Progress in cryptography is also influenced by the development of chaos function. This paper developed a new chaos functions which are the result of the composition of the two functions, namely chaos Henon Map and Tent Map. Forms composition resulting chaos function such $x_{n+1} = 1 - \alpha\left(\mu(1 - |2x_{n-1} - 1|)\right)^2 + b\mu(1 - |2x_{n-2} - 1|)$ with initial values $a = 2{,}01; b = 0{,}409;\ \mu > 0;\ x_n \in \mathbb{R}$. Furthermore, in this paper the new chaos function is called Henon Tent Map (HTM). The encryption process developed in this paper is to do *exclusive or* (XOR) operation of each pixel of the original image with each key stream generated by HTM function. So it can produce the encrypted image from the original image with a certain initial values. Further testing the performance of the encryption algorithm based HTM by randomness test according to standards of the National Institute of Standards and Technologies (NIST). Other tests done by testing the sensitivity of the initial value, distributed test or ergodisitas test and image quality test. The results of all these tests show that the developed algorithm is able to withstand a brute-force attack.

Keywords: Composition of chaos function, henon tent map, encryption alghorithm, digital image

Observing the Trends of Criminal Occurrence Territory Using Spatial Scan Statistic and Correspondence Analysis

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ABSTRACT

This study objectives are to detect cluster of crime cases through scan statistic and to analyze the relation between types of crime and the location of crime case occurred. This study uses data that published by Badan Pusat Statistik (BPS) about 22 criminal types cases based on province in Indonesia that occurred during 2013. The spatial scan statistic method was aimed to detect cluster of crime cases among provinces in Indonesia. The scan statistic detects cluster by creating circular scanning windows that spread to whole study area. For each scanning windows, a likelihood ratio test and p-value calculation was performed in order to decide whether the window that being analyzed was a cluster. The cluster detection was done using SaTScan™ software and was presented in maps. The correspondence analysis is aimed to observe the trend of provinces in Indonesia to crime cases occurrence. This method analyze a numerical frequencies cross tabular data as the input, and results a simple graphical display which permits more rapid interpretation and understanding of the data. A chi-square test was performed to decide that provinces and crime cases were dependent. Then, correspondence analysis was perfumed to observe which province that have strong relation to certain crime case. The spatial scan statistic method successfully detect provinces that categorized as cluster for 22 crime types cases being analyzed.

Keywords: Crime, scan statistic, hotspot

Solving Cyclical Nurse Scheduling Problem Using Preemptive Goal Programming

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ABSTRACT

Nurse scheduling system in hospital is being modelled as a preemptive goal programming problem that is solved by using LINGO software with the objective function to minimize deviation variable at each goal. The scheduling is done cyclically, so every nurse is treated fairly since they have the same work shift portion with the other nurses. By paying attention to the hospital's rules regarding nursing work shift cyclically, it can be obtained that numbers of nurse needed in every ward are 18 nurses and the numbers of scheduling periods are 18 periods where every period consists of 21 days.

Keywords: Nurse scheduling, cyclical scheduling, goal programming

Hotspot Detection Using Space Time Scan Statistic on Childen Under Five Health Case Study in Depok

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ABSTRACT

Some problems that affect the health level in Depok is the high malnutrition rates from year to year and the more spread infectious and non-communicable diseases in some areas. Children under five years old is a fulnarable part of population to get the malnutrition and diseases. Based on this reason, it is important to observe the location and time, where and when, malnutrition in Depok happened in high intensity. To obtain the location and time of the hotspots of malnutrition and diseases that attack children under five years old, space time scan statistics method can be used. Spacetime scan statistic is a hotspot detection method, where the area and time of information and time are taken into account simultaneously in detecting the hotspots. This method detects a hotspot with a cylindrical scanning window: the cylindrical pedestal describes the area, and the height of cylinder describe the time. Cylinders formed is a hotspot candidate that may occur, which require the testing of hypotheses, whether a cylinder can be summed up as a hotspot.
Hotspot detection in this study carried out by forming a combination of several variables. Some combination of variables provides hotspot detection results that tend to be the same, so as to form groups (clusters). In the case of infant health level in Depok city, Beji health care center region in 2011-2012 is a hotspot. According to the combination of the variables used in the detection of hotspots, Beji health care center is most frequently as a hotspot. Hopefully the local government can take the right policy to improve the health level of children under five in the city of Depok.

Keywords: Spacetime scan statistic, hotspot, malnutrition

A Mathematical Model of Predator-Prey Interaction between Seal, Herring and Steelhead Trout

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ABSTRACT

A mathematical model of predator-prey interaction between Seal, Herring and Steelhead Trout will be introduced in this article. The population of Steelhead Trout is divided into two subpopulation according to their living ecosystem, i.e in freshwater and sea ecosystem. Therefore, the model was developed as a four-dimensional system of differential equation. The migration of Steelhead Trout is assumed to be take place all over the year as a constant parameter as well as the harvesting rate in Herring and Steelhead Trout population. Mathematical analysis of the equilibrium points and local stability criteria was done. Some numerical simulation to give an interpretation about the analytical results will be conducted.

Keywords: Predator-prey, seal, steelhead trout, herring, equilibrium point, local stability

Application of Agglomerative Clustering for Analyzing Phylogenetically on Bacterium of Saliva

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ABSTRACT

Analyzing population of Streptococcus bacteria is important because these spesies can cause dental caries, periodontal, halitosis (bad breath) and more problems.This paper will discuss the phylogenetically relation between the bacterium Streptococcus in saliva using a phylogenetic tree of agglomerative clustering methods. Starting with the bacterium Streptococcus DNA sequence obtained from the GenBank to be aligned, the alignment is performed using the Neddleman-Wuncsh Algorithm for global alignment. The alignment results in the optimal score or the distance between DNA sequence of the bacterium Streptococcus one another. Optimal scores collected in a single matrix. Agglomerative clustering technique consisting of single linkage, complete linkage and average linkage. In this technique the number of group sequal to the number of individual species. The most similar species is grouped until the similarity decreases and then formed a single group. Results of grouping is a phylogenetic tree and branches that join an established level of distance, that the smaller distance the more the similarity of the larger spesies implementation is using the Octave, an open source program.

Keywords: Global alignment, agglomerative clustering, phylogenetic tree

Fuzzy Kernel K-Medoids Algorithm for Anomaly Detection Problems

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ABSTRACT

Intrusion Detection System (IDS) is an essential part of security systems to strengthen the security of information systems. IDS can be used to detect the abuse by intruders who try to get into the network system in order to access and utilize the available data sources in the system. There are two approaches of IDS, Misuse Detection and Anomaly Detection (behavior-based intrusion detection). Fuzzy clustering-based methods have been widely used to solve Anomaly Detection problems. Other than using fuzzy membership concept to determine object to cluster, another approaches as in combining fuzzy and possibilistic membership or feature-weighted based methods are also used. We propose Fuzzy Kernel k-Medoids that combining fuzzy and possibilistic membership as a powerful method to solve anomaly detection problem since on numerical experiment it is able to classify IDS benchmark data into five different classes simultaneously.

Application of Spectral Clustering on Microarray Data of Carcinoma by Using Partitioning Around Medoids (PAM) Algorithm

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ABSTRACT

Microarray technology became one of the indispensable tools by biologists to monitor the expression levels of genes of an organism, one of which is the expression of the genes of people with carcinoma. Carcinoma is a cancer that forms in the epithelial tissue. These data can be analyzed such as the identification expressions hereditary gene and also build classifications that can be used to improve diagnosis of carcinoma. Microarray data usually served in large dimension that most methods require large computing time to do the grouping. Therefore, this study uses spectral clustering method which allows to work with any object for reduces dimension. Spectral clustering method is a method based on spectral decomposition of the matrix which is represented in the form of a graph. After the data dimensions are reduced, then the data are partitioned. One of the famous partition method is Partitioning Around Medoids (PAM) which is minimize the objective function with exchanges all the points that are not medoid and the medoids iterates through until converge. Objectivity of this research is to implement methods spectral clustering and partitioning algorithm PAM to obtain groups of 7457 genes with carcinoma based on the similarity value. The result in this study is three groups of genes with carcinoma.

Keywords: Carcinoma, graph, microarray, PAM, spectral clustering

Analysis of Family of Dengue Virus Using Regularized Markov Clustering (R-MCL) Algorithm and Its Implementation

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ABSTRACT

Dengue is a mosquito-borne viral disease that has rapidly spread in all regions of WHO in recent years. Dengue virus consisting 10 different proteins and classified to 4 major serotypes: DEN-1, DEN-2, DEN-3, and DEN-4. In this study, we applied Regularized Markov Clustering (R-MCL) algorithm to cluster 30 protein sequences of dengue virus which taken from Virus Pathogen Database and Analysis Resources (ViPR) and to analyse the result. R-MCL algorithm was implemented on Python and resulting 8 clusters with more than one centroids on several clusters where the number of centroid represents the density level of interaction. Moreover, the density of protein-to-protein interaction which connected in a network tends to form complex protein which serves as certain biological processes. The result shows that R-MCL clusters dengue virus based on the common functionality of their protein components regardless their serotypes.

Keywords: Bioinformatics, dengue virus, R-MCL, clustering, sequence alignment, protein-protein interactions

Clustering Self Organizing Map (SOM) Method for Human Papillomavirus (HPV) DNA as A Main Cause of Cervical Cancer Disease

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ABSTRACT

One of the most widely used clustering method, since it has advantage on its robustness is Self Organizing Map (SOM) method. This paper discusses the application of SOM method on Human Papillomavirus (HPV) DNA which is a main cause of cervical cancer disease, the most dangerous cancer in developing countries. We use 18 types of HPV DNA based on the newest complete genome. By using open-source-based program R, clustering process can separate 18 types of HPV into two different clusters. There are two types of HPV in the first cluster while 16 others in the second cluster. The Analyzing result of 18 types HPV based on the malignancy of the virus (the difficultness to cure). Two of HPV types the first cluster can be classified as tame HPV, while 16 others in the second cluster are classified as vicious HPV.

Keywords: Min – max normalization, N- mers frequency, Self Organizing Map (SOM)

Application of K-Means Clustering Algorithm In Grouping the DNA Sequences of Hepatitis B Virus (HBV)

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ABSTRACT

Based on WHO data, an estimated of 15 millions people worldwide who are infected by hepatitis B (HBsAg+) are also infected by hepatitis D. Hepatitis D infection can occur simultaneously with hepatitis B (co infection) or after a person is exposed to chronic hepatitis B (super infection). Hepatitis B is caused by the HBV virus and hepatitis D is caused by HDV virus. HDV can not live without HBV. Hepatitis D virus is closely related to HBV infection, hence it is really realistic that every effort of prevention against hepatitis B can indirectly prevent hepatitis D. This thesis discussed the clustering of HBV DNA sequences by using k-means clustering algorithm and R programming. Clustering processes is started with collecting HBV DNA sequences that are taken from GenBank, then performing extraction HBV DNA sequences using n-mers frequency and furthermore the extraction results are collected as a matrix and normalized using the min-max normalization with interval [0, 1] which will later be used as an input data. The number of clusters is two and the initial centroid selected of cluster is choosed randomly. In each iteration, the distance of every object to each centroid are calculated using the Euclidean distance and the minimum distance are selected to determine the membership in a cluster until two convergent clusters are created. As the result, the HBV viruses in the first cluster is more virulent than the HBV viruses in the second cluster, so the HBV viruses in the first cluster can potentially evolve with HDV viruses that cause hepatitis D.

Keywords: Fitur extraction; euclidean distance; k-means clustering; n-mers frequency

Cancer Clustering Using Hybrid Method of Fuzzy C-Means with Improved Particle Swarm Optimization and locality Preserving Projection as Reducers Dimensional Microarray Data

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ABSTRACT

Microarrays technology is growing rapidly in bioinformatics, one of them about cancer. Clustering of cancer gene expression data that are large size and high dimensionality can provide information and knowledge to overcome cancer. In this paper, given the stage of clustering technique performed. Firstly, the highly dimensionality of the microarray gene data is reduced using Locality Preserving Projections (LPP). LPP is chosen because of its ability to preserving locality of neighborhood relationship territory. Secondly, the clustering of microarray gene data using hybrid methods FCM and IDPSO, because it can overcome the FCM weakness easy trapped to fall into local minima and it can overcome the PSO weakness has a random initial solution. IDPSO is the latest development of the PSO. The hybrid FCM and IDPSO that aim can make efficient clustering genes with parameter adjustment in order to avoid falling into a local minima so as to obtain a better solution. The results of this paper in the form of classes of cancer with high accuracy.

Keywords: Cancer, microarray, fuzzy c-means, improved particle swarm optimization

Data Preprocessing for Determining Outer/Inner Parallelization in the Nested-Loop Problem using OpenMP

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ABSTRACT

Multi-thread programming using OpenMP on the shared-memory architecture with hyperthreading technology allows the resource to be accessed by multiple processors simultaneously. Each processor can execute more than one thread for a certain period of time. However, its speedup depends on the ability of the processor to execute threads in limited quantities, especially the sequential algorithm which contains a nested-loop. The number of the outer-loop iterations is greater than the maximum number of threads that can be executed by a processor. The thread distribution technique that had been found previously only be applied by high-level programmer. This paper generates a parallelization procedure for low-level programmer in dealing with 2-level nested-loop problems with the maximum number of threads that can be executed by a processor is smaller than the number of the outer-loop iterations. Data preprocessing which is related to the number of the outer-loop and the inner-loop iterations, the computational time required to execute each iteration and the maximum number of threads that can be executed by a processor are used as a strategy to determine which parallel region that will produces optimal speed up.

Keywords: Parallelization, nested-loop, preprocessing, OpenMP

Implementation of Hierarchical Clustering Using K-Mer Sparse Matrix to Analyze Mers-CoV Genetic Relationship

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ABSTRACT

Hierarchical clustering is an effective method in creating phylogenetic by knowing the distance matrix between DNA sequence. One of methods to make the distance matrix use k-mer method. k-mer is more efficient than others. The steps to make distance matrix using k-mer method starts from creating k-mer sparse matrix. Then, creating k-mer singular value vector. The last step is counting distance each vector. This paper will analyze the sequence of DNA MERS-CoV by implementing Hierarchical clustering using k-mer sparse matrix so that will be known the ancestor of each sequence of DNA MERS-CoV.

Parallelization Strategies for Continuum-Generalized Method of Moments on the Multi-Thread Systems

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ABSTRACT

Continuum-Generalized Method of Moments (C-GMM) covers the Generalized Method of Moments (GMM) shortfall which is not as efficient as Maximum Likelihood estimator by using the continuum set of moment conditions in a GMM framework. However, this computation would take a very long time since optimizing regularization parameter. Unfortunately, these calculations are processed sequentially whereas in fact all modern computers are now supported by hierarchical memory systems and hyperthreading technology, which allowing for parallel computing. This paper aims to design parallel algorithm for C-GMM on the multi-thread systems by first detecting parallel regions for the original C-GMM algorithm. Furthermore, this parallel algorithm will be implemented with standard shared-memory application programming interface, i.e. Open Multi-Processing (OpenMP).

Keywords: Parallel, thread, continuum-generalized method of moments, OpenMP

Clustering Protein Sequences of Herpes Virus Using Tribe Markov Clustering (Tribe-MCL)

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ABSTRACT

The herpes virus can be found anywhere and one of the important characteristics is its ability to cause acute and chronic infection at certain times so as a result of the infection allows severe complications occured. The herpes virus is composed of DNA and containing protein and wrapped by glycoproteins. In this work, the Herpes viruses family can be classified and analyzed by clustering their protein-sequence using Tribe Markov Clustering (Tribe-MCL) algorithm. Tribe-MCL is an efficient clustering method based on the theory of Markov chains, to classify protein families from protein sequences using pre computed sequence similarity information. We implement the Tribe-MCL algorithm using an open source program of R. We select 24 protein sequences of Herpes virus obtained from NCBI database at http://www.ncbi.nlm.nih.gov/. The dataset consists of three types of glycoprotein B, F, and H. Each type has eight herpes virus that infected humans. Based on our simulation using different inflation factor r=1.5, 2, 3 we found various number of the clusters results. The greater the inflation factor the greater the number of their clusters. Each protein will group together in the same type of protein.

Keywords: Clustering, herpes virus sequence of protein, tribe markov clustering, tribe-MCL

Non-Negative Matrix Factorization as A Robust Feature Selection Method for Classification of Dementia with MRI Data

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ABSTRACT

This paper investigates applications of non-negative matrix factorization as feature selection method to select the features from gray level co-occurrence matrix. The proposed approach is used to classification of dementia using MRI data. In this study, texture analysis using gray level co-occurrence matrix is done to feature extraction. MRI images were processed and get nine features from gray level co-occurrence matrix. Non-negative matrix factorization selected three features that influence of all features produced by feature extractions. A support vector machines (SVM) classifier is adapted to classify dementia, i.e. Alzheimer's disease, Mild Cognitive Impairment (MCI) and normal control. The experimental results show that non-negative factorization as feature selection method was able to achieve an accuracy of 96.4% for classification of Alzheimer's and normal control. The proposed method also compared with Principal Component Analysis (PCA), and the experimental results show that the results of our approach are better.

Keywords: Non-negative matrix, features selection, gray level co-occurrence matrix, Magnetic Resonance Images (MRI)

Spectrum Analysis on Fisher-Kolmogorov-Petrovsky-Pischunov Equation using Evans Function Approach

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ABSTRACT

The eigenvalues of a dynamical system, can be used to determine the stability of a system. In general, the eigenvalues will form two kinds of spectrum, continuous spectrum and point spectrum. This paper will discuss methods to determine the spectrum of eigenvalues, the method are Sturm-Liouville Theory and Evans function. The equation that we used is Fisher-Kolmogorov-Petrovsky–Pischunov equation: $u_t = u_{xx} - u + u^{\beta}$, with $2 < \beta < 3$.
Numerical methods which we use is Newton Raphson and Runge Kutta.

Keywords: Spectrum, continuous spectrum, point spectrum, evans function, Sturm-Liouville theory, FKPP equation

Data Acquisition System of 16-Channel EEG Based on ATSAM3X8E Arm Cortex-M3 32-Bit Microcontroller and ADS1299TI

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ABSTRACT

The instrumentation system have been acquired of EEG (electroencephalogram) signal based on 32-bit microcontrollers of Cortex-M3 ATSAM3X8E. The instrument consists of 16-channel electrodes with dry-electrodes type made in Florida Research Instrument, USA, which is implemented in the form of EEG head-caps connected into the ADC (Analog to Digital Converter) ADS1299 Texas Instruments. The resolution of ADC is high, 24-bits, so it can be acquired with high precision conversion from analog signal EEG signals in order microvolt (µVolt). The ADS1299 ADC front-end has been designed in double-layer format PCB (Print Circuit Board) with daisy-chain configuration, so that it can be simultaneously acquired the multielectrodes 16-channel. The SPI (Serial Peripheral Interface) protocol for activation process of ADS1299 device has been successfully tested in accordance with the standards protocol, and the protocol was tested using SPI Analyzer Hantek type 4032L USB logic analyzer with sampling rate of 400 MSa/s. The EEG data acquisition systems have been worked between the ADS1299 and microcontroller system and can transmit acquisition results to the PC (Personal Computer). The data acquisition system has been visualized with real-time acquisition results in multi-graph plotter, brain-mapping of 16-channel electrode, and the results of signal processing based on FFT (Fast Fourier Transform). The firmware software GUI (Graphical User Interface) have been developed based on OpenBCI (Brain Computer Interface) with Java Processing. The data acquisition system can process with data stored in the *.txt format. Instrumentation systems have been worked to process the electrical of brain signal activity of the EEG in the frequency range of 1-50 Hz that has been validated by EEG Simulator NETECH 330. The validation process has been done tested with variation frequency of 0.1 Hz, 2 Hz, 5 Hz, and 50 Hz, and potential difference-amplitude variation by 10 µVolt, 30 µVolt, 50 µVolt, 100 µVolt, 500 µVolt, 1 mVolt, 2 mVolt and 2.5 mVolt. The results of the verification process of the acquisition system is not optimal to work at a frequency of 0.1 Hz and the detection of potential difference arround 10 µVolt and over 1 mVolt.

Keywords: EEG, ADS1299, SPI, microcontroller, brain-signal, brain-mapping

Scan Statistic and Correspondence Analysis on Hotspot Detection of Health in Depok

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ABSTRACT

Hotspot an area providing an overview of all the problems that will be seen. For example, health problems, the health of a region can be used as parameters and conditions of an area can be determined the severity of an area so that it can be overcome preventively. Of health factors that exist, some health factors to be considered include: the number of infant with low birth weight, malnourished children under five, underfive mortality, maternal deaths, births without the help of health personnel, infants without handling the baby's health, and babies without basic immunization in every public health center area in Depok. Correspondence analysis allows you examine the relationship between two nominal variables graphically in a multidimesional space. It computes row and colomn scores and produces plot based on the scores. Categories that a similar to each other appear close to each other in the plots. In this way, it is to see which categories of variable are similar to each other which categories of the two variables are related (Hair, Anderson,Tatham,Black,1995). With Scan Statistic methods and Correspondence Analysis, will be examined hotspot that occurred from some of the variables selected. Apparently the result hotspot which is derived from software SaTScan and Correspondence Analysis method obtained Sukatani health centers as a point hotspot and shows the distribution of the same is on the eastern of the city of Depok. This hotspot detection results can be used as input for government agencies to be able to take action so that the low levels of health can be minimized and the community created Depok City with better health levels again.

Keywords: Scan statistic, correspondence analysis, SatScan, hotspot detection

Infant Mortality and Lack of Health Service in Depok: An Application of Hotspot Detection using Spatial Scan Statistic

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ABSTRACT

Infant mortality is a serious public health concern worlwide, particularly in developing and also in emerging countries, including Indonesia. Even though the infant mortality is communicable disease, but we need to know precisely the most severe region to prevent the increasing number of this case. Spatial scan statistic is a method to detect the hotspot on interest area. Through this the event of interest trend or geographical patterns of event in the study area is studied. This method is applied to assess the area degree on health and to detect the most severe region in Depok using hotspot detection. The variables in this study are infants deaths, children under five years deaths, Childbirths without attended by skilled health personnel, pregnant women without received ferum (fe) capsules, and without tetanus immunization. The source of the data is the Department of Health in Depok during period 2011-2014. This paper show that maternal utilization have the same hotspot to infant mortality. The result of this study found Cilodong is the worst hotspot area from 2011-2013, while in 2014 there is no hotspot detection in infant mortality. Therefore the government and policy maker should take preventive action due to decrease infant mortality.

Keywords: Hotspot detection, spatial scan statistic, infant death

Numerical Analysis on Determinant Some Centrosymmetric Matrix

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ABSTRACT

Centrosymmetric matrix has special characteristics, which can be formed as block matrices. Some different block matrices are lower Hessenberg, tridiagonal and centrosymmetric form. These forms can be exploited on computing determinant centrosymmetric matrix by the roles of orthogonal matrix. Some numerical examples are given.

Keywords: Centrosymmetric, Hessenberg, tridiagonal, determinant

Hypergraph Partitioning Implementation for Parallelizing Matrix-Vector Multiplication using CUDA GPU-Based Parallel Computing

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ABSTRACT

Calculation of the matrix-vector multiplication in the real-world problems often involves large matrix with arbitrary size. Therefore, parallelization is needed to speed up the calculation process that usually takes a long time. Graph partitioning techniques that have been discussed in the previous studies can not be used to complete the parallelized calculation of matrix-vector multiplication with arbitrary size. This is due to the assumption of graph partitioning techniques that can only solve the square and symmetric matrix. Hypergraph partitioning techniques will overcome the shortcomings of the graph partitioning technique. This paper addresses the efficient parallelization of matrix-vector multiplication through hypergraph partitioning techniques using CUDA GPU-based parallel computing.

Keywords: Graph partitioning, hypergraph partitioning, parallelization, matrix-vector, CUDA

Topic Extraction Method using Combination of Singular Value Decomposition and Birch

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ABSTRACT

The development of online-based technology creates an enormous amount of information available online. With the rapid technological development which provides much information, topic detection becomes an important issue. Topic detection system usually used for extract the information from a big text data. There are several methods to determine topics automatically; there are dimensional reduction methods such as latent Dirichlet allocation (LDA) [1], non-negative matrix factorization [2], and the clustering method. In this paper, we purpose a new method for extracting topic from text using a combination of SVD and BIRCH. The result shows that a combination of SVD and BIRCH is better than LDA, NMF, and a combination of SVD and k-means clustering [3].

Keywords: Topic detection, topic extraction, BIRCH, SVD, text mining

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Solving Multiple Traveling Salesman Problem (M-TSP) using K-Means Clustering-Genetic Ant Colony System (GACS) Algorithm

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ABSTRACT

Multiple Traveling Salesman Problem (M-TSP) is a routing problems to visit *n* city by *m* salesman (m <n) on the condition that each city can only be visited exactly once by a salesman and travel must end in origin city. n cities are divided into m clusters and each cluster is visited by a salesman. The division of the cluster will use k-means clustering algorithm, and each cluster will look for the route using Genetic algorithms Ant Colony System (GACS), which is a combination of genetic algorithm and Ant Colony System.

Keywords: Multiple traveling salesman problem, k-means clustering, genetic ant colony system

Some Blackhole and Compactification Solutions of Noncanonical Global Monopole in D-Dimensional Spacetime

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ABSTRACT

Here we present some solutions with noncanonical global monopole in nonlinear sigma model in *D*-dimensional spacetime. We discuss some blackhole solutions, its horizons and its thermodynamic properties. We also obtain some compactification solutions. We list some possible compactification channels from *D*-space to 2 × (*D*-2)-spaces of constant curvatures.

Keywords: Noncanonical global monopole, blackhole, compactification

Effects of Post-Thermal Annealing on the Structural of ZnO Thin Films Deposited using Sol-Gel Spin Coating Method

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ABSTRACT

ZnO thin film was deposited on corning glass substrate using sol-gel spin-coating method. The effects of the post-thermal annealing temperature on the structural of ZnO thin film were determined using scanning electron microscopy (SEM) and X-ray diffraction (XRD) measurement. The results showed that the films thicknesses around 300 nm and has polycrystalline hexagonal wurtzite structure. From XRD measurement, the (002) diffraction peak increases with the increasing of post-thermal annealing temperature. It indicates that the films are growing along the *c*-axis with a preferential orientation of (002). The calculation of all parameters from the XRD data, such as *d*-spacing, texture coefficient (*TC*), crystalline size (*D*), lattice strain (ε), dislocation density (ρ) indicated that the post-thermal annealing significantly affect crystalline structures.

Keywords: ZnO thin film, post-thermal annealing, SEM, XRD

Compactification of Higher Dimensional Spacetime with Maxwell Field

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ABSTRACT

We find another solutions of compactification for $p + D$ dimensional with Einstein-Maxwell action [1]. Using the same method as [2], the first solution of compactification is found by fixing null cosmological constant $(\Lambda = 0)$ in higher dimensional and that shows us the higher dimensional spacetime is Minkowski. By this compactification, we obtain de Sitter spacetime in lower dimensional with $D - 2$ dimensional spaces are compacted into *p+2* dimensional. The solution can be written by $M_{p+D} \rightarrow dS_{p+2} \times S_{D-2}$. For the second solution, we find the result by fixing $p = 1$ and $D = 5$. We obtain de Sitter spacetime in lower dimensional and have negative cosmological constant in 6-dimensional which is anti de Sitter spacetime. The solution can be written by $AdS_6 \rightarrow dS_3 \times S_3$ which means 3-dimensional spaces are compacted. For both solutions, the charge Q can be positive or negative.

Keywords: Anti de sitter, compactification, De Sitter, Einstein-Maxwell, higher dimensional, Minkowski

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Structure, Magnetic and Electrical Properties of $Zn_{1-x}Mn_xO$ Material

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ABSTRACT

ZnO and MnO_2 powder have been syntesized using solid state reaction method to produced $Zn_{1-x}Mn_xO$ materials. Effect of doping and annealing at the material $Zn_{1-x}Mn_xO$ (x=0.015, 0.02, 0.025) to the change of crystal structure, electrical and magnetic propertis has been studied. The XRD result showed that sample that were doped with Mn has hexagonal wurtzite polycrystalline structure. The addition of Mn dopant resulting the lattice parameter and peaks intensity decrease. The significant decrease of the peak intensity occur at x=0.02, wich also indicates the decrease of the crystal quality of ZnO. The change of the ZnO structure is affecting the electrical and magnetic properties of the samples.

Keywords: ZnO, MnO_2, $Zn_{1-x}Mn_xO$ materials, XRD, VSM

Preparation and Structure Characterization of Zinc Oxide Doped with Transition Metal Ferrite and Chromium

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ABSTRACT

In this paper, the effect of doping concentrations of Fe and Cr at ZnO powder has been studied using XRD. The preparation of doped ZnO was using solid state reaction method with *high speedshaker mill* and continued with sintering at 900^0C for 4 hours. Samples doped with Fe and Cr has polycrystalline hexagonal wurtzite structure. XRD pattern of ZnO doped with Fe is not far diffrent with Cr, where the intensity deacreases and the peak shifted to a higher 2θ angle. It indicates that the occurents of the change of crystal paramater such as lattice parameters, crystalline sizes and *d*-spacing.

Keywords: ZnO, transition metal, XRD, crystalline size, lattice parameters

Design of Very Low Frequency Vibration Exciter with Single Degree of Freedom

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ABSTRACT

System providers artificial vibration is called vibration exciter is a system used to provide vibration control that produces certain frequencies and acceleration. Vibration exciter used for testing, measurement and calibration related to the scope of vibration. Vibration exciter on the market has a high price and requires sufficient technical knowledge. Therefore, the objective of the research is to design vibration exciter that is simple and low cost without compromising function. Research carried out by making the mechanical system of the vibration exciter whose main components consist of a vibration table, linear motion guide, connecting rod, pillars and base. This research design electronic systems as the actuator movement of the mechanical system that consists of a microcontroller, DC motors, and motor driver. Range of measuring the frequency of the vibration exciter are expected to be realized is 0.1 hertz to 1 hertz. Measurement of frequency and acceleration is done using accelerometer sensor, signal conditioning and pulse analyzers to obtain vibration spectrum of the vibration exciter. From the research results can be obtained information that the vibrating frequency values obtained ranged between 43.575 milihertz to 425.99 milihertz while vibrating acceleration values obtained were in the range of measuring 2.95600 mm/s^2 to 3405.74 mm/s^2. Another result is the value of the measurement uncertainty of vibration exciter is 2.1% to 4.0% of the nominal value of frequency and 4.2% to 20% of the nominal value of acceleration.

Keywords: Vibration exciter, DC motor, arduino uno, pulse width modulation, duty cycle

Kaon Photoproduction in Field Theoretical and Multipoles Approaches

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ABSTRACT

I started with the discussion of the traditional field theoretical approach, where the photoproduction can be theoretically described by using a series of appropriate Feynman diagrams and the unknown parameters are extracted from fitting the calculated observables to experimental data [1]. I will then discuss another alternative approach, known as the multipoles approach [2], where the resonance behavior is parameterized by using electric and magnetic multipoles and the unknown parameters can be obtained either from the Particle Data Book [3] or from fitting to the experimental data.

Keywords: Kaon photoproduction, Feynman diagrams, multipoles, isobar model

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Hyperon Resonances with Spin-5/2 in Kaon Photoproduction

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ABSTRACT

We have investigated the effect of including spin-5/2 hyperon resonances in the kaon photoproduction process $\gamma p \rightarrow K^{+}\Lambda$. To this end we used the previously constructed isobar model [1,2] and inserted a number of hyperon resonances in the *s*-channel of the background terms. The numerical calculation was performed with the help of the hyperon data from Particle Data Group [3]. To construct the interaction vertex we have followed the prescription of Pascalutsa [4], whereas to model the high-spin propagator we have adopted the Vrancx [5] recipe. We also regularized the *u*-channel in order to avoid the singularity, since numerically the value of Mandelstam variable *u* could be zero. By minimizing the value of χ^2 we have improved the consistency of the model with the experimental data, especially with the cross-section and polarization observables data. We have found that the spin-5/2 hyperon resonances contribute significantly to the kaon photoproduction process, especially in the backward directions.

Keywords: Kaon photoproduction, spin-5/2 hyperon resonance, isobar model, χ2 minimization, cross-section, polarization observables

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Kaon Photoproduction Processes (Symbol) and (Symbol) from Thresholds up to W = 2 GeV

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ABSTRACT

Kaon photoproduction processes $\gamma p \rightarrow K^{+}\Lambda$ and $\gamma n \rightarrow K^{0}\Lambda$ have been investigated in the energy range from threshold up to W = 2 GeV. The $K^{+}\Lambda$ background amplitude was constructed from Feynman diagrams, whilst the resonance terms were calculated by means of the multipole formalism. The observables for the $K^{0}\Lambda$ channel were obtained by imposing the isospin symmetry to the $K^{+}\Lambda$ channel and using some experimental data on the helicity photon amplitudes for neutron obtained from Particle Data Group [1]. The observables used in the present investigation were cross-section and polarization observables. In the case of $K^{+}\Lambda$ channel the agreement with the experiment data has been achieved. In the case of $K^{0}\Lambda$ channel, the predicted observables indicate significant discrepancies with the Kaon-Maid [2].

Keywords: Amplitude, cross-section, multipole, photoproduction, polarization, threshold

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Contribution of Spin-7/2 and -9/2 Nucleon Resonances in Kaon Photoproduction Off the Nucleon

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ABSTRACT

Contribution of spin-7/2 and -9/2 nucleon resonances in kaon photoproduction off the nucleon, □ + *p* □ *K*+ + □ has been investigated by using an effective field theoretical approach. To construct the high-spin amplitudes we use the prescription proposed by Pascalutsa [1], whereas to compare the theoretical prediction and experimental data we use our previous isobar model [2, 3], which fits around 7400 data points. The corresponding particle properties are taken from the Review of Particle Properties of Particle Data Group [4]. It is found that the contribution is not negligible. Contribution of these high-spin resonances is especially important in the single and double polarization observables [5].

Keywords: Kaon photoproduction, spin-7/2 and -9/2, nucleon resonances

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Photoproduction of $K^+\Lambda$ in A Multipole Approach Revisited

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ABSTRACT

Kaon photoproduction process $p \rightarrow K^+\Lambda$ has been analyzed by using the multipole approach. The present analysis provides an update to our previous model [1]. All nucleon resonances listed in the Particle Data Book [2], with at least two-star rating, are included in the present model. To construct the background amplitudes we use the Feynman diagrammatic technique, whereas for the resonance amplitudes we exploit the Breit-Wigner formulation. The unknown parameters in both background and resonance amplitudes are extracted from fitting the calculated observables to around 7400 experimental data points. The results are compared with the previous covariant isobar model [3], Kaon-Maid [4], as well as experimental data. It is found that the present model provides a better agreement with the experimental data.

Keywords: Kaon photoproduction, multipole approach, cross-section, polarization

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Build Design for Water Tank with Maximum Rate of Water Outflow: a Quantitative Study

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ABSTRACT

A mathematical model to find the best shape of water tank will be discussed in this article. Some assumptions would be made to start a model construction. The properties for some possible water tank shape will be discuss and the fastest time that required to empty the water tank will be analyzed. The model is obtained through momentum transport properties in physics. At the end of the research, the author conclude that the best water tank shape model that maximize the out flow of water is a truncated cone shape.

Keywords: Water tank, form design, rate of flow, time

Comparative Study of Welding Repair between Method of Friction Stir Welding (FSW) Gas Tungsten Arc Welding (GTAW) in Weld Joint Aluminum Series 5083

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ABSTRACT

This study compares the results of welding 5083 series aluminum plate with a thickness of 6 mm using the Friction Stir Welding (FSW) with a variation of welding speed, namely 22, 29 and 38 mm / min and the results of repair welding repair with the results of conventional welding Gas Tungsten Arc Welding (GTAW). The samples of aluminum welded with FSW method using a milling machine with a rotational speed of 1555 rpm and a length of 5.0 mm pin tool cylindrical threaded. Two samples of the weld the welded repairs to the FSW method with the same conditions with the initial process, with one sample with the conditions upside down which part of the root weld is made part of the face of the weld repair. One other sample GTAW welded repair method entirely. Results FSW and GTAW identified using tensile test, hardness test, microstructure and SEM-EDS. The identification results of the analysis of microstructure and SEM-EDS showed the formation of precipitates Mg_2Si and alumina (Al_2O_3) which resulted in higher hardness values at weld zone. Then the microstructure of the test results obtained FSW welds grain size smaller than GTAW. It causes hardness of FSW results higher than the GTAW. The next of the macrostructure analysis showed that all FSW welds are incomplete fusion defects caused by imperfect welding process. This resulted in GTAW tensile test results better than FSW.

Keywords: Aluminum series 5083, Friction Stir Welding (FSW), Gas Tungsten Arc Welding (GTAW), tensile test, hardness test, microstructure

Computer Aided Diagnosis Toward Mammography by Using Watershed Segmentation Method

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ABSTRACT

The reading of mammography is an activity that requires knowledge and a powerful ability. Successful treatment of breast cancer depends on early detection and diagnosis of breast abnormalities. Mammography is the best available inspection to detect early signs of breast cancer such as mass, calcification, bilateral asymmetry and architectural distortion. Due to the limitations of the human observer, the computer has a major role in detecting early signs of cancer. Watershed method is expected to provide information on various features that define the disorder and the fact that they often can not be distinguished from the surrounding tissue.
Mammography computer-aided diagnosis is expected to assist in the reading of abnormalities in the breast. Watershed segmentation with the selection of the right filter can produce images that could help to make diagnosis. For the diagnostic process is required specificity and high sensitivity. The results of the evaluation at watershed method and the threshold for sensitivity and specificity have a difference of 45% and 12%. ROC evaluation Sobel combination watershed has a value of 83 % accuracy and combination prewitt watershed has a value of 85 % accuracy.

Keywords: Digital Mammography, breast abnormalities, CAD, watershed

Development of Online Condition Monitoring System for Electric Generator Set

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ABSTRACT

This paper presents an online condition monitoring system to recognize the condition of the machine parts of the Electric Generator Set being operated. The detection and identification of the defective parts at the early stage will help a Generator Set (GenSet) to operate normally and prevent operational failure. The condition monitoring system consists of a MMA7361 3-axis accelerometer, a NI MyDAQ data acquisition module, and a Personal Computer (PC) that has been installed with a LabView data acquisition software. The Generator Set that was used in the experiment is Krisbow 2000 W 4-Stroke Electrical Generator Set. The vibration data from various GenSet operating conditions were collected from the accelerometer attached outside the GenSet body. The various operating conditions of the GenSet that were setup in the experiment are the GenSet in normal operating condition without any defective parts, and the GenSet that were operated with abnormal conditions machine parts, namely: with worn ignition coil, with clogged carburetor, with large gap spark plug, and with electrically overloaded condition. The vibration data are transformed into their Power Spectral Density (PSD) graphs by using Fast Fourier Transform (FFT) and then processed by compression and normalization algorithms before stored as the database. A PSD graph from a vibration data of the GenSet with an unknown operating condition is compared with the PSD graphs database of each conditions. The comparison process is carryout using a graph fitting method. In the other words, this method will find the similarity between the PSD graph of an unknown condition GenSet with one of the PSD graphs database. In the several tests it was obtained that the accuracy in detecting the GenSet with clogged carburetor is 100%, large gap spark plug is 100%, worn coil ignition is 60% and over loaded condition is 100%. This results show that graph fitting method has a good performance in detecting of defective machine parts in the Generator Set.

Keywords: Condition monitoring, generator set, FFT, PSD, graph fitting method

Electrical Properties of $La_{0.7}Ba_{0.297}Ca_{0.003}MnO_3$ Derived from Low Temperature Sol-Gel Synthesis

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ABSTRACT

In this paper, we report electrical properties of $La_{0.7}Ba_{0.297}Ca_{0.003}MnO_3$ synthesized through a low temperature sol-gel route. The synthesized material was powdering of a single phase polycrystalline $La_{0.7}Ba_{0.297}Ca_{0.003}MnO_3$. The powder was fabricated at a temperature about 1123 K which was lower than that of most of sol-gel synthesis [1]. The electrical resistivity of the sample was evaluated by the resistivity measurement using the four point probe (FPP) method in the Cryogenic Magnet (Oxford Teslatron Instruments) at temperatures in the range between 5 and 300 K under influence the external magnetic field of 0 T and 1.5 T. Result of the measurement is shown in Figure 1, from which there is evident that magnetic field caused resistivity of this sample decreased and metal-insulator transition temperature (T_{MI}) shift towards higher temperature. It occurred might be due to the magnetic field caused delocalization of charge carriers and make alignment of host spin [2]. Hence, electrons can move easily due to the existence of magnetic field [2]. Decrement of resistivity because of the influence magnetic field is well known as the magnetoresistance effect [3]. It is shown that sample of $La_{0.7}Ba_{0.297}Ca_{0.003}MnO_3$composition synthesized by a low temperature sol-gel process has a magnetoresistance ratio (MR) of about 18% under a magnetic field of 1.5 T.

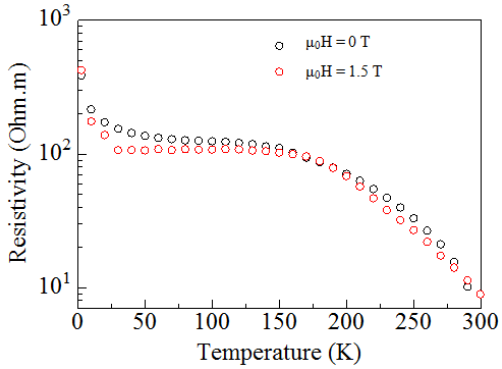

Figure 1. Temperature dependence of resistivity of polycrystalline $La_{0.7}Ba_{0.297}Ca_{0.003}MnO_3$

Keywords: Electrical properties, low temperature, magnetoresistance, sol-gel, magnetic field

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Measuring Refractive Index of Sesame Oil using A Double Slit Fraunhofer Diffraction Method

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ABSTRACT

Sesame oil is a source of polyunsaturated fatty acids that are beneficial to health. Sesame oil is widely used in household scale and also as raw material in industry. Therefore, physical parameters are required to indicate the quality of oil, one of which is the index of refraction. In this research, the measurement of the refractive index of three brands tested sesame oil as a function of temperature has been done using a double slit Fraunhofer diffraction method. This method has several advantages, among others, the operation of the appliance is not complicated, easy designed, widely applicable, and it is non-destructive testing / non-contactive testing that utilizes a light beam which is not high power (intensity) so it does not spoil the purity of the tested material. The results of research showed that the value of refractive index of sesame oil decreased to the increasing of temperature for the range 26° C to 90° C. Based on comparison of refractive index values of research and references using the t test, the obtained t count for each brand of sesame oil at temperature of 40° C, that is: $t_{count\ A} = 0.051$, $t_{count\ B} = 0.031$, and $t_{count\ C} = 0.038$. The t count of label B sesame oil is the smallest than all, so that label B sesame oil has a most excellent quality compared to label A and C sesame oil.

Keywords: Fraunhofer diffraction, refractive index, sesame oil

On Derivation of BPS Equations of Vortices in K-generalized Abelian-Higgs Model

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ABSTRACT

A new self-dual equations, or BPS equations, of vortices in the K-generalized Abelian-Higgs Model was derived by exploiting the identity equation of the scalar Kinetic terms [1]. Here we develop a method for obtaining these BPS equations by assuming the BPS energy EBPS can be written as an integral over total derivative of energy function Q, which is a function of the effective fields, as such we can define a BPS Lagrangian $\mathcal{L}_{BPS} \propto -Q'(r)$, where r is an effective coordinate. Matching this BPS Lagrangian with the corresponding effective Lagrangian, we can extract the resulting BPS equations. We show there are two ways to get the BPS equations of vortices in the K-generalized Abelian-Higgs Model using our method.

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The Influences of Mn Doping on the Structural, Morphological, Optical and Magnetic Properties of ZnO Nanorods Grown by A Simple Hydrothermal Method

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ABSTRACT

Zinc Oxide (ZnO) is very promising material for semiconductor devices applications. It has wide band gap and large exciton binding energy at room temperature. The transition metal (Mn, Fe, Co, Ni, Cr) doped ZnO has potential to be multifunctional material with coexisting magnetic and optical properties. Recently, transition metal doped ZnO has been being major interest due to potential applications in spintronics. In this study, ZnO nanorods were grown on glass substrates using hydrothermal method. Samples were prepared by dissolving Zinc Nitrate Tetrahydrate (ZNT), Hexamethylenetetramine (HMT) and Manganese Chloride Tetrahydrate in DI water while stirring at room temperature. To evaluate crystal structures on the film, the X-ray Diffraction (XRD) was employed in a powder X-ray Diffractometer using CuKa radiation. The morphological and optical properties of Mn-doped ZnO were determined by using JEOL JSM-5310LV Scanning Electron Microscopy (SEM) and UV-Vis spectrophotometer respectively. In order to examine the magnetic properties, Mn doped are varied and the hysteresis loop is carried out by using a Vibrating Sample Magnetometer (VSM). The results indicate that Mn doped variation modifies the magnetic properties of ZnO nanorods but does not significantly induce the change in crystal structure.

Keywords: ZnO nanorods, structural, morphological, optical, magnetic

Synthesis and Characterization of Co Doped Zinc Oxide Nanorods Prepared by Ultrasonic Spray Pyrolysis and Hidrothermal Methods

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ABSTRACT

In the recent years, transitional metal-doped ZnO nanorods have attracted many research groups due to their unique magnetooptical properties for spintronic devices application. In this work, ZnO nanoseed were deposited on glass substrates using ultrasonic spray pyrolysis at temperature of 500^{o} C and then Co-doped ZnO nanorod were grown by using hydrothermal method at temperature of 95^{o} C for 2 hours. The crystal structure, morphological and optical properties of Co-doped ZnO nanorod were investigated by using X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM)), UV-Vis spectrophotometer respectively. Effect of Co dopant on crystal structure, morphological and optical properties of ZnO nanorod will be discussed in detail.

Keywords: ZnO, nanorods, crystal structure, hydrothermal

Neutrino Oscillation Parameters in A Two-Loop Neutrino Mass Model with Leptoquarks

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ABSTRACT

We analyze a neutrino mass model in which neutrino masses arise radiatively at two-loop level with leptoquarks exchange. As discussed in Ref. [1], this model is known for its ability to explain the smallness of neutrino mass with TeV scale leptoquarks and to predict the hierarchy of neutrino mass, thanks to the charged-fermion masses entering the loop. Due to chirality suppression, it is a good approximation to consider only the quark masses of third generation in the loop, and it is actually the main subject of Ref. [1]. However, the value of $\sin^2\theta_{13}$ found under that circumstance was ~0.05. Although this was consistent with the θ_{13} then upper limit [2], this value is currently ruled out by Daya Bay experiment [3]. Thus, in this article, we focus on parameter space of neutrino mass matrix where the quark masses of the second generation play a significant role. We discuss the predictions of this model, in particular its compatibility with the current neutrino oscillation data. The consequences of this model on low-energy phenomena will also be discussed.

Keywords: neutrino mass, neutrino oscillation, leptoquark

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One-Hadron-Exchange Model Potential for K-P Interaction

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ABSTRACT

We present the one-hadron-exchange model potential for *K-p* interaction. The parameters are determined by fitting with the experiment data of *K-p* scattering [1][2][3]. We calculate the *K-p* scattering by using three-dimensional basis [4]. The fitting parameters consist of cut-off masses and coupling constants of σ, ρ, ω, Λ and Σ, and mass of σ. The fitting processes are calculated in energy between 51 and 884 MeV.

Keywords: Kaon interaction, one-hadron-exchange, three-dimensional basis

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Cracking on Anisotropic Neutron Stars

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ABSTRACT

We study the effect of cracking of a local anisotropic neutron star due to small density fluctuations. It is assumed that the neutron star core consists of leptons, nucleons and hyperons. The relativistic mean field model is used to describe the core of equation of state (EOS). For the crust, we use the EOS of introduced by Miyatsu et al. Furthermore, two models are used to describe pressure anisotropic in neutron star matter. One is proposed by Doneva-Yazadjiev (DY) and the other is proposed by Herrera-Barreto (HB). The anisotropic parameter of DY and HB models are adjusted in order the predicted maximum mass are compatible to the mass of PSR J1614-2230 mass and PSR J0348 + 0432. We have found that cracking can potentially present in the region close to the neutron star surface. The instability due cracking is quite sensitive to the neutron star mass and anisotropic parameter used.

Impact of Phase Transition from Neutrons to Hyperons in Neutron Star Properties

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ABSTRACT

We revisit the impact of phase transition from neutrons to hyperons in the properties of neutron star using BSP parameter set of relativistic mean field (RMF) model. Similar to the one was done in Ref. [1], the significance of the phase transition is observed from the impact $g_{\sigma^*\Lambda}$ / $g_{\sigma N}$ variation on the corresponding equation of state of neutron stars and mass-radius relation of neutron stars. The impact of anisotropic pressure on the equation of state of neutron stars and mass-radius relation is also investigated. It is found that equation of state of neutron stars is very sensitive to $g_{\sigma^*\Lambda}$ / $g_{\sigma^*\Lambda}$coupling constant variation. However, different to the result of Ref. [1], we do not obtain the hyperon stars with very small radii R~ 8 km. We do not also find significant effect of anisotropic pressure to change the behavior of neutron star properties due to phase transition.

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Fabrication Optimisation of Optical Biosensor using Alcohol Oxidase Enzyme for Formaldehyde Detection

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ABSTRACT

Formaldehyde sensor has been well developed in few last decade, one of the most sensitive formaldehyde sensor is the sensor using bioreceptor and biology molecule which known as biosensor. In this study, a new and simple biosensor has been successfully fabricated. The biomolecule alcohol oxidase enzyme (AOX) was immobilized on *poly-n-butyl acrylic-co-N-acryloxysuccinimide* (nBA-NAS) membrane containing cromoionophore. The chemical reaction between AOX and folmaldehyde generated the color change of cromoionophore detected by optical absorbance UV Vis measurement. This paper reported the optimisation the use of buffer phosphate solution, respond time, enzyme quantity as well as the measurement of detection range of biosensors. The results show that the optimum concentration and pH of buffer phosphate solution is 0.05 M and pH 7, respectively. The optimum respond time is 3 minutes, the optimum enzyme unit for biosensor is 1 unit/sample and the detection range of biosensor is 0,216 mM with R^2 = 0.9421.

Keywords: Biosensor, formaldehyde, absorbance, NAS, chromoionophore

Electrical Properties of $La_{0.67}Sr_{0.33}Mn_{0.7}Ni_{0.3}O_3$ Synthesized by Sol Gel Method

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ABSTRACT

The previous study showed that LSMO compound has T_C above room temperature. In order to shift T_C of the compound to the near room temperature, Ni doped was given to Mn site of LSMO. In this paper, 30% Mn site was doped by Ni. $La_{0.67}Sr_{0.33}Mn_{0.7}Ni_{0.3}O_3$ compound synthesized by sol gel method and characterized using XRD. Then single phase compound's resistivity was measured to see the electrical properties of this compound. The XRD result showed that samples have single phase with rhombohedral structure and R-3c space group. Resistivity as a temperature function graph did not show resistivity peak and metal insulatir transition. Below 300 K, the resistivity measurement showed that resistivity increased with decreased of temperature that indicates insulator behavior.

Improved Magnetic Properties of Barium Hexaferrite Enhanced by Nanoparticle of $CO_XFE_{3-X}O_4$ (X = 0.5 - 1) Magnets

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ABSTRACT

Magnetic properties of nanocomposite magnets made of nanoparticles of Barium Hexaferrite (BHF) and $Co_xFe_{3-x}O_4$ (x = 0.5-1.0) were reported in this paper. The two types of magnetic particles have a high total magnetization value which was required for permanent magnet applications. Both $Co_xFe_{3-x}O_4$ and BHF nanoparticles were synthesized through mechanical alloying coupled with high frequency ultrasonic irradiation. In this respect, mechanically milled BHF precursors was sintered at a temperature of 1000 ^{0}C for 4 hours leading to single phase powders of nanocrystalline materials. A similar method was also employed in preparation of $Co_xFe_{3-x}O_4$ materials, but this required a relatively longer sintering time up to 12 hours at a sintering temperature of 900 ^{0}C. Their respective nanoparticles were obtained after particle destruction by high frequency ultrasonic irradiation. Nanocomposite magnets were obtained after sintering the mechanically mixed the two types of nanoparticles as constituted components of the composite. It was found that the hysteresis loop of $Co_xFe_{3-x}O_4$ materials as evaluated by Vibrating Sample Magnetometer (VSM) showing soft magnetic phase with a total magnetization value increased as x increased to 1.0 resulted in 0.34 T and a corcivity of 60.36 kA/m. It is shown that the magnetic properties of nanocomposite magnets are a composition dependent in which the remanence is enhanced above the value of an isotropic single phase BHF magnet [1]. The enhancement in remanent magnetization raised from effect of grain exchange interaction between hard and soft magnetic phases [2]. The results of the microstructure structure studied by X-Ray diffraction (XRD) and Scanning Electron Microscopy (SEM) of nanocomposite magnets will be presented and their respective enhancement in magnetic properties is discussed detailed in term of grain exchange interactions.

Keywords: Permanent magnets, barium hexaferrite, Nanoparticles

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Physical and Microwave Characterization of Barium Hexaferrite Nanoparticles in Conductive Pani Matrix

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ABSTRACT

In this paper, we report results on the synthesis of a conductive polymer which fabricated through the method of chemical oxidative polymerization of aniline to form conductive Poly Aniline (PANi) powders. It is shown that the polymerization of aniline taking place in a critical duration time of about 10 hours from which all physical properties changing with time as polymerization was in progress. These include mean particles as well as their particle size distribution which in turn to increase the viscosity and temperature of polymeric liquid. The electrical conductivity of PANi was generated by protonation through the addition of protonic acids into emeraldine base [1] which experimentally used respectively HCl, $HClO_4$, and H_2SO_4. The existence of conductive PANi was confirmed by FTIR spectrophotometer which showing a typical absorption spectrum of PANi [2]. We also report results of microwave characterizations of conductive PANi reinforced Barium Hexaferrite nanoparticles (BHF) in the form of a composite material which are evaluated by Vector Network Analyzer (VNA). The reinforce particles were synthesized through mechanical alloying coupled with particle destruction by high frequency ultrasonic irradiation. The reflection loss (RL) of nanocomposite PANi/BHF subject to VNA evaluation indicated a broaden absorption in the frequency range between 8 and 12 GHz. It is shown that the values of RL for nanocomposites are composition dependent. The more fraction of reinforced particles in the composite, the higher value of RL was obtained. Thus, increasing the amount of microwave absorption means minimizing the microwaves are being transmitted. All physical properties as well as microwave characterization of nanocomposite PANi/BHF derived from synthesized materials are discussed in detail in this report.

Keywords: Nanocomposite, PANi-BHF, microwave absorbing material

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Control System of Hexacopter using Color Histogram Footprint and Convolutional Neural Network

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ABSTRACT

The development of unmanned aerial vehicles (UAV) has been growing rapidly in recent years. The use of logic thinking which is implemented into the program algorithms is needed to make a smart system. By using visual input from a camera, UAV is able to fly autonomously by detecting a target which are shown in several works [1]. However, some weaknesses arose as usage in outdoor environment might change the target's color intensity. Color histogram footprint overcomes the problem because it divides color intensity into separate bins that makes the detection tolerant to the slight change of color intensity [2]. Template matching compare its detection result with template of reference image to determine the target position which is used to position the vehicle in the middle of the target by using visual feedback control based on PID controller. The hexacopter has a total takeoff weight of 5.9 Kg which is consists of components used in building the vehicle, including the frame, propellers with a length of 17 x 5.5 inches, a Li-Po battery with a capacity of 10.000 mAh, ESCs with a maximum current of 40A, GPS, camera, single board computer, flight controller, gimbal, brushless DC motors 360 Kv, and other supporting items. It has a standard flight time of ±16 minutes. Color histogram footprint method localize the target by calculating the backprojection of a histogram [2]. It has an average success rate of 77% from a distance of 1 meter. Visual feedback control based on PID controllers is used to control the throttle and roll by counting the difference between target center point and image center point which is used as a reference to control the movement. It can position itself in the middle of the target based on images taken by the camera with an average positioning time of 73 seconds. After the hexacopter is in the middle of the target, Convolutional Neural Networks (CNN) classifies a number contained in the target image to determine a task for the hexacopter depending on the classified number, either landing, yawing, or return to launch. The recognition result shows an optimum success rate of 99.2%. The program is written in C++ using OpenCV libraries and ROS environment.

Keywords: Color histogram footprint, hexacopter, template matching, unmanned aerial vehicle, visual feedback control

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Gamma Index Evaluation of IMRT Technique using *Gafchromic* Film EBT3 for Homogeneous and Inhomogeneous Material

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ABSTRACT

This study was the extended work which has been done by Wibowo (2015) about Gamma Index (GI) evaluation for homogeneous and inhomogeneous material with IMRT techniques [1]. This study was done to evaluate the gamma index for registering between the planar of dose planning and the measurement from EBT film. Treatment plan was simulated for 5 patients using FBCT modality, Philips Pinnacle3 planning system, 6 MV photon energy, 50 segments IMRT technique, and calculation grid resolution (CGR) of 0.2 cm. GI evaluation was done with criteria of dose difference (DD) of 2%, dose to agreement (DTA) of 2 mm and DD of 5% DTA of 3 mm, SAD 100 cm, depth of 5 cm and 10 cm of the phantom. The result shows that GI for homogeneous material is greater than for inhomogeneous material with discrepancy to previous work is about 1,98% for homogeneous material (depth 5 cm) and 2.05% (depth 10 cm) while it was found of 2,98% for inhomogeneous material (equivalent depth 5 cm) and 4.59% (equivalent depth 10 cm).

Keywords: FBCT, gafchromic film EBT3, gamma index, homogeneous and inhomogeneous material, PTV

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Improved Magnetic Properties of La Substituted Barium Hexaferrite $(Ba_{0,7}La_{0,3})Fe_{12}O_{19}$ Enhanced by Fe_3O_4 Nanoparticles

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ABSTRACT

The improvement of magnetic properties could be achieved through the use of high total magnetization of magnetic particles in a nanocomposite structure. The latter should result in nanocomposite magnets, a new generation of magnetic system, which combines different materials in nano-scale to generate unachievable properties from single phase materials [1]. Nanocomposite magnets have very broad applications including permanent magnets, nanocrystalline soft magnetic materials, biomedical materials and devices [2]. In this work, results of synthesis and magnetic characterization of $(Ba_{0,7}La_{0,3})Fe_{12}O_{19}/Fe_3O_4$ nanocomposite are reported. Both Fe_3O_4 and La substituted Barium hexaferrite nanoparticles were synthesized through mechanical alloying coupled with high frequency ultrasonic irradiation. Nanocomposite magnets were obtained after sintering the mechanically mixed the two types of nanoparticles as constituted components of the composite at a temperature 800 ^{0}C for 3 hours. It is shown that the magnetic properties have changed with different weight ratios between hard and soft magnetic phases. The maximum energy product of nanocomposite magnets increased above the theoretical value of an isotropic of single phase conventional hard ferrite when the hard magnetic phase was mixed with a little weight ratio of soft magnetic, but it decreased when the weight ratio of soft magnetic is high. The results of the microstructure structure studied by X-Ray diffraction (XRD) of nanocomposite magnets will be presented and their respective magnetic properties which evaluated by a Permagraph are discussed detailed in term of grain exchange interactions.

Keywords: Ultrasonic irradiation, nanocomposite magnets, magnetic properties, spring, magnets

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The Performance of Formaldehyde Biosensor on Gold Nanoparticles and Alcohol Oxidase Enzyme

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ABSTRACT

Formaldehyde is an industrial chemical that is widely used in many industrial processes. It is toxic, an irritant to eyes and skin and human carcinogen. The long exposure of formaldehyde can increase the risk of human health. Therefore, it is needed for formaldehyde control in consumer goods and the environment. In this study, a novel formaldehyde optical biosensor based on gold nanoparticles and alcohol oxidase enzyme based was fabricated. Gold nanoparticles were grown on the indium tin oxide coated glass substrate and then coated by *poly-n-butyl acrylic-co-N-acryloxysuccinimide* (nBA-NAS) membrane containing cromoionophore. The alcohol oxidase enzyme was then simply immobilized on the membrane. Biosensor performance parameters were measured through the optical absorption value using UV-Vis spectrophotometer including the repeatability, reproducibility, selectivity and lifetime. Formaldehyde biosensor showed good repeatability and reproducibility with a life time of 21 days and selective to acetaldehyde and methanol.

Keywords: Biosensor, alcohol oxidase, nBA-NAS, gold nanoparticles

The Effect of Gold Nanoparticles on the Range of Detection of Formaldehyde Biosensor Based on Alcohol Oxidase Enzyme

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ABSTRACT

In recent few decades, the use of nanoparticles for analytical application has undergone rapid developments. There are many attentions in noble metal such as gold and silver nanoparticles due to their interesting catalytic, electronic and optical properties. Gold nanoparticles have unique optical properties when it is interacting with the light, referred as the localized surface plasmon resonance effect (LSPR). In order to improve the performance of devices, various shape and size of gold nanoparticles have been widely used for analytical chemistry application, such as spectroscopy, electronic detection, and sensors. In this study, the gold nanoparticles were utilized in the biosensors for detection of formaldehyde. Gold nanoparticles were grown on indium tin oxide coated glass substrate with seed mediated growth method and then coated with the poly(n-butyl acrylate-N-acryloxy-succinimide) and the alcohol oxidase enzyme. The structural, morphological and optical characterizations of gold nanoparticles were performed by using X-ray diffraction, scanning electron microscopy and UV-Visible spectrometer, respectively. The formaldehyde biosensor's range of detection was also investigated. The results showed that gold nanoparticles have increased the optical absorption intensity of biosensor.

Keywords: Biosensor, gold nanoparticles, enzyme alcohol oxidase, formaldehyde

Performance of Optical Biosensor using Alcohol Oxidase Enzyme for Detection of Formaldehyde

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ABSTRACT

Formaldehyde (H_2CO) is commonly used as a disinfectant, a preservative in the food industry and also naturally present in some fruits and vegetables. Formaldehyde is toxic, allergenic and carcinogenic. The high accumulation formaldehyde in food and long exposure in environment is dangerous for human health; hence the monitoring of formaldehyde in the environment and food is crucially needed. The various analytical methods for determining content of formaldehyde have been developed, here a new and simply prepared biosensor using alcohol oxidase enzyme (AOX) has been successfully fabricated. The membrane *poly-n-butyl acrylic-co-N-acryloxysuccinimide* (nBA-NAS) containing chromoionophor ETH5294 was used for immobilization of alcohol oxidase enzyme. Biosensor response was based on the colour change of chromoionophore that correlated with the detected concentration of formaldehyde. The performance of biosensor parameters measured through the optical absorption value using UV-Vis spectrophotometer including the repeatability, reproducibility, selectivity and lifetime. The results showed that the prepared a biosensor has good repeatability with RSD 1.9%, and good reproducibility (RSD=2.1%). The biosensor was selective to acetaldehyde and methanol and stable for more than 35 days and decrease 41.77% after 49 days.

Keywords: Optical biosensor, poly(nBA-NAS), enzyme alcohol oxidase, formaldehyde, chromoionophor

The Influence of Ca-Doping on Structure and Microstructure of $La_{0.7}(Ba_{1-X}Ca_X)_{0.3}MnO_3$

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ABSTRACT

This paper describes structural and morphology of polycrystalline $La_{0.7}(Ba_{1-x}Ca_x)_{0.3}MnO_3$ (x = 0.1; 0.3; and 0.5) prepared by sol-gel method. The aim of Ca-doping in $La_{0.7}Ba_{0.3}MnO_3$ is to make lattice distortion in this structure. The distortion would influence transport mechanism in this material [1]. Core-shell model explained that in polycrystalline material, intergrain distance plays an important role to the electron transport process [2-3]. Besides that, Ca-doping was choosen due to the fact that Curie temperature (T_c) of $La_{0.7}Ba_{0.3}MnO_3$ decrease with Ca-doped [1]. Additionally, magnetocaloric properties of the material will increase due to Ca-doped. Ca-doping did not make change of crystal structure but the lattice parameter decreased with increasing doping concentration. Scanning electron microscope (SEM) is used to observed microstructure of the material. It is showed that all samples are homogeneous with fine size of equiaxed grain morphology. Increasing doping concentration caused grain size increase and become more close packed grains. Microanalysis by EDX (Energy Dispersive X-ray) confirmed purity of the material and there is no significant different between designated composition and measured one.

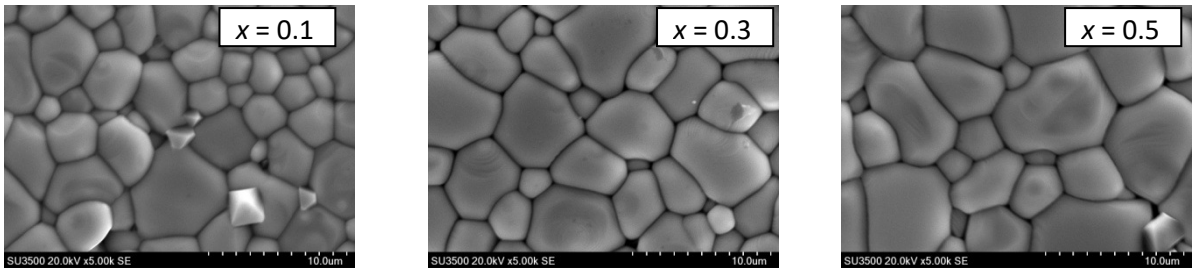

Figure 1. Typical SEM micrographs of $La_{0.7}(Ba_{1-x}Ca_x)_{0.3}MnO_3$ materials

Keywords: Optical biosensor, poly(nBA-NAS), enzyme alcohol oxidase, formaldehyde, chromoionophor

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Enhancement of Magnetic Properties in $Nd_{12-x}Dy_xFe_{82}B_6/Fe_3B$ Nanocomposite Prepared by Ultrasonic Irradiation

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ABSTRACT

We reported results of our recent studies, which focused on nanocomposite magnets consisting of hard and soft magnetic phases, prepared through mechanical alloying method coupled with particle destruction by high frequency ultrasonic irradiation. We take the attention on the substitution of dysprosium leading to Dy substituted Nd-Fe-B to develop high coercivity hard magnetic phase. This was considered important in order to compensate the effects of grain exchange interaction between a hard magnetic phase and a soft magnetic phase in a nanocomposite magnet, which generally showed that remanent magnetization is enhanced with a significant reduction in a coercivity. Our studies showed that the constituents of the nanocomposite magnets, consisting Dy substituted NdFeB hard magnetic phases, which forming $Nd_{12-x}Dy_xFe_{82}B_6$ with x = 0, 2, 4 and 10 compositions, when intimately coupled with that of nanoparticles of the Fe_3B soft magnetic phases to form nanocomposite magnets of suitable compositions resulted in enhancement of magnetic properties. It is shown that composite magnets with 20 % and 30 % in weight have resulted in remanence enhancement with remanent to total magnetization ratio values, $J_r/J_s > 0.5$ despite the reduce in coercivity, but still retained the high value of maximum energy products. Magnetic properties enhancement mechanisms in the nanocomposite magnets under studied will be discussed in detail. The microstructure of nanocomposite magnets studied by both X-ray diffractometer and scanning electron microscope will also be presented and discussed.

Keywords: Nd-Fe-B, nanocomposite magnet, ultrasonic irradiation, nanoparticle, grain exchange interaction, spring magnets

Magnetic Properties of Polycrystalline $La_{0.7}Ba_{0.3}MnO_3$ for Magnetocaloric Effect Application

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ABSTRACT

In this paper, we report magnetic properties of $La_{0.7}Ba_{0.3}MnO_3$ prepared by sol-gel method. This material has high magnetoresistance and magnetocaloric properties [1-2]. Preparation material by sol-gel method has been an interested study to improve physical properties of the material. Because with this method we can ontained material which has distribution of homogeneous size [3]. The synthesized material was powdering of a single phase polycrystalline $La_{0.7}Ba_{0.297}Ca_{0.003}MnO_3$. The powder was compacted and sintered about 1573 K [1]. Magnetic properties of the sample was evaluated by VSM (Vibating Sample Magnetometer) at temperatures in the range between 300 K and 400 K under influence the external magnetic field of 2 T. Numerical evaluations of magnetic entropy change (ΔS_M) were carried out from Eq.(1) using isothermal magnetization measurements with M is magnetization, T is temperature, and H is external magnetic field.

$$\Delta S_M = \int_0^{H_{max}} \left(\frac{\partial M}{\partial T}\right)_H dH \quad (1)$$

The magnetic entropy change as function of temperature for polycrystalline $La_{0.7}Ba_{0.3}MnO_3$ is shown in Figure 1. From figure 1, it is shown that the material has ΔS_M = -3.08 $Jkg^{-1}K^{-1}$.

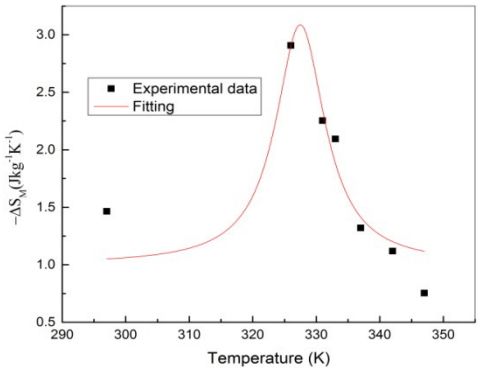

Figure 1. The magnetic entropy change as function of temperature for polycrystalline $La_{0.7}Ba_{0.3}MnO_3$

Keywords: Optical biosensor, poly(nBA-NAS), enzyme alcohol oxidase, formaldehyde, chromoionophor

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Implementation of Small Field Radiotherapy Dosimetry for Spinal Metastase Case

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ABSTRACT

The main objective of this study was to know dose profile of small field radiotherapy in the spine case with SAD techniques. In addition, we evaluated and compared the dose planning of SBRT and conventional techniques to measurements with Exradin A16 and Gafchromic EBT3 film dosimeters [1]. Evaluation of radiotherapy planning has been used using both conformity and homogeneity index for thorax and lumbal regions [2]. The results showed that film EBT3 is highest precision and accuracy with average of standard deviation of ±1.7 and maximum discrepancy of 2.6%, respectively. In addition, the deviation of Full Wave Half Maximum (FWHM) in small field size of 0.8 x 0.8 cm^2 is 16.3%, while it was found around 3% for the field size of 2.4 x 2.4 cm^2. The comparison between penumbra width and the collimation was around of 37.1% for the field size of 0.8 x 0.8 cm^2, while it was found of 12.4% for the field size of 2.4 x 2.4 cm^2. Moreover, the homogeneity index and conformity index evaluation of the planning shows that planning of thorax indicating better results than lumbal regions.

Keywords: Conformity index, dose, dose profile, homogeneity index, penumbra, small field

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Microwave Absorber Properties of $La_{0,67}Sr_{0,33}Mn_{0,8}Ni_{0,2}O_3$ with Sol Gel Synthesis Methods

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ABSTRACT

This paper reports the process and the results are supplemented by material microwave absorber characterization $La_{0,67}Sr_{0,33}Mn_{0,80}Ni_{0,20}O_3$ which has been synthesized by sol gel method. Results refinement of the XRD data showed that the material $La_{0,67}Sr_{0,33}Mn_{0,8}Ni_{0,2}O_3$ have formed a single phase. From the results of using the software refinement High Score obtained crystal size on sample of 21.18 nm. Number of spin concentration in the sample at ESR test results showed a decrease when doping Ni increased, the area under the curve of absorption decreases as 388,718. This is due to the substitution of Ni^{2+} ions Mn^{3+} ions thus inhibiting electron hopping of electrons e_g (ion Mn^{3+}) to t_{2g} (Mn^{4+} ion) in the mechanism of double excange so that the spin of the electrons will t_{2g} antiparallel. Competition between ferromagnetic properties with antiferromagnetic spin make will change the direction so that the sample magnetization will decrease and the magnetic moments become random. ESR results are used to confirm the results of the VNA. Microwave absorption ability is indicated by the value of reflection loss on the sample is -34,30 dB.

Keywords: $La_{0,67}Sr_{0,33}Mn_{0,8}Ni_{0,2}O_3$, double excange, reflection loss

Form Factor Parametrization for A Model of K^+p One-Hadron-Exchange Potential

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ABSTRACT

A K^+p interaction model is derived as one-hadron-exchange potential. The exchanging hadron are consist of σ, ω, ρ, Λ, and Σ [1]. We determine the cut-off parameters of the form factors at each vertex by means of fitting processes to data of K^+p scattering differential cross section. The scattering laboratory energies being considered are from 21 MeV until 669 MeV. We solved the K^+p scattering calculation using three-dimensional technique, which there is no partial wave expansion [2]. We obtain that χ^2/N is 2,4 for the model.

Keywords: K^+p interaction, one-hadron-axchange potential, 3D technique

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Parameterization of Form Factor of K-P Interaction Model Based on One Hadron Exchange

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ABSTRACT

A model of K-p interaction potential is derived based on one hadron exchange interaction, with the hadrons exchange being scalar-meson-σ; vector-meson-ω, ρ; and baryon-Λ, Σ [1]. The cutoff parameters of the form factors at each vertex are determined by means of fitting processes to experimental data of K-p differential cross section, considering the scattering laboratory energies of about 50 MeV to 225 MeV. Theoretical value of differential cross sections are calculated using three-dimensional (3D) technique without partial-wave expansion [2]. We obtain K-p interaction model with χ^2/N value being 3.9.

Keywords: K-p potential, one-hadron-exchange interaction, 3D Technique

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A Model of K+P One-Hadron-Exchange Potential

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ABSTRACT

A model of K+p potential is derived based on K+N interactions being described in Ref. [1]. The model is constructed as a one-hadron-exchange potential for simplicity. The hadrons being exchanged are ρ (rho), σ (sigma), ω (omega), Λ (lambda), and Σ (sigma). The potential's parameters are determined by means of fitting processes to K+p scattering data, which are the spin averaged differential cross sections, for energies of about 21 MeV to 669 MeV. These parameters are the cutoff-parameters for the form factors, sigma mass, and the coupling constants. Theoretical data are produced without partial wave expansion by employing a three-dimensional technique for KN scattering [2].

Keywords: K+p potential, one-hadron-exchange interaction, 3D technique

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K-P One-Hadron-Exchange Potential Model

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ABSTRACT

We present a model of K-p one-hadron-exchange potential based on K-N interactions described in Ref. [1]. The hadrons being exchanged include σ, ρ, ω, Λ and Σ. The potential's parameters are determined by fitting to experimental data of K-p scattering [2]-[4], which are the spin averaged differential cross sections. The energies being considered are between 51 MeV and 884 MeV. We calculate K-p scattering by using a three-dimensional basis [5]. The set of fitted parameters consists of cut-off parameters for the hadron form factors, σ mass, and coupling constants.

Keywords: K-p interaction, one-hadron-exchange potential, three-dimensional basis

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Influence of Fe/Ba Ratio and Calcination on the Physical Properties of $BaFe_{12}O_{19}$ Thin Films Prepared by Chemical Solution Deposition

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ABSTRACT

Hexagonal barium ferrite ($BaFe_{12}O_{19}$) thin films have been prepare on Si substrates by chemical solution deposition technique using aqueous solution of metal nitrates. Coated films were heat treated at 800^0C to 1000 ^{o}C, and all the films were characterized by using X-ray diffraction (XRD) and field emission scanning electron microscopy (FESEM) and vibrating sample magnetometer (VSM). The effects of Fe/Ba ratio and calcination of $BaFe_{12}O_{19}$ thin film structure, crystallites size, magnetic properties and morphology were also investigated.

Keywords: $BaFe_{12}O_{19}$, thin Film, chemical solution deposition

Output Factor of Small Field Electron Beams Dosimetry Measurement

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ABSTRACT

The electron beam has a uniform dose distribution on the surface and have been used for cancer therapy at the surperficial lesions [1]. Cancers that are located close to organs at risk require treatment using a small field, so that accurate dosimetry for electron beam small field becomes a challenge [2, 3]. Dose distribution and output of square and circular field with dimensions of equivalent 5x5 cm^2 and smaller, for nominal energies of 6, 8, 10, 12, and 15 MeV from the Elekta Synergy Platform Linac were measured. All dose distribution measurement were performed using the Gafchromic EBT-3 film. Output measurement were performed using the Exradin A11 ion chamber plan-parallel, Exradin A16 micro ion chamber, PTW Freiburg T60010M-4 silicon diode, and Gafchromic EBT-3 film. The results obtained show that the point of maximum dose moved closer to the surface as the field size decreased. Output factor were comparable to a decrease field size and energy electron beam. There are also differences in the value of the output of the four detectors are among a maximum of 49.5% - 87.6% on field 1x1 cm^2 for 6 MeV, and a minimum of 0.49% - 0.59% on 8x8 cm^2 for 15 MeV were compared with reference field 10x10 cm^2 output factor, so dose distribution of electron treatment field were created with square and circular field of a equivalent 1x1 cm^2 ware not appropriate for patient treatment. In this study, PTW Freiburg T60010M-4 silicon diode are most compatible for small field electron beam measurment.

Keywords: Small field, output factor, electron beam dosimetry

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Electromagnetic Wave Absorbing Characteristics of Synthesized Barium Stronsium Titanate/Polyaniline Nanocomposites

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ABSTRACT

In recent years, advanced materials based on dielectric materials have attracted much attention due to its most promising properties in a wide range technological applications including in the area of light-weight electromagnetic wave absorbers [1]. Barium Strontium Titanate (BST) as filler and conducting polyaniline (PANi) as matrices, both of dielectric materials show high sensitivity to the electric field [2,3]. This is a fundamental development of electromagnetic absorber with BST/polyaniline nanocomposites to result optimum characteristic absorption of electromagnetic waves. Thus the synthesis of novel conducting polymers and a study of their physical properties has been of prime importance. In the current study, we will report our recent results in electromagnetic wave absorbing characteristics of the BST reinforced PANi nanocomposite. BST was synthesized by the mechanical alloying method and successive particle size reduction steps through high frequency ultrasonic irradiation treatments. Whereas polyaniline was produced by oxidative polymerization processes which allows efficient control of the dielectric properties. It is shown that the conductivity of polyaniline can be increased by oxidative polymerization. Mechanical alloying and successive ultrasonic irradiation reduced particle size of BST to the few nanometres that influenced dielectric constant enhancement. We have synthesized successfully the BST/PANi nanocomposites with 20:80, 50:50 and 80:20 compositions. The physical properties like particle sizes, particle morphology, dielectric constant, electromagnetic absorption characteristics are investigated by XRD, SEM, FTIR, LCR and VNA. It is found that BST/polyaniline nanocomposite can enhance main properties of electromagnetic absorber. The high dielectric constant of BST and conductivity of polyaniline support nanocomposite BST/polyaniline as electromagnetic absorber materials.

Keywords: Barium strontium titanate, conducting polymer, microwave absorber, particle size, dielectric materials

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Electrical Conductivity of $LaFeO_{3.X}Fe_3O_4$ (X=0.0, 0.1, 0.2, 0.3, and 0.4) Composites Materials

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ABSTRACT

DC conductivity of nanocomposites material $LaFeO_3.xFe_3O_4$ with x= 0, 0.1, 0.2, 0.3, and 0.4 at.% have been studied by impedance spectroscopy method. $LaFeO_3$ was synthesized by solgel method result in nanoparticle, then it mixed with Fe_3O_4 powder, homogeneously. The mixture was pressed into pellet and sintered at 1300 for 1 h to form nanocomposite of $LaFeO_3.xFe_3O_4$. The electrical properties as a function of temperature (300K-500K) and frequency (100Hz-1MHz) are presented in Nyquist and Bode plot resulting in equivalent circuit and their parameters which contributed by grain and grain boundary. DC conductivity of $LaFeO_3.xFe_3O_4$ as a function of temperature was explained by using Arrhenius equation. From this equation, the values of the activation energy (E_a) for all samples are found. The E_a can be separated by grain and grain boundary which is supported by morphology characterized by scanning electron microscopy (SEM) of the samples which is found that the gransize of main phase increases with Fe_3O_4 contain until x=0.3.

Keywords: $LaFeO_3$, nanocomposite, solgel, impedance spectroscopy, dc conductivity

Dosimetry Audit Simulation of Treatment Planning System in Multicenter Radiotherapy

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ABSTRACT

Treatment planning system (TPS) is an important modality that determines radiotherapy outcome. TPS requires input beam data obtained through a long commissioning and potentially error occured. Error in this step may result in systematic error which have implication to inacurrate dose in tumor target. The aim of this study to verify the TPS dosimetry to know deviation range between calculated and measurement dose in phantom representing dose received by tumor target. This research used CIRS phantom 002LFC representing the human thorax and simulated all external beam radiotherapy stage. Phantom was scanned using CT Scanner and planned 8 test case that were similiar to those in clinical practice situation was made, tested in four centers of radiotheraphy. Dose measurement using 0.6 cc ionization chamber. Calculated and measured dose were compared. The results of this study showed that generally, deviation of all test case at all four centers was within agreement criteria with average deviation about -0.17 ± 1.59 %, -1.64 ± 1.92 %, 0.34 ± 1.34 % dan 0.13 ± 1.81 %. The deviation out of tolerance commonly were found on test case using beam modifier, tangential incidence beam and at inhomogen material. Generally, measured dose in bone equivalent material tend to be larger than the calculated dose.The conclusion of this study was all TPS involved in this study showed good performance. The Superposition algorithm showed rather poor performance than either Analytic Anisotropic Algoritm (AAA) and Convolution algorithm with average deviation about -1.64 ± 1.92 %, -0.17 ± 1.59 % and -0.27 ± 1.51 % respectively.

Keywords: Dosimetry, TPS, point dose, deviation

Effect of Gamma Irradiation on Antioxidant and Acidity Levels of Arabica Coffee and Civet Coffee

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ABSTRACT

This research discusses the antioxidant and the acidity levels on coffee arabica, civet coffee, and irradiation coffee by National Nuclear Energy Agency (BATAN). This research utilized the sample of coffee before and after irradiation with the varieties of doses (2,5 kGy; 5 kGy and 10 kGy). In the experiment determining the levels of antioxidants using DPPH method (2,2-diphenyl-1-picrylhydrazil) with spectrophotometer UV-Vis and the acidity using pH meter. Determining the cluster functional using FTIR and the number of particles using ESR Spectrometer. Results antioxidant levels on arabica coffee and civet coffee before and after irradiation are shown with IC_{50} values. IC_{50} values on arabica coffee (Toraja) with the varieties of dose (0 kGy; 2,5 kGy; 5 kGy and 10 kGy) are 54.150 µg/ml (high); 50.326 µg/ml (high); 49.026 µg/ml (very high) and 46.546 (very high) as well as IC_{50} values on civet coffee (Gayo) are 64.226 µg/ml (high); 55.090 µg/ml (high); 58.885 µg/ml (high) and 56.739 µg/ml (high). From the measurement results showed that the antioxidant levels increased after irradiation but for the level of acidity are not significance.

Keywords: Antioxidant, acidity, coffee, DPPH, irradiation, spectrophotometer UV-Vis

Synthesis, Structural and Electrical Properties of $LaFe_{0.5}MO_{0.5}O_3$ Crystalline Materials

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ABSTRACT

The starting point to explain the electrical properties of $LaFe_{0.5}Mo_{0.5}O_3$ is the valence of the metals ions. In $LaFeO_3$ and $LaMoO_3$, Fe and Mo ions are both in a formal 3+ valence state. When they mix to form $LaFe_{0.5}Mo_{0.5}O_3$ the charged between metal ions is adjusted which will affect the structural and electrical properties of this compound. In this paper, electrical properties of material $LaFe_{0.5}Mo_{0.5}O_3$ have been studied by impedance spectroscopy method. $LaFe_{0.5}Mo_{0.5}O_3$ was synthesized by solgel method result in nanoparticle, then was pressed into pellet and sintered at 1300 for 1 h to form nanocrystalline $LaFe_{0.5}Mo_{0.5}O_3$. The structural properties are characterized by XRD and SEM. X-ray diffraction characterization at room temperature shows orthohombic phase and having perovskite structure, oxidation number, atomic position, lattice parameter, and grainsize. The electrical properties as a function of temperature (300K-500K) and frequency (100Hz-1MHz) are presented in complex plane and bode plot resulting similar equivalent circuits for all temperatures which were contributed by grain and grain boundary. DC conductivity of $LaFe_{0.5}Mo_{0.5}O_3$ as a function of temperature was explained by using Arrhenius equation. From this equation, the values of the activation energy (E_a) for this sample is found. The E_a can be separated by grain and grain boundary which is supported by morphology characterized by SEM of the sample which is found that the gransize in nanoscale. The dielectric properties at temperature (300K-500K) and frequency (100Hz-1MHz) are presented by parallel plate method.

Keywords: $LaFeO_3$, nanocrystalline, sol-gel, impedance spectroscopy, dc conductivity

Hirota Bilinear Formalism and Rational Solution of Supersymmetric KDV Equation

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ABSTRACT

A bilinear form of KdV and super-KdV equations has been proposed and studied in the framework of Hirota Method [1]. The properties of Hirota operator have been proved. We have expressed simplified version of Hirota method for KdV equation [2]. The rational solutions of KdV equation have been reviewed [3], and we obtain the rational solutions of super-KdV equation.

Keywords: Supersymmetric KdV equation, Hirota bilinear method, soliton solutions, rational solutions

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Synthesis and Characterization of Nano-Sized $CaCO_3$ in Purified Diet

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ABSTRACT

The growth and development of animals depend strongly on the balanced nutrition in the diet. This research aims is to characterize the weight variations of nano-seized calcium carbonate ($CaCO_3$) in purifed diet that to be fed to animals model of rat. The nano-sized $CaCO_3$ was prepared by milling the calcium carbonate particles for 20 hours at a rotation speed of 1000 rpm and resulting particle size in a range of 2-50 nm. Nano-sized $CaCO_3$ added to purified diet to four formulas that were identified as normal diet (N), deficiency calcium (DC), rich of calcium (RC), and poor of calcium (PC) with containing nano-sized $CaCO_3$ much as 0.50%, 0.00%, 0.75% and 0.25% respectively. The nutritional content of the purified diet was proximate analysed and AAS, it resulted as followed moisture, ash, fat, protein, crude fibre, iron, magnesium, potassium and calcium were suggest that N sample for healty rats and RC purified diet for conditioned osteoporosis rats. The crystalline phases of the samples were examined by X-ray diffraction showed that crystalline increase with the increasing concentration of $CaCO_3$. These results of the current study indicated that the N and RC purified diet has met the recommended standards of National Research Council (NRC).

Materials Modification of $La_{1.4}Ca_{1.6}Mn_2O_7$ with Ag-Doped through Sol-Gel Methods as A Replacement for Conventional Cooling Machine

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ABSTRACT

In this paper, we would like to report that materials of $La_{1.4}Ca_{1.6-x}Ag_xMn_2O_7$ with variation of Ag as doping (x=0,6) has been successfully created with sol-gel method as a process of synthesize. The research were prepared by sol-gel method to produce the homogeneity of particle size distribution and relatively low processing temperatures [1]. The temperature of calcination for this materials at 500°C for 5 hours and then sintering at 1300°C for 24 hours. The results of X-Ray Diffraction (XRD) characterization show that $La_{1.4}Ca_{1.6}Mn_2O_7$ phases are formed with hexagonal structures type $Sr_3Ti_2O_7$ [2].

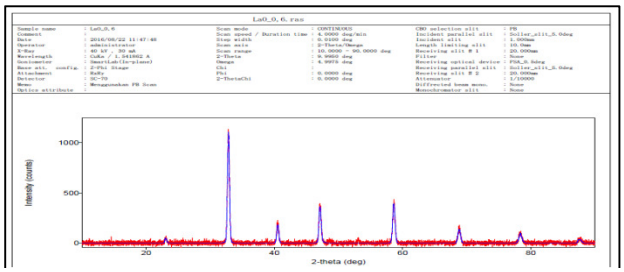

Figure 1. XRD pattern of $La_{1.4}Ca_{1.6-x}Ag_xMn_2O_7$ materials with Ag x=0,6

Keywords: Calcination, doping, particle size distribution, sintering, sol gel

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Transmission Probability of Poly(DA)-Poly(DT) DNA in Electric Field

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ABSTRACT

Transmission probability of poly(dA)-poly(dT) DNA for several voltages has been studied. The DNA molecule is modeled by using tight binding Hamiltonian model. It is contacted to electrodes at both sides with 32 long base pairs. The voltage is applied at the electrodes and assumed it can change base onsite energy linearly, so can influence charge transmission at DNA chain. The transmission probability is calculated using transfer matrix and scattering matrix method. The transmission probability results also be compared at different temperatures and twisting motion frequencies.The results show that as the voltage increases, the probability transmission increases in higher energy than Fermi energy region but not significant in around the Fermi energy region. At higher temperature, the increment of transmission probability is lower and similar tendency is observed higher twisting motion frequency.

Keywords: DNA, temperature, transmission, voltage

Classification of Right-Hand Grasp Movement Based on Emotiv EPOC+

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ABSTRACT

Combinations of BCI stage elements for right-hand grasp movement have been obtained, providing the average value of their classification accuracy. The aim of this study is to find a suitable combination for best classification accuracy of right-hand grasp movement based on EEG headset, EMOTIV Epoc+. There are three movement classifications: grasping hand, relax, and opening hand. These classifications take advantage of Event-Related Desynchronization (ERD) phenomenon that make it possible to differ relaxation, imagery, and movement state from each other [1]. The combinations of elements are the use of Independent Component Analysis (ICA), spectrum analysis by Fast Fourier Transform (FFT), maximum mu and beta power with their frequency as features, and also classifier Probabilistic Neural Network (PNN) and Radial Basis Function (RBF). The average values of classification accuracy are ±84% for training and ±57% for testing. To have a better understanding of the signal quality recorded by EMOTIV Epoc+, the result of classification accuracy of left or right-hand grasping movement EEG signal (provided by Physionet) also be given, i.e. ±87% for training and ±71% for testing [2]. The comparison of accuracy value from each combination, experiment condition, and external EEG data are provided for the purpose of value analysis of classification accuracy.

Keywords: Classification accuracy, FFT, grasping movement, PNN, training, testing

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Voltage Dependency of Transmission Probability of Aperiodic DNA Molecule-Voltage Dependency of Transmission Probability of Aperiodic DNA Molecule

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ABSTRACT

Characteristics of electron transports in aperiodeic DNA molecule has been studied. Double stranded DNA model with the sequences of bases, GCTAGTACGTGACGTAGCTAGGATATGCCTGA, in one chain and its complements on the other chains has been used. Tight Binding Hamiltonian is used to model DNA molecule. In the model we consider that on-site energy of the bases is linearly dependent on the electric field applied. Slater-Koster scheme is used to model electron hopping constant between bases. The transmission probability of electron from one electrode to the next electrode is calculated using a transfer matrix technique and scattering matrix method simultaneously. The result shows that, generally, higher voltage gives slightly larger value of the transmission probability. The applied voltage seems to shift extended states to lower energy. Meanwhile, the value of the transmission increases with twisting motion frequency increment.

Keywords: DNA aperiodic, transmission probability, electron transport, twisting motion frequecy, voltage

Automatic Antimicrobial Effectiveness Measurement Using Non-Metric Camera and Morphological Image Processing Technique

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ABSTRACT

Technology being developed in the biomedical to find treatments that accurate and inexpensive. Methods to measure antimicrobial effectiveness are with tube dilution method. The disc containing the antimicrobial agent is placed on an agar medium that has been cultivated microorganisms that would diffuse in the agar medium. Area clearly indicates microorganism growth inhibition by an antimicrobial agent agar medium surface, clear area of what is called the zone of inhibition [1]. Currently, the measurement zone of inhibition is still done manually using a calipers or ruler [2]. This inhibition zone forms of irregular, therefore, required detection of inhibition zones automatically to minimize human error while saving costs and time. In this research, an instrumentation system for automatic detection and measurement of inhibition zone was developed using image processing technique. Samples inhibition zone data in a petri dish is captured using the camera and processed directly in the computer. The instrumentation system consists of a set of measuring instruments, light source, and a camera that connected to PC directly. The image processing techniques perform camera calibration, spatial calibration, edge detection, area measurement and transforming pixel value to a meter value. A standard checkerboard with certain dimension and shape was used as calibrator object to generate camera and spatial calibration parameter. The measurement system was evaluated using a set of standard checkerboard object at various camera object distances, camera angles and object orientation. The average measurement error between actual and computed inhibition diameter obtained from the antimicrobial object are 0.932%, 0.847% and 1.136% at camera-object distance 15 cm, 20 cm and 25 cm, respectively. Finally, the proposed measurement system is very promising and could be used as an instrument for antimicrobial effectiveness evaluation.

Keywords: Antimicrobial, camera calibration, inhibition zones, measurement system, edge detection

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Modeling of Full Heusler within Tight-Binding Approximation

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ABSTRACT

Heusler alloys have been known for about a century, and predictions of magnetic moment values using Slater-Pauling rule have been successful for many such materials. However, such a simple counting rule has been found not to always work for all Heusler alloys. For instance, Fe_2CuAl has been known to have magnetic moment of 3.30 μ_B per formula unit [1], although the Slater-Pauling rule suggests the value of 5 μ_B. On the other hand, a recent experiment shows that a non-stoichiometric Heusler compound $Fe_2Mn_{0.5}Al_{0.5}$ possesses magnetic moment of ~4μ_B [2], closer to the Slater-Pauling prediction for the stoichiometric compound. Such discrepancies signify that the theory to predict the magnetic moment of Heusler alloys in general is still far from being complete. Motivated by this issue, we propose to do a theoretical study on a Full Heulser Alloy Fe_2MnAl to understand the formation of magnetic moment microscopically. We model the system by constructing a Tight-Binding-based Hamiltonian and incorporating Hubbard repulsive as well as spin-spin interactions for the electrons occupying the d orbitals. Then, we solve the model using Green's function approach, and treat the interaction terms within the mean-field approximation. At this stage, we aim to formulate the computational algorithm for the overall calculation process. Our final goal is to compute the total magnetic moment per unit cell of this system and compare it with the experimental data.

Keywords: Heulser alloy, magnetic moment, tight-binding

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Algorithm Implementation of Particle-Particle Ladder Diagram Approximation to Study Strongly-Correlated Metals and Semiconductors

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ABSTRACT

In condensed-matter physics, strongly-correlated systems refer to materials that exhibit variety of fascinating properties and ordered phases, depending on temperature, doping, and other factors. Such unique properties most notably arise due to strong electron-electron interactions, and in some cases due to interactions involving other quasiparticles as well. Electronic correlation effects are non-trivial that one may need a sufficiently accurate approximation technique with quite heavy computation, such as Qantum Monte-Carlo, in order to capture particular material properties arising from such effects. Meanwhile, less accurate techniques may come with cheaper numerical cost, but the ability to capture particular properties may highly depend on the choice of approximation. Among the many-body techniques derivable from Feynman diagrams, we aim to formulate algorithmic implementation of the Ladder Diagram approximation to capture the effects of electron-electron interactions. We wish to investigate how these correlation effects influence the temperature-dependent properties of strongly-correlated metals and semiconductors. As we are interested to study the temperature-dependent properties of the system, the Ladder diagram method needs to be applied in Matsubara frequency domain to obtain the self-consistent self energy. However, at the end we would also need to compute the dynamical properties like density of states (DOS) and optical conductivity that are defined in the real frequency domain. For this purpose, we need to perform the analytic continuation procedure. At the end of this study, we will test the technique by observing the occurrence metal-insulator transition in strongly-correlated metals, and renormalization of the band gap in strongly-correlated semiconductors.

Keywords: Ladder diagram, Matsubara frequency

Studies on the Electrical Properties of Double-Perovskite La_2FeTiO_6 Prepared by Sol-Gel Synthesis Method

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ABSTRACT

The electrical properties of double-perovskite La_2FeTiO_6 were investigated. The structural properties were characterized by XRD, SEM, and EDAX. XRD characterization result that La_2FeTiO_6 is single phase with Orthorhombic Perovskite structure, Pnma space group. The grainsize were calculated by Scherrer method is in nanoscale (24 nm). The electrical properties of the material as a function of temperature and frequency were measured by impedance spectroscopy method using RLC meter. Impedance data are presented in the nyquist plot and bode plot which is used to identify an equivalent circuit. Dielectric properties (dielectric constant and dielectric loss) of this material have been presented using parallel plate method. Impedance spectroscopy reavealed the presence of both grain and grain bondary effect in La_2FeTiO_6. Dielectric constant decreases steeply at lower frequencies and remains constant at higher frequencies.

Keywords: La_2FeTiO_6, double perovskite, electrical properties

Electric Field Influence on Electronic Transport in A Periodic DNA Molecules

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ABSTRACT

There are many factors that change the structure of DNA, and at the end it will affects electronic transport in DNA molecules. From previous study we know that electrical current will increase for higher electric field. The study is focused particularly on electric field influence for charge transport properties of poly(dG)-poly(dC) DNA molecules that are presented in terms of transmission probabilities of electron flow. We calculate transmission probabilities using transfer matrix and scattering matrix method with varying temperatures, voltages, and twisting motion frequencies. The result shows that the extended states shift to lower energy and the extended state band widen as voltage increasing.

Keywords: DNA PolyGC, transmission probability, electrical current, voltage, scattering matrix, transfer matrix

Theoretical Formulation of Optical Conductivity of $La_{0.7}Ca_{0.3}MnO_3$ Exhibiting Paramagnetic Insulator-Ferromagnetic Metal Transition

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ABSTRACT

A theory of high-energy optical conductivity of $La_{0.7}Ca_{0.3}MnO_3$ has been proposed previously by M.A. Majidi *et. al*. [1]. The proposed theory works to explain the temperature-dependence of the optical conductivity for the photon energy region above ~0.5 eV far upto ~22 eV, but fails to capture the correct physics close to the dc limit in which metal-insulator transition occurs. The missing physics at the low energy has been acknowledged as mainly due to not incorporating phonon degree of freedom and electron-phonon interactions. In this study, we aim to complete the above theory by proposing a more complete Hamiltonian incorporating additional terms such as crystal field, two modes of Jahn-Teller vibrations, and coupling between electrons and the two Jahn-Teller vibrational modes. We solve the model by means of Dynamical Mean-Field Theory. At this stage, we aim to derive the analytical formulae involved in the calculation, and formulate the algorithmic implementation for the self-consistent calculation process. Our final goal is to compute the Density of States and the optical conductivity for the complete photon energy range from 0 to 22 eV at various temperatures, and compare them with the experimental data of Rusydi *et. al*. [2]. We expect that the improved model preserves the correct temperature-dependent physics at high photon energies, as already captured by the previous model, while it would also reveal ferromagnetic metal - paramagnetic insulator transition at the dc limit.

Keywords: Manganite, optical conductivity, crystal field, Jahn Teller distortion, phonon

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The Diagonal Hopping Dependent I-V Characteristics of Periodic DNA Molecule

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ABSTRACT

The diagonal hopping dependent I-V characteristic of a periodic DNA molecule has been studied. Exponentially twisting angle dependent hopping constant is used in the calculation. The diagonal hopping constant is modeled using semi-empirical Slater-Koster theory [1]. A 32 base pairs doubled-stranded Poly(dG)-poly(dC) DNA molecule model sandwiched in between two metallic electrodes is used in the calculation of I-V characteristic using Landauer-Buttiker formalism [2] by assuming symmetric voltage drop at the contacts. The I-V characteristics is calculated from the transmission probability of charge on the molecule calculated using transfer and scattering matrix methods, simultaneously. The results show that generally, as the vibration and diagonal hopping coupling constant increases, the current magnitude increases. However, at low voltage the increment of current is minute. These trends are observed in the I-V characteristic of DNA molecule for all frequencies and temperatures used.

Keywords: I-V characteristic of DNA, twisting motion frequency, transmission probability, diagonal hopping

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The Effect of Intrastrand Hopping Term on Charge Transport Properties of An Aperiodic DNA Molecule

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ABSTRACT

The effect of inter-strand hopping term on charge transport has been studied by using tight-binding method. In this study, aperiodic DNA molecule with sequence GCTAGTACGTGACGTAGCTAGGATATGCCTGA is used. The molecule is connected to electrodes on both sides to determine the charge transport properties. The *inter-strand hopping* parameter is representing inter-base electron hopping. The charge transport properties is studied using transfer matrix and scattering matrix methods to obtain transmission probability. The transmission probability is used to calculate the I-V characteristics by using a Launder-Büttiker formula. The result shows that increment of the inter-strand hopping term result in higher current magnitude at high voltage.

Keywords: Inter-strand, I-V characteristic, transmission, aperiodic DNA molecule

Effect of Watson-Crick Electronic Coupling on DNA Poly(dA)-Poly(dT) Transport Property

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ABSTRACT

Charge transport properties in DNA poly(dA)-poly(dT) has been studied by using thigh binding Hamiltonian approach. Molecule DNA that we use consists of 32 base pair of adenine (A) and thymine (T) and backbone is consist of phosphate and sugar. The molecule DNA is contacted electrode at both ends. Charge transport in molecule DNA depend on the environment, we studied the effect of electronic coupling of *Watson-Crick* hopping in DNA poly (dA)-poly (dT) to transmission probability and characteristic I-V. The electronic coupling constant influence charge transport between adenine-thymine base pairs at the same site. Transmission probability is studied by using transfer matrix and scattering matrix method, and the result of transmission probability is used to calculate the characteristic I-V by using formula Landauer Buttiker. The result shows that when the electronic coupling increase then transmission probability and characteristic I-V increase slightly.

Analysing Power Spectral of Electroencephalogram (EEG) Signal to Identify Motoric Arm Movement using EMOTIV EPOC+

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ABSTRACT

Rehabilitation of motoric dysfunction from the body becomes the main objective of developing Brain Computer Interface (BCI) technique, especially in the field of medical rehabilitation technology. BCI technology based on electrical activity of the brain, allow patient to be able to restore motoric disfunction of the body and help them to overcome the shortcomings mobility. In this study, EEG signal phenomenon were obtained from EMOTIV EPOC+, the signals were generated from the imagery of lifting arm, and look for any correlation between the imagery of motoric muscle movement against the recorded signals. The signals processing were done in the time-frequency domain, using Wavelet relative power (WRP) as feature extraction, and Support vector machine (SVM) as the classifier. In this study, it was obtained the result of maximum accuracy of 81.3% using 8 channel (AF3, F7, F3, FC5, FC6, F4, F8 and AF4), 6 channel remaining on EMOTIV EPOC + does not contribute to the improvement of the accuracy of the classification system tly.

Electrical Properties Study as A Function of Temperature of Double Double Perovskite Sr_2FeTiO_6

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ABSTRACT

Double perovskite Sr_2FeTiO_6 has been specially investigated its electrical and magnetic properties due its ferromagnetic and giant magneto dielectric characteristic. Sr_2FeTiO_6 were prepared by sol–gel method result in powder form. Then, the powder were pressed and sintered at 1100^{o}C for 1 h in air to form pellet.The structure and electrical properties of Sr_2FeTiO_6 have been studied. The structural features of the systems have been studied using X-ray diffraction (XRD). Through XRD characterization at room temperature, the structure of the synthesized products is proved to be single phase cubic Perovskite with lattice parameter a=b=c=3,899A˚ and grain size 26 nm. The electrical properties of the material, as functions of temperature (293K-523K) and frequency (100 Hz – 1 MHz), were examined by Impedance Spectroscopy method using RLC meter. Impedance data were presented in the form of Nyquist plot and Bode plot, which are used to identify the equivalent circuit parameter along with the values. Impedance plot showed resistance decrease with temperature increase and corelation between temperature and relaxation time. Relaxation time and activation energy was presented using Arrhenius Law.

Keywords: Impedance spectroscopy, relaxation time, activation energy

Comparison of Leaf and Stem Bark Extract of *Diospyros discolor* as Reduction Agents in Biosynthesis of Silver Nanoparticles

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ABSTRACT

Biosynthesis is an environmentally friendly synthesis method to produce nanoparticle because of its use of plant or microorganism. As one of the most commonly found plants in Indonesia, *Diospyros discolor* has the potential to become a substance reduction in biosynthesis. In this study, the influence of leaf and stem bark of *Diospyros discolor* is observed through the creation of silver nanoparticle with biosynthesis method. Color change of solvent, UV-Vis spectroscopy, TEM, and PSA are used to characterize the result of biosynthesis. Observed absorption spectra increases in proportion to the length of time of nanoparticle creation reaction. Reduction process of silver ion to become nanoparticle in biosynthesis is known as slow process [1]. This creation process is signified visually with color change of the solvent. The use of ratio between silver nitrate precursor with *Diospyros discolor* extract plays a role in the number of produced silver nanoparticles. Volume of the extract in proportion to silver nitrate volume shows the highest creation process of nanoparticle. This amount of available extract is considered sufficient to reduce the high amount of silver ions [2]. Observation of parts of *Diospyros discolor* plant used in the experiment shows that the extract from stem bark produces higher amount of nanoparticle compared to extract from the leaf. The absorption curve displays that the peak of high absorption is possible with small amount of extract. For its application as silver nanoparticle biosynthesis agent, stem bark of *Diospyros discolor* has better reduction function compared to the leaf.

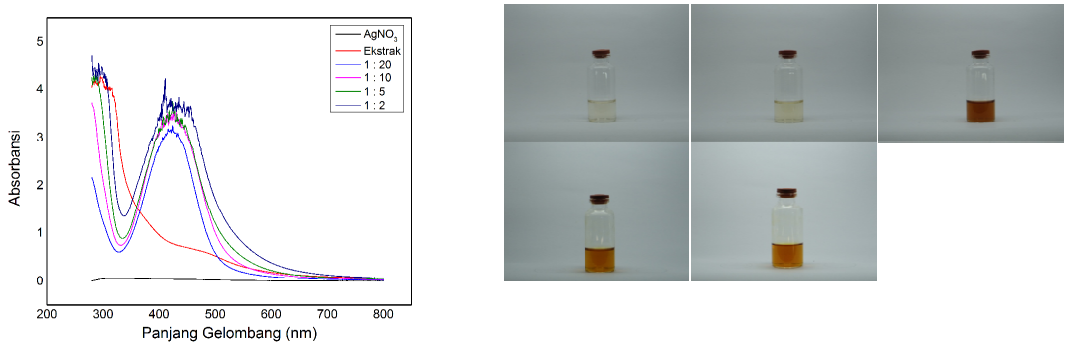

Figure 1. Absorption spectra of varied volume ratio of stem bark Diospyros Discolor (left). Biosynthesis result of varied reaction time: 15 minutes, 1 hour, 4 hours, 24 hours, and 48 hours (right)

Keywords: Biosynthesis, silver nanoparticles, *Diospyros discolor*, leaf extract, stem bark extract

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Absorption Characteristics of Silver Nanoparticle Biosynthesized by *Diospyros Discolor* Wild

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ABSTRACT

Plants and micro-organism have potentials to be used as reducing agents in the nanoparticle synthesis process. This method, known as biosynthesis, has a superiority as an environmental-friendly green synthetic because it is capable of reducing the use of chemical materials. In this work, the effect of different usage of *Diospyros discolor's* fruit flesh and seed for silver nanoparticles biosynthesis was studied. The silver nanoparticles product was characterized using UV-Vis spectrophotometer, TEM, and PSA. The use of *Diospyros discolor* extracts were compared based on the ratio to the volume of silver nitrate precursor solution. The use of plant extract volume, which comes near to silver precursor volume, is identified for resulting high absorption spectrum. The color of the solution is also observed to become darker compared to the ones with bigger concentration ratio. The reaction time needed during the synthesis affects the nanoparticle formation as shown in the UV-Vis spectra. Longer absorption time will create higher absorption peak. The difference of used *Diospyros discolor*'s fruit or seed does not affect the synthesis result significantly. This argument is supported by the observed absorptions, which are on the same peak value, for every volume ratio being used. Hence, the choosing of fruit flesh or seed of *Diospyros discolor* as a reducing agent will only be determined by the reaction time spent.

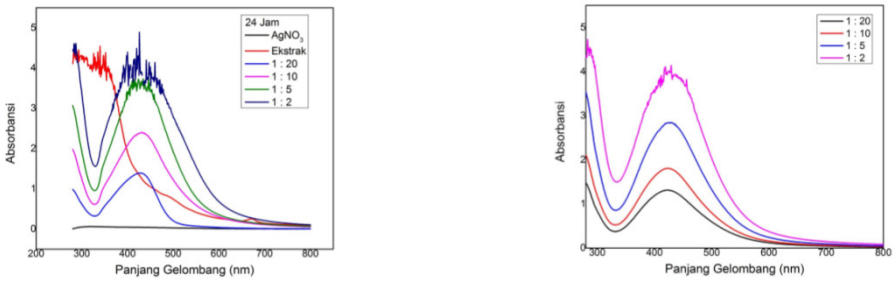

Figure 1. Absorption spectra of variated ratio of Diospyros Discolor fruit (left) and seed (right) to silver precursor

Keywords: Biosynthesis, silver nanoparticles, *diospyros discolor*

Silver Nanoparticles Biosynthesis using *Pometia pinnata* J.R.FORST. & G.FORST: Comparing the Effect of Leaf Extract and Stem Bark Extract on Reduction Reaction

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ABSTRACT

The need for an environmental-friendly nanoparticle synthesis has generated an alternative method using biological materials in form of plants or microorganism. With the high amount of biodiversity, the potential of biological materials usage as a synthetic alternative also increases. *Pometia pinnata* is an endemic plant, commonly encountered in tropical area and has not been explored as a biosynthetic agent. In this work, *Pometia pinnata* extract, which is originated from leaves and stem bark, is used as a silver nanoparticle biosynthetic process. The volume ratio between extracts and silver nitrate was varied. The silver nanoparticles products was characterized by using UV-Vis spectrophotometer, TEM, and PSA. For each of solution ratio, the absorption peak was found increasing at the same time with the increase of solution volume on the precursor solution. The change of color can be seen from the mixture of the solution and it becomes darker following the change of ratio volume and reaction time. The increase of reaction time will also cause the rise of absorption peak intensity because of the reduction process and it does not observed in a short period of time. The higher absorption value on the use of leaves extracts shows that the leaf part of *Pometia pinnata* is a better reduction agent for silver nanoparticle biosynthetic process than stem bark extract.

Keywords: Biosynthesis, silver nanoparticles, *Pometia pinnata*

Study of *Pometia pinnata* J.R.FORST. & G.FORST and *Diospyros discolor* Wild. Fruit Fleshes for Synthesizing Silver Nanoparticles

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ABSTRACT

Green synthetic method still has the potential to be developed, especially in the use of available biological materials. Some plants, such as *Pometia pinnata* and *Diospyros discolor*, are plants that are only available in the tropical area forest. In this study, fruit flesh of the *Pometia pinnata* and *Diospyros discolor* are used to reduce silver ion into a silver nanoparticle. UV-Vis spectrometer, TEM, and PSA were used for characterizing of silver nanoparticles product. In the increase of extract volume ratio between fruit flesh and silver nitrite, the intensity of the absorption peak being measured is increasing. The result that can be monitored visually with the change of color that happened. The monitored reaction time spent affects the nanoparticle formation. The use of *Diospyros discol*or fruit flesh extract creates optimum result since the 4 hours' period and going through saturation right after. Based on the comparison of the two extracts, the peak absorption of *Diospyros discolor* was found higher than the *Pometia pinnata*. Therefore, the use of *Diospyros discolor* fruit extract is more potential for the silver nanoparticle biosynthetic.

Keywords: Biosynthesis, silver nanoparticles, *Diospyros discolor, Pometia pinnata*

Fabrication and Structure of ZnO and Li-Doped ZnO by Sol-Gel Method

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ABSTRACT

The substitution of group-I and or group V elements on Zn-site and on O-site respectively are the challenge that need to be overcome for the realization of the most ZnO based application materials. The process of fabrication to obtain of high quality crystal samples in various structures should be handled carefully with precaution. ZnO and Li doped ZnO have been fabricated via sol gel method. The samples have been observed by means of X-ray diffractometer, Thermal gravimetry analyzer (TGA), FTIR and SEM. The characterization results show similar to commercial powder for undoped ZnO and for Li doped ZnO show a shifting in crystallographic properties. It conclude that the process for the fabrication of high quality ZnO and Li doped ZnO have been achieved.

Keywords: Li doped ZnO, sol gel, structure

Phase Transition of $Ni_{43}Mn_{41}Co_5Sn_{11}$ Heusler Alloy

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ABSTRACT

In the recent years, heusler alloy has been extensively studied. Among various the heusler alloy, Ni-Mn-Sn have gained considerable interest due to their multifunctional properties such as shape memory effect, magnetocaloric effect, magnetoresistance, etc., associated with first order martensite to austenite structural transition[1]. In this paper, we report the magneto-structural phase transitions under varying temperature of $Ni_{43}Mn_{41}Co_5Sn_{11}$ synthesized through vacuum arc-melting process. The magnetization of the sample was obtained after annealing process at 1173 K for 12 hours. It was evaluated by magnetic measurement using vibrating sample magnetometer (VSM250) up to a field of 21 kOe. **Error! Reference source not found.** show the magnetic isotherm (*M-H* curves) in the vicinity of the structural phase transition point. Magnetic saturation (Ms) of the NMCS alloy decreased and ferromagnetic transition shift towards higher temperature from 297K-372K. It occurred might be due to alignment of the atomic magnetic moments depends on temperature[2]. We also have discussed the context of structural disorder and the ferromagnetic correlations will be explained in this study [3]. Structural disorder of these alloy will explain the magnetic transition and the entropy change related magnetic properties [1].

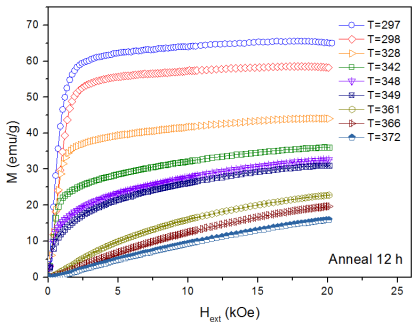

Figure 1. Absorption spectra of variated ratio of Diospyros Discolor fruit (left) and seed (right) to silver precursor

Keywords: Heusler alloys, phase transition, ferromagnetic transition, magnetization

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Modeling of Half Heusler within Tight-Binding Approximation

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ABSTRACT

Heusler compounds are very important for technology development, such as for spintronic, thermoelectric, and magnetocaloric applications. Heusler compounds have two families, full- and half-Heusler compounds. Half Heusler compounds are the ternary intermetallic compounds with XYZ composition, where X and Y are transition d-elements, and Z is *sp* valence elements. They are generally crystallized in the $C1_b$-type structure. The magnetic moments of such materials may be predicted using Slater-Pauling rule, giving $m_{xyz} = N_{valence} - 18$. However, this simple counting rule has been found not to always work for all compounds in this group. This motivates us to perform a theoretical study to investigate the mechanism of magnetic moment formation microscopically. In this study, we focus on a particular half-Heusler NiMnSb compound. We model the system by constructing a Tight-Binding-based Hamiltonian and incorporating Hubbard repulsive as well as spin-spin interactions for the electrons occupying the d orbitals. Then, we solve the model using Green's function approach, and treat the interaction terms within the mean-field approximation. At this stage, we aim to formulate the computational algorithm for the overall calculation process. Our final goal is to compute the total magnetic moment per unit cell of this system and compare it with the experimental data.

Keywords: Half -Heulser, magnetic moment, tight-binding

Charge Transport Properties of DNA Aperiodic Molecule: The Role of Interbase Hopping in Watson-Crick Base Pair

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ABSTRACT

The charge transport properties of DNA aperiodic molecule has been studied by considering various interbase hopping parameter on watson-crick base pair. 32 base pair long double-stranded DNA aperiodic model with sequence GCTAGTACGTGACGTAGCTAGGATATGCCTGA on one chain and it's complement on the other chain is used. Transfer matriks method has been used to calculate transmission probabilities for determining I-V characteristic using Landauer Büttiker formula. DNA molecule is modeled using hamiltonian tight binding combined with the theory of Slater-Koster. The result show, the increment of watson-crick hopping value leads to the transmission probabilities and current of DNA aperiodic molecule increases.

The Effect of Different Values of Inter-Strand Hopping on the Current and Transmission Probability of An Aperiodic DNA Molecule

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ABSTRACT

The effect of different values of inter-strand hopping on the current and transmission probability of an aperiodic DNA molecule has been studied. This research used double strands model of 32 base pairs long ATGC DNA (Adenine, Thymine, Guanine, Cytosine) that was arranged randomly. By changing the beta values on inter-strand hopping. By changing the beta values of inter-strand hopping, current and transmission probability was calculated by using the transfer matrix method. The beta value is involved in the tight-binding Hamiltonian model of the molecule. The result of calculation showed that at temperature 4.2 K at frequency 2 meV and 4 meV, current decreases as the beta values increases. Likewise, at the same temperature and frequency, the transmission probability decreases with the increment of beta values.

Simulating the Classical and Relativistic Equation of State of the Stars upon Variation of the Electron to Baryon Ratio

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ABSTRACT

The stability of the stars are sustained through the competition between Fermionic Pauli pressure and the gravitational attraction of their own masses, as expressed by the hydrodynamic equilibrium of their constituent particles or the equation of state. As the stars getting older, the composition of the star is changed and dominated by heavy elements due to fusion reaction inside the stars. This compositional change will affect the mass and radius of the star. In this paper we discussed the equation of state of the stars classically and relativistically upon variation of electron to baryon ratio or Y_e (Y_e =Z/A). By solving the Polytropic Equation of classical and relativistic star using fourth order Runge-Kutta method, we were able to describe the mass-radius relationship of the stars from extremely low to high electron content. Including a "simplified version" of neutron which assumed to have Y_e =0.10. It was also found that a numerical trick is needed in order to solve the polytropic equation using a MATLAB program. Overall the results state that the decreasing value of Y_e will result in the decreasing value of the mass and radius of the stars.

Keywords: Equation of state, stars, polytropic equation, electron to baryon ratio, numerical methods, MATLAB

Effect of Addition of Butyl Benzyl Phthalate Plasticizer and Zinc Oxide Nanoparticles on Mechanical and Thermal Properties of Cellulose Acetate Butyrate/Organoclay Biocomposite

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ABSTRACT

Plastics as packaging materials and coatings undergo increase of demands globally each year. This pose a serious problem to the environment due to its difficulty to degrade. One solution to addressing the problem of plastic wastes is the use of bioplastics. According to the European Organization Bioplastic, bioplastic is defined as renewable sources based, biodegradable, or compostable plastics, one of which is derivative of cellulose. However, this bioplastic has shortcomings on its physical and mechanical properties. To improve these properties, biocomposites are made with the addition of certain additives and fillers.

In this study has been investigated the effect of adding Butyl Benzyl Phthalate plasticizer (BBP) and ZnO nanoparticles on mechanical and thermal properties of s cellulose acetate butyrate (CAB) / organoclay biocomposite. ZnO nanoparticles synthesized from commercial ZnO precursor by using size reduction method. ZnO was dissolved in a solution of citric acid in the ratio 1:1 to 1:5 to form zinc citrate. Zinc citrate then decomposed by calcination at temperature of 600oC. ZnO nanoparticles with an average size of 44.4 nm are obtained at a ratio of 1: 2.

The addition of ZnO nanoparticles and BBP plasticizer was varied to determine the effect on the properties and thermal mechanical of biocomposite. The addition of ZnO nanoparticles is done with concentration of 10-15% and BBP plasticizer with concentration of 30-40%. The addition of plasticizer BBP and ZnO nanoparticles by 30% and 14% make biocomposite has a tensile strength of 0.81 N/mm2. Addition and subtraction BBP plasticizer and ZnO nanoparticles composition affect biocomposite tensile strength values so are its thermal properties.

Keywords: Biocomposites, Cellulose Acetate butyrate, organoclay, ZnO nanoparticles, Butyl Benzyl Phthalate Plasticizer

Design Nuclear Preparedness Early Warning System Around Nuclear Area

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ABSTRACT

Environmental radiation monitoring system measured gamma dose rate continuously around nuclear facilities. It is important tool to present dose rate information to public or authorities for radiological protection. In this research, we have done to design nuclear preparedness early warning system around the Serpong nuclear facility. Design is based on Arduino GSM shield and Radio frequencies technology for transmit environmental radiation result of measurement and meteorological data. Data was collected at a certain location at Center for Empowerment of Informatics and Nuclear Strategic Area BATAN Serpong. System consistency models are defined for quality of data and the level of radiation exposure in the deployed environment. Online users can access website with display of dose radiation on environment marked on Google Map. This system is capable given early warning of emergency when the dose shows tree time of background radiation exposure value is 250 nSv/hour.

The Influence of FE_3O_4 Extracted from Iron Sand on MgH_2 Thermal Properties of MgH_2 for Hydrogen Storage Material Application

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ABSTRACT

It is known that magnesium is one of the candidates for the hydrogen absorbing material because, theoretically, have the ability to absorb large quantities of hydrogen (7.6 wt%). However, Mg has its disadvantages because of the reaction kinetic is very slow, and relatively high temperature operation (300°C). In this paper, we reported a series of initial research on the MgH_2 by inserting the metal oxide catalyst extracted from local iron sand and prepared by a high energy ball milling technique for 2 hours. The structure investigation by X-ray diffraction after 2 hours of milling, informed that the MgH_2 emerges as the dominant phase. The morphology observation by electron microscopy showed that the surface material of the powder irregular shape as a result of repetitive processes during milling. Furthermore, from the gravimetric test results, this material able to absorb hydrogen 5.1 wt% within 60 min at a temperature of 300°C. From this results, it seems clear that the Fe_3O_4 act as an effective catalyst in MgH_2 although it is used in small quantities.

Keywords: Hydrogen storage, magnesium, iron sand, milling, absorption

Mathematical Modeling of Photovoltaic Thermal PV/T System with V-groove Collector

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ABSTRACT

The use of v-groove in solar collector has a higher thermal efficiency in references. Dropping the working heat of photovoltaic panel was able to raise the electrical efficiency performance. Electrical and thermal efficiency were produced by photovoltaic thermal (PV/T) system concurrently. Mathematical modeling based on steady-state thermal analysis of PV/T system with v-groove was conducted. With matrix inversion method, the energy balance equations are explained by means of investigative method. The comparison results show that in the PV/T system with V-groove collector is higher temperature, thermal and electrical efficiency than other collectors.

Keywords: Mathematical model, thermal, temperature, electrical, collector

Effects of Y and Lu Substitutions on the Low Temperature Structural Properties of $Tb_2Fe_2Si_2C$

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ABSTRACT

In some magnetic materials, the temperature dependences of the lattice parameters show anomalies below the magnetic ordering temperatures, implying the existence of a correlation between the lattice and the ordered moment. This interaction is known as the magnetoelastic effect or a spontaneous magnetostriction. Recent x-ray diffraction studies on the quaternary rare-earth carbide $Tb_2Fe_2Si_2C$ reveal the presence of a strong magnetoelastic effects below the antiferromagnetic ordering temperature which was attributed to the Tb – Tb exchange striction [1]. Motivated by this finding, we have investigated the effect of substituting Tb with smaller non-magnetic elements Y and Lu on the low temperature structural properties of $Tb_2Fe_2Si_2C$. We find that the magnetoelastic transition (T_{ME}) is shifted towards low temperature and the anomalies in the lattice parameters are weakened with the increasing Y content. Substitution of Tb with 50% of Y in $TbYFe_2Si_2C$ is almost sufficient to fully suppressed the spontaneous magnetostriction observed in the undoped sample. Interestingly, although the unit cell of $Tb_{1.9}Lu_{0.1}Fe_2Si_2C$ is similar to the unit cell of $Tb_{1.5}Y_{0.5}Fe_2Si_2C$ which implies that substituting Tb with 5 % of Lu has the same compression effects to that of Tb with 25 % of Y, we observed no pronounced changes to the anomalies in the lattices parameters of $Tb_{1.9}Lu_{0.1}Fe_2Si_2C$ (5% Lu). This result suggests that the suppression of the anomalies in $Tb_{1.5}Y_{0.5}Fe_2Si_2C$ (25 % Y) is most likely due to the weakening of the long range magnetic correlations between Tb^{3+} ions upon dilution by a relatively high content of non-magnetic Y and is not the results of a chemical stress on the unit cell of the parent $Tb_2Fe_2Si_2C$.

Keywords: Magnetostriction, rare earth intermetallics

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Thermal Stability and Crystallization Kinetics of $Fe_{73}Al_5Ga_2P_{11-X}C_5B_4Si_X$ (X = 1, 3) Metallic Glasses

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ABSTRACT

The thermal stability and crystallization kinetics of $Fe_{73}Al_5Ga_2P_{11-x}C_5B_4Si_x$ (x = 1, 3) metallic glasses [1] have been studied by differential scanning calorimetry (DSC). The activation energy and the frequency factor associated with the two-step crystallization process were derived by the Kissinger method. ^{57}Fe Mössbauer spectroscopy studies on the as-quenched ribbons reveal that the magnetic hyperfine field distribution on both samples are equivalent suggesting the similar effect of the local magnetic disorder.

Keywords: Bulk metallic glass, kinetics, ^{57}Fe Mössbauer spectroscopy

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Optimization of Rotational Speed for Growing $BaFe_{12}O_{19}$ Thin Films Using Spin Coating

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ABSTRACT

Barium ferrite ($BaFe_{12}O_{19}$, BaM) thin films were fabricated by the spin coating of precursors obtained using a sol–gel method. The effects of the rotational speed on the spin-coating process for growing a BaM thin film were investigated in this study. Coated films were heat-deposited at different rotational speeds ranging from 2000 to 4000 rpm, while the number of layers was set to nine. Further, the effect of the number of layers on the growth of BaM thin films was dissussed. For this purpose, we take the layers number 1 to 12 and take the constant rotational speed of 3000 rpm. All the filmswas characterized using X-ray diffraction, Scanning electron microscopy, and Energy-dispersive X-ray spectroscopy. It was found that by increasing the rotational speed the amount of material deposited on the Si substrate decreased. The measured grain size of the BaM thin film was nearly similar for three different rotational speeds. However, the grain size was found to increase with the number of layers.

In Vitro Study of DNA *Adduct* 8-OHdG Formation from 2'-Deoxyguanosine-5'-monophosphate with Benzene through Fenton Reaction

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ABSTRACT

Carcinogenic substances exposure in environment such as benzene can give a contribution for radical formation to be interacted with DNA generating 8-hidroksi-2'-deoksiguanosin (8-OHdG) as biomarker of DNA damage due to reactive oxygen species. In this study, the formation of 8-OHdG was performed by reacting the nucleotide of DNA, 2'-deoxyguanosine -5'-monophosphate (dGMP), with benzene in the presence of Fe(II) and hydrogen peroxide undergo Fenton reaction process. The mixture was incubated under various temperatures at 37◦C and 60◦C, then pH 7,4 and pH 8,4, for 5 hour reaction time. The DNA adducts obtained from these reaction were analyzed using reversed phase HPLC with UV detector at a wavelength of 254 nm. Eluent used in this research was a mixture of phosphate buffer pH 6,7 10 mmol/L and methanol (85:15). The retention time of dGMP and 8-OHdG standard are obtained at 7,3 minute and 9,0 minute respectively. Reaction between dGMP and benzene, Fe(II), and hydrogen peroxide showed that 8-OHdG is formed as a consequence of oxydative stress.

Keywords: 2'-deoxyguanosine -5'-monophosphate, benzene, 8-OHdG, DNA damage, fenton reaction

Green Synthesis of Gold Nanoparticles with Polyciasfruticosa Leaf Extract for Reduction Methylene Blue

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ABSTRACT

Metal nanoparticles how a great interest to researches due to their applications toward catalysis, sensors, and drug delivery. Biosynthesis of gold nanoparticles (AuNPs) using aqueous leaf extract of *Polyciasfruticosa* (PF) has been reported in this article. Extract of PF play a role as reducing agents and stabilizer of AuNPs. The formation of PF-AuNPs under radiation of natrium lamp for 15 min was monitored by UV – Vis spectrophotometer.The growth process and stability of PF-AuNPs was observed from the color and absorbance change in the wavelength range 529-533 nm. The optimum condition of PF-AuNPs synthesis was performed at concentration of NF extract 0.6% (w/v). Size and its distribution of NF-AuNPs were identified by Particle Size Analizer (PSA) as 31 nm and stable up until 20 days. The stable PF-AuNPs was further characterized by Fourier transform infrared (FT-IR) spectroscopy to identify the functional group in phenolic compound of PF interact with AuNps. Charecterization of XRD and TEM-SAED shows AuNP has FCC crystalline and range diameter of AuNp 20 nm with spheric shape. Catalytic activity of optimum AuNP@PF for Methylene Blue reduction was tested. Percent reduction of MB using AuNP@PF reach 58,82 % with reduction rate constant value is 0,02576 min^{-1} while following first order kinetics.

Keywords: AuNPs, *Polyciasfruticosa*, green synthesis

Identification of Nonvolatile Compounds in Clove (*Syzygium aromaticum*) from Manado

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ABSTRACT

Syzygium aromaticum (clove) are native to Indonesia and has been widely used in food industry due to their flavor. Nonvolatile compounds contribute to flavor, mainly in their taste. Currently, very little information available about nonvolatile compounds in clove. Identification of nonvolatile compounds are important to improve clove's value. Compound extraction was conducted by maceration in ethanol. Fractionation of the extract were performed by gravity column chromatography on silica gel and sephadex LH-20. Nonvolatile compounds were identified by High-Performance Liquid Chromatography with Diode-Array Detection (HPLC-DAD) and Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS). LC-MS/MS was operated in negative mode with 0.1% formic acid in water and acetonitrile as eluents. Nonvolatile compounds were identified by fragment analysis and compare to references. Several compounds have been identified and characterized. They are: gallic acid, quinic acid, caffeoylquinic acid, naringenin, ellagic acid, and galloylglucose.

Keywords: Nonvolatile compounds, clove, HPLC-DAD, LC-MS/MS, fragmentation

Analysis of Chemical Constituents in Clove Bud Oil (*Syzgium aromaticum*) Java and Manado

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ABSTRACT

The largest clove production contributors in Indonesia are mostly coming from Java and Manado. Different flavor among clove origin is caused by chemical constituents in clove oil. Unfortunately, scientific research and publications about flavor in clove from Indonesia's origin are still limited. The objective of this research is analyzing significant differences constituents in terms of flavor in clove oil Java and Manado. The essential oils were isolated from cut clove bud sample by steam distillation method. The chemical constituents of clove bud oil were analyzed by gas chromatography-mass spectrometry (GC-MS). Constituents then were identified by comparing the results of the chromatogram and reference retention time using Wiley mass spectra library (Wiley W9N11). Thirty four and thirty two chemical constituents were identified based on GC-MS from clove oil collected from Java and Manado, respectively. Major classes of compounds are sesquiterpenes, phenyl propanoid, oxygenated sesquiterpen, and esters. There are different compositions in major constituents between both origins. Clove Java contained eugeneol (55,60%), eugenyl acetate (20,54%), caryophyllene (14,84%), and α-humulene (2,75%). While, in clove Manado major constituents composition were eugenol (74,64%), caryophyllene (12,79%), eugenyl acetate (8,70%), and α-humulene (1,53%). However, minor constituents cis-isoeugenol (0,02%), β-elemene (0,04%) and junipene (0,07%) existed in clove Java. Furthermore, clove Manado have minor constituents characteristics are γ-cadinene (0,03%), caryophyllenyl alcohol (0,02%), and humulene oxide (0,05%). Both clove oils from Java and Manado contain same major chemical constituents but different in their composition. In addition, there are some minor constituents that only exist in specific origin.

Keywords: Clove oil, steam distillation, GC-MS, chemical constituents, flavor, chemical composition

Effect of Oven Drying and Storage on Essential Oil Composition of Clove (*Syzygium aromaticum*) from Toli-toli

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ABSTRACT

The research about post harvested clove is still limited especially in Indonesia, as the biggest producer of clove in the world. The present study was aimed to investigate the effect of drying process and storage on essential oil content and its composition of Indonesian clove originated from Toli-toli. The essential oil of fresh and dried clove was obtained by steam distillation and the composition of oil was analysed by gas chromatography-mass spectrometry (GC-MS). In all of the clove oil samples, eugenol was the major component, followed by caryophyllene and acetyleugenol. The drying method used was oven drying at 50°C and drying was conducted until clove's moisture content reaches 13±1%. During drying process, the content of phenylpropanoid such as eugenol, isoeugenol, and chavicol increased, while esters and monoterpenes decreased. From the organoleptic characteristic, dried clove looked brown in color and gave spicier odor than that of fresh clove. As for storage, the composition of clove oil was studied from dried clove after oven drying, then stored in the laboratory at room temperature for 4 months. There were slightly change on clove oil composition during 4 months storage. The content of major components of clove such as eugenol was found to be higher and acetyleugenol was lower in clove stored for 4 months compared to clove before storage.

Keywords: *Syzygium aromaticum*, steam distillation, chemical composition, gas chromatography-mass spectrometry, drying process, storage

Chemical Profiling of Clove Bud Oil (*Syzygium* aromaticum) from Toli-Toli and Bali by GC-MS Analysis

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ABSTRACT

Indonesia is the largest clove producer in the world. In 2012, total world clove production is 113,215 tons where nearly 71% (79,250 tons) comes from Indonesia. Although Indonesia is a major producer of clove in the world, research and publications about cloves in this country are scarce and hence knowledge about characteristics of difference varieties of cloves is very limited. The present study was aimed to compare major and minor constituents in clove oil responsible for their flavor based on origin which are cloves from Toli-Toli and Bali. The essential oil from clove bud (*Syzygium aromaticum*) was obtained by steam distillation. The chemical composition of clove oil was analyzed by GC-MS. The major compounds of clove oil were eugenol, caryophyllene, α-humulene and eugenyl acetate with composition 66.37%, 15.38%, 1.97% and 12.99%, respectively (Toli-Toli) and clove from Bali were 72.34%, 12.51%, 2.34% and 5.33%, respectively. The unique minor compounds of clove oil from Toli-Toli were (+)-δ-cadinene (0.13%) and β-caryophylladienol (0.19%) while in clove oil from Bali were valencene (0.17%), δ-selinene (0.22%) and alloaromadendrene (0.24%). A total of 36 compounds were identified from the clove bud oil Toli-Toli and 38 compounds from the clove bud oil Bali.

Keywords: *Syzygium aromaticum*, steam distillation, chemical composition.

The Influence of Sun Drying Process and Prolonged Storage on Composition of Essential Oil from Clove Buds (*Syzygium aromaticum*)

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ABSTRACT

Clove (*Syzygium aromaticum*) is native to Indonesia and used as a spice in virtually all of the world's cuisine. Clove bud oil, a colourless or yellow liquid, is obtained from distillation of buds. The quality of oil is influenced by origin, post-harvest processing, pre-treatment before distillation, distillation method, and post-distillation treatment. The objective of this study is to investigate the effect of drying process and prolonged storage on essential oil composition of clove bud from Tolitoli, Indonesia. To determine the effect of drying, fresh clove bud was dried under sunlight until it reached moisture content 13±1%. The effect of storage was studied in the oil extracted from clove bud that was stored in laboratory at 25^{o}C for 4 months. The essential oil of each treatment was obtained by steam distillation and its chemical composition was analyzed by GC/MS. The major components found in fresh and dried clove are as follows: eugenol, eugenyl acetate, and caryophyllene. Percentage of caryophyllene was slightly increase after drying but decrease during storage. While the content of eugenyl acetate decreased during drying and storage, the content of eugenol increased. The drying and storage also affect to the change on minor compounds of essential oil of clove.

Keywords: Clove oil, *Syzygium aromaticum*, drying, storage, GC/MS

Green Synthesis of Nanoscale Zero Valent Iron Using *Syzzygium Aromaticum* Flower Extracts for Pb(II) Removal

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ABSTRACT

Nanoscale zero valent iron (nZVI) has been recognized as a pioneer nanomaterial to be applied for heavy metal remediation in aquatic environments [1]. However, most of developed synthesis method used a very toxic sodium borohydride (NaBH4) as reductor agent [2,3]. This paper reports our studies on synthesis of nZVI using *Syzzigium aromaticum* flower extracts as an environmental friendly redactor agent which is also act as capping agent to prevent the as prepared particle from corrosion. The extracts was prepared from firstly dried *Syzzigium aromaticum* flower at temperature of 50°C using double distilled water. FTIR and MS studies showed that eugenol was the major fraction found in the extracts. Volume ratio of the extracts to Fe solution in the preparation process of nZVI was varied. PSA (particle size analyzer) measurements showed the finest particles of nZVI with narrow size distribution was obtained at extracts:Fe ratio of 4:1 (Fig 1a). Based on batch experiments conducted to investigate the adsorption of Pb(II) using the as prepared nZVI, different optimum of contact time was achieved for different type of size distribution of the particle. The % removal of Pb(II) determined using AAS (atomic absorption spectrometer) was 96% (Fig 1b). These results showed that the obtained nZVI has promising application for Pb(II) removal from aquatic environments.

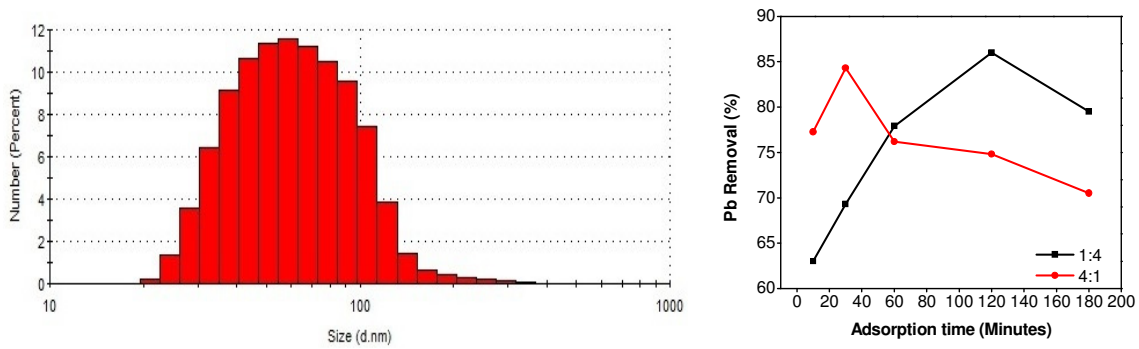

Figure 1. Particles size distribution of nZVI (a) and Pb adsorption using nZVI (b)

Keywords: Green synthesis, zero-valent iron, Pb adsorption, remediation, polyphenol

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Bioethanol Production by Simultaneous Saccharification and Fermentation (SSF) Using Agricultural Waste Corn Cobs

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ABSTRACT

Bioethanol from agriculture waste biomass is a second generation of alternative fuels despite of fosil biofuels and recently development of bioethanol production is widely discussed involving methods and materials. One of potential waste biomass for bioethanol production is corn cobs because of its a high carbohydrate content and abundant availability. The main purpose of this research is enhancing bioethanol production from corn cobs by SSF method with enzymatic hydrolysis using cellulase and xylanase from two potential Actinomycetes (*Catenuloplanes indicus* and *Streptomyces sp*.) and fermentation using *Saccharomyces cereviceae* NBRC 1440. The saccharification of corn cobs using a combination of enzymes was analyzed using Thin Layer Chromatography (TLC) and the data showed that enzyme from actinomycetes has the ability to break down corn cobs into monosaccharides such as glucose and xylose. Further analysis of bioethanol production was performed by High Performance Liquid Chromatography (HPLC).

Keywords: Bioethanol, SSF, corn cobs, cellulase, xylanase, *saccharomyces cerevisiae*

Cytotoxic Chalcones from Some Indonesian Cryptocarya

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ABSTRACT

Malignant tumors, is one of the main causes of death in the world. Until now, the search for cytotoxic (antitumor) compounds from nature, particularly from plants, is being a continuation activities. One group of plants that produce potential cytotoxic compounds is the *Cryptocarya*, one of the large genera of the Lauraceae family. As a part of our chemical and cytotoxic evaluation of the *Cryptocarya* spesies, we examined three species of Indonesian *Cryptocarya*. The sample of the wood of *C. konishii* hayata was collected from Cibodas Botanical Garden, West Java while the stem bark of *C. phoebeopsis* and *C. cagayanensis* were obtained from Sorong, Papua. Our investigation of flavonoid constituents on these species afforded three chalcone compounds i.e. desmethylinfectocaryone (**1**), infectocaryone (**2**) and cryptocaryone (**3)**. The molecular structures of the isolated compounds were determined based on spectroscopic data, including UV, IR, 1D and 2D NMR. Cytotoxic effects of the compounds were evaluated using using MTT [3-(4,5-dimethylthiazolyl-2)-2, 5-diphenyltetrazolium bromide] assay. Compound **1**, **2** and **3** displayed strong cytotoxic properties (IC_{50} < 2 µg/mL) against Murine Leukemia P388 and HL 60 (blood premyelocytic leukemia*)* cells whereas **2** and **3** exhibited strong cytotoxicity properties against HCT116 (colon cancer). Cryptocaryone (**3)** also showed moderate cytotoxic properties (IC_{50} < 10 µg/mL) towards A549 (human lung adenocarcinoma epithelial) cells.

Molecular Interaction Study of Commercial Cyclic Peptides and MERS-COV Papain-Like Protease PL^{PRO} as Novel Drug Candidate for MERS-COV

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ABSTRACT

Middle-east respiratory syndrome (MERS-CoV) has become the current outbreak, MERS-CoV infection results in illness in the respiratory system, digestive, and even lead to death with an average mortality caused by MERS-CoV infection reaches 50%. Until now, there are no effective vaccine or drug to ward off MERS-CoV infection. Papain-like protease (PL^{pro}) is responsible for cleavage of a nonstructural protein that is important for viral maturation. Inhibition of PL^{pro} with a ligand will block the cleavage process of nonstructural protein, thus reduce the infection of MERS-CoV. Through of bioinformatics study with molecular docking and drug scan analysis of commercial cyclic peptides, Aldosterone Secretion Inhibiting Factor (1-35) (bovine) was obtained as an inhibitor for PL^{pro}. Thus, Aldosterone Secretion Inhibiting Factor (1-35) (bovine) has a potential as a novel candidate drug for treating MERS-CoV.

Keywords: MERS-CoV, papain-like protease (PL^{pro}), commercial cyclic peptide, molecular docking, drug scan analysis

Efficient Dynamic Molecular Simulation using QSAR Model to Know Inhibition Activity in Breast Cancer Medicine

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ABSTRACT

According to data from GLOBOCAN (IARC) at 2012, breast cancer was the highest rated of new cancer case by 43.3% (after controlled by age), with mortality rated as high as 12.9%. Oncology is a major field which focus to improve the development of drug and therapeutic cancer in pharmaceutical and biotechnology companies. Nowadays, many researchers in the world leads to computational chemistry and bioinformatics for pharmacophore generation. A pharmacophore describes a group of atoms in the molecule which is considered to be responsible for a pharmacological action. Prediction of biological function from chemical structure in silico modeling reduces the use of chemical reagents so the risk of environmental pollution decreased. In this research, we proposed QSAR model to analyze the composition of cancer drugs which assumed to be homogenous in character and treatment. Atomic interactions which analyzed are learned through parameters such as log p as descriptors hydrophobic, n_poinas descriptor contour strength and molecular structure, and also various concentrations inhibitor (micromolar and nanomolar) from NCBI drugs bank. The differences inhibitor activity was observed by the presence of IC residues value from inhibitor substances at various concentration. Then, we got a general overview of the state of safety for drug stability seen from its IC_{50} value. In our study, we also compared between micromolar and nanomolar inhibitor effect from QSAR model results. The QSAR model analysis shows that the drug concentration with nanomolar is better than micromolar, related with the content of inhibitor substances concentration. This QSAR model got the equation: Log 1/IC50 = (0.284) (±0.195) LogP + (0.02) (±0.012) n_poin + (-0.005) (±0.083) Inhibition10.2nanoM + (0.1) (±0.079) Inhibition30.5nanoM + (-0.016) (±0.045) Inhibition91.5nanoM + (-2.572) (±1.570) (n=13 ; r=0.813 ; r^2=0.660; s=0.764; F=2.720; q^2=0.660)

Keywords: pharmacophore, QSAR, IC_{50}, nanomolar, micromolar

Chemical Constituents and Potential Cytotoxic Activity of *Myristica Fatua* Houtt Leaves

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ABSTRACT

The aims of this research were to determine the chemical constituents of *n*- hexane fraction from *Myristica fatua* Houtt leaves by Gas Chromatograpy/Mass Spectrometry (GC/MS) and their cytotoxic activities against MCF-7 cell lines[1]. The results indicated that sesquiterpenes[2] and fatty acids were major compounds of this fraction, there were *trans*-calamenene (17.75%), hexadecanoic acid (11,14%), caryophyllene (7.49%), α-muurolene (6.99%), and γ-muurolene (6.60%). In vitro anticancer activity test against breast cancer MCF-7 cell lines showed potential cytotoxic at 40 µg/mL on microscopic observation.

Keywords: *Myristica fatua* Houtt, GC/MS, sesquiterpenes, fatty acids, MCF-7 cell lines

The Effect Of Ammonia Source On The Sensitivity Of Modified NaY/IDC and ZSM-5/IDC Zeolite Ammonia Gas Sensor

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ABSTRACT

A Modified NaY/IDC and ZSM-5/IDC zeolite has been succsessfully prepared on the surface of quartz based Interdigicated Capacitor (IDC). The ZSM-5 was synthesized with double template using hydrothermal method and NaY zeolite was synthesized using sol-gel method. XRD patterns confirmed that structures were ZSM-5 and NaY zeolites. SEM-EDX showed that ZSM-5 has hexagonal shape and uneven morphology with Si / Al molar ratio of 24, while NaY crystals were intergrown in cuboid shapes with Si / Al molar ratio of 2. ZSM-5 and NaY zeolite were deposited on Au/Ag layer IDC using spin coating technique to give NaY/IDC and ZSM-5/IDC. NaY/IDC and ZSM-5/IDC prior ammonia gas sensor testing using Electrochemical Impedance Spectroscopy (EIS) method. The composite has different sensitivity in range concentration of ammonia 20-300 ppm. IDC has no significant effect of presence of various concentrations, NaY / IDC composite has optimum frequency 30000 Hz with r^2 = 0.8014 at and ZSM5 / IDC composite has optimum frequency 20000 Hz with r^2 = 0.9726.

Keywords: Ammonia, hybrid zeolite, idc, impedance, NaY, ZSM-5

Carbon Dioxide Capture by Mthyle Diethanol Amine Impregnated Mesoporous Carbon

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ABSTRACT

Methyl Diethanol Amine (MDEA) were impregnated onto the surface of the mesoporous carbon to increase carbon dioxide (CO_2) adsorption capacity. The mesoporous carbon was synthesized through soft template method with phloroglucinol as carbon precursor and triblock copolymer (Pluronic F127) as structure directing agent. These MDEA impregnated mesoporous carbon (MDEA-MC) were characterized by Fourier transform infrared spectroscopy for the functional groups, elemental analyzer for nitrogen content and N_2 adsorption/desorption for BET surface area and total pore volume. CO_2 adsorption were investigated using autoclaved-reactor in batch system. The FTIR spectrum of MDEA-MC had absorption peaks at 3395 cm^{-1} and 1031 cm^{-1} which are characteristic for O-H stretch and amine C-N stretch in MDEA. The elemental analyzer showed that nitrogen content on the mesoporous carbon increased after impregnation by 23 wt%. The BET surface area and total pore volume of mesoporous carbon decreased after impregnation, 43 wt % and 50 wt%, respectively. The maximum CO_2 adsorption capacity of MDEA43-MC was 2.63 mmol/g (298 K, 5 psi and pure CO_2). This is 64 % higher compared to the CO_2 adsorption capacity of the starting MC and also commercially available activated carbon with higher surface area. All the results suggest that MDEA-MCis a promising adsorbent for CO_2 capture.

Keywords: Mesoporous carbon, methyl dietanol amine, adsorption, carbon dioxide

Purification of Aflotoxin B1 Antibody for the Development of Aflatoxin Biosensor

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ABSTRACT

Aflatoxin B1 (AFB1) are produced from agricultural products especially peanuts overgrown with *aspergillus flavus* during the post-harvest process. Aflatoxin is classified as a highly toxic and carcinogenic substance to humans by the International Agency for Research on Cancer (IARC), WHO. This research was conducted on the development of Aflatoxin B1 detection method with aflatoxin biosensor using antibody that specifically bind to aflatoxin B1.This antibody was produced by injecting an Aflatoxin B1 hapten to a rabbit. Antibody was obtained from rabbit's blood serum and purified using Protein A affinity chromatography and Precipitation at the isoelectric. The result showed that Purification using protein A contains antibody of 4.0 mg/mL, whereas purification using precipitation at isoelectric pH contains antibody of 0.3 mg/mL. Pure antibody was tested for its specificity against aflatoxin B1, and also against tertrahydro furan (THF), Dimethyl formamide (DMF), Bovine serum albumin (BSA), and ethanol. The result revealed that THF, BSA, and ethanol was bound to antibody while DMF showed no interaction. It was concluded that the antibody have been successfully purified from rabbit's blood serum using protein A affinity chromatography and precipitation methods.

Keywords: Aflatoxin B1, antibody, affinity chromatography, protein A, isoelectric pH, biosensor.

Synthesis and Characterization of Mesoporous ZSM-5 Zeolites Using PDDA-Cl And CTABr as Secondary Templates: Effect of Template Polarity

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ABSTRACT

Synthesis and characterization of mesoporous ZSM-5 using polydiallyldimethylammonium, chloride PDDA-Cl, and cationic surfactant cetyltrimethylammonium bromide, CTABr as secondary template have been studied. The weight lost after calcination at 550 ^{0}C for 5 hours were 30.93 wt% and 25.87 wt% for PDDA-templated ZSM-5 (ZSM-5$_{pc}$) and CTAB-templated ZSM-5 (ZSM-5$_{cs}$), respectively. both as-synthesized mesoporous ZSM-5 zeolites then were characterized by XRD, FTIR, SEM, and EDX. The XRD analysis on both mesoporous ZSM-5 showed similar diffraction patterns and the typical peaks of ZSM-5 in which 2Θ = 7^o-9^o (doublet peaks) and 22^o-25^o (triplet peaks) appeared. Moreover, the analysis of functional group by FTIR also showed that both mesoporous ZSM-5 gave strong band at 550 cm^{-1}, which is assigned to asymmetric stretching mode of the double 5-rings from MFI zeolites. However, no peaks were observed by low angle XRD. Meanwhile, the result of EDX calculation showed mesoporous ZSM-5$_{pc}$ had Si/Al ratio of 26.69 and ZSM-5$_{cs}$ had Si/Al ratio of 12.62. Furthermore, the SEM images exhibited by mesoporous ZSM-5$_{pc}$ had morphology of hexagonal (coffin-like) while ZSM-5$_{cs}$ had ellipse form.

Keywords: Mesoporous ZSM-5, functional group, typical peak, Si/Al ratio, morphology

Indentification of Novel Ebola Virus (EBOV) VP24 Inhibitor from Indonesian Natural Products by Using in Silico Drug Design Approach

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ABSTRACT

Ebola remains as one of the most deadly diseases in the world, with almost 26,000 cases are reported and kills 10,000 of them, and yet neither treatment nor vaccine that can combat this disease effectively. This disease is caused by ebolavirus (EBOV), a primary member of *Filoviridae* family. The life cycle of this virus has been operated by several key proteins, one of them is VP24 protein, which has been known for its crucial role in the transcription and replication of EBOV. Therefore, targeting VP24 protein can be a solution for treating this pathogenic disease. In this study, virtual screening of Indonesian natural products as EBOV VP24 inhibitor was performed. About 2,020 ligands from many sources, including HerbalDB database, were obtained and screened by using DataWarrior software to measure its molecular and pharmacological properties, resulting 301 ligands in the process. Then, the molecular docking simulation was performed to check the ligand's binding interaction and affinity with EBOV VP24 protein, this simulation was done by using MOE 2014.09 software. This study resulted that cycloartocarpin is the best ligand to inhibit the EBOV VP24 protein. Therefore, this ligand should be checked its stability through molecular dynamics simulation, and performed in vitro test to verify its bioactivity against the EBOV VP24 protein.

Keywords: EBOV, VP24 protein, molecular docking, Indonesian natural products, in silico drug design, pharmacological properties.

Synthesis of 2-(1,5-difenil-4,5-dihydro-1H-pyrazole-3-yl)pyridine Iron (III) Complexes as a Fluorosensor for Cyanide Ion

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ABSTRACT

Cyanide containing salts are widespread chemicals found insurface water originating not only from industrial waste but also from biological sources. One method for determine the presence of cyanide ion is fluorescent chemosensor which has a high selectivity and sensitivity. A cyanide sensor based on iron (II) complexes of the pyrazoline derived ligand has been designed and prepared. Pyrazoline derived ligands can be used as fluoresensor agent because of the ease of synthesis and the presence of strong donor nitrogen atoms in the chelating metal ions. In this research, will be studied the utilization of iron (II) complexes of the 2-(1,5-difenil-4,5-dihydro-1H-pyrazole-3-yl)pyridine ligand as a anion fluorescence sensor CN^-. Ligand synthesized by two step of Claisen-Schmidt condensation and excess of phenyl hydrazine reaction. Reddish yellow solid with a 18.35% yield then characterized using FTIR, UV-Visible, and H^{1-}NMR spectroscopy. The pyrazoline iron complexes were characterized by IR, NMR and UV-Vis spectroscopy, and the structures determined by X-ray crystallography. The fluorescence intensity probe of the complex before and after the addition of cyanide ions with a variety of $5x10^{-6}$ M to $5x10^{-5}$ M also be conducted using a spectrofluorometer. Selectivity parameters of relative emission intensity of the cyanide ion mixed solution is studied to determine the ability of selective anion detection of the complex.

Keywords: Fluorosensor, pyrazoline iron complexes, Claisen-Schmidht condensation, ion cyanide

Composite Photocatalys Synthesis of TiO_2/CNT and Its Capability of Degrading 1,4-Dioxane Compound

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ABSTRACT

In this study, we investigate the capability of a composite material consisting of carbon nanotubes (CNT) and titanium dioxide (TiO_2) composites in degrading the 1,4-dioxane. It is widely known that 1,4-dioxane is both toxic and harmful for human and environment, thus degrading this compound is crucial. We used tetra butyl titanate (TBT) to synthesize titanium dioxide (TiO_2) using hydrothermal method with a varied temperature of 70 ^{0}C, 400 ^{0}C, and 700 ^{0}C. The degradation level of composite material was further studied via varying the CNT concentration (0%, 1%, 2%, 3% and 5%) under UV photo sources (λ = 254 nm). TEM, DRS, FT-IR, XRD and BET were used in order to characterize the as-prepared materials. The results show that TiO_2 nanosheet could be successfully obtained from the hydrothermal process of TBT with crystal lattice of 17.73 nm, crystallinity of 90.3%, band gap of 3.46 eV and surface area of 20.37 m^2/g. We found that the optimum condition for photocatalitic performance was acheived at CNT concentration of 1%, resulting in a degradation level of 73.5% for 90 min.

Keywords: Synthesis of TiO_2, carbon nanotube (CNT), tetra butyl titanate (TBT), TiO_2-nanosheet, and 1,4-dioxane compound

Characterization Of Superabsorbent Hydrogel Based On Epichlorohydrin Crosslink And Carboxymethyl Functionalization Of Cassava Starch

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ABSTRACT

Superabsorbent hydrogel was prepared by epichlorohydrin crosslink of cassava starch. Their swelling improved with added carboxymethyl group on the starch-epichlorohydrin structure. The structure and properties of starch-epichlorohydrin-carboxymethyl hydrogel were measured by SEM, FTIR, water and physiological solution absorption test and water retention test. The result showed that hydrogel displayed macroporous with heterogen distribution and irregular surface were formed by epichlorohydrin and carboxymethyl bond in the structure of hydrogel. It was confirmed also by the FTIR spectra. The swelling ratio of starch-epichlorohydrin hydrogel to the water is 518% and increased to 1028.5% with carboxymethyl addition on the structure. The best influence of the physiological solution to the swelling ratio of starch-epichlorohydrin-carboxymethyl hydrogel is urea solution. The water retention of starch-epichlorohydrin-carboxymethyl hydrogel in NaCl solution is better than in $CaCl_2$ solution

Keywords: Cassava, starch, hydrogel, crosslink, epichlorohydrin, carboxymethyl

Synthesis of ZSM-5 Zeolite from Bayat Natural Zeolite as Silica and Alumina Sources

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ABSTRACT

Zeolite ZSM-5 has been successfully synthesized from natural zeolite Bayat (Si/Al ratio 5 - 6, MOR) without further purification. The silica and alumina source are taken from natural zeolit by depolimerizing natural zeolite method via submolten system. Ludox 40 was used as additional silica source to reach Si/Al ratio of 32 in the starting gel and tetrapropylammonium hydroxide (TPAOH) was used as a structure directing agent (SDA). Synthesis was carried out hydrothermally with aging and crystallization temperature at 150 ^{o}C. The as-synthesized zeolite wascharacterized with XRD, FTIR and SEM-EDX. The XRD patterns of the resulted synthesis showed diffraction peaks at 2θ = 7.9°- 8.8°(doublet peaks) and diffraction peaks at 2θ = 22°-25° (triplet peaks) which are characteristic for ZSM-5 structure. The SEM image showed that the ZSM-5z zeolite from natural zeolite had morfology of hexagonal crystalls with some debris of impurities.The elemental Analysis using EDX gave moles of Si and Al of 1.62 and 0.09 and the Si/Al molar ratio of 18.5 and 0,46 wt% Na. The as-synthesized ZSM-5z then will be tested as adsorbent for heavy metal polutant in aqueous condition. It is expected that the adsorption capacity of the as-synthesized ZSM-5z is improved compared to the starting natural zeolite.

Keywords: Natural zeolite, ZSM-5, submolten, single template

Isolation, Amplification, and Characterization of Foodborne Pathogen Disease Bacteria for Rapid Kit Test Development

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ABSTRACT

There is a lot of public concern over food safety. Food-safety cases recently, including many food poisoning cases in both the developed and developing countries, considered to be the national security threats which involved police investigation. Quick and accurate detection methods are needed to handle the food poisoning cases with a big number of sufferers at the same time. Therefore, the research is aimed to develop a specific, sensitive, and rapid result molecular detection tool for foodborne pathogen bacteria. We, thus, propose genomic level approach with Polymerase Chain Reaction. The research has successfully produced a specific primer to perform amplification to film-C S. typhi, E. coli, and pef Salmonella typhimurium genes. The electrophoresis result shows that amplification products are 95 base pairs, 121 base pairs, and 139 base pairs; and all three genes are in silico. In conclusion, the research has been successfully designed a specific detection tool to three foodborne pathogen bacteria genes. Further stages test and the uses of Real-time PCR in the detection process are still in the trial process for better detection method.

Keywords: PCR, food borne pathogen bacteria, rapid kit test

Preparation of Demipermanent and Semipermanent Hair Dyes Gels from Ethanol Extract of *Caesalpinia Sappan L*. Using Carbomer as Gelling Agent

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ABSTRACT

Caesalpinia sappan L. (Cs L)) contains of essential oils, saponins, brazilin, brazilein, alkaloids, flavonoids and tannins that have a function as cationic natural dyes. The Extract of Cs L wood powder was macerate using ethanol of 96% as solvent, and then thickened using vacuum rotary evaporator at 40OC – 50OC. Three formulas of demipermanent hair dye gels were use Carbomer of 2% as gelling agent, and Cs L extracts of 3%, 6% and 9%. Three formulas of semipermanent hair dye gels were use Carbomer 1,50% as gelling agent and Cs L extracts of 2,50%, 7,00% and 10,50%. Those hair dyes gels were prepared by swelling and mixing methods. All products of hair dyes gels were evaluated about organoleptic, homogeneity, pH, consistency, rheological properties and dyeing effect. The demipermanent hair dyes gels products have brown to brown dark black colors, pH of 5,05 - 5,43, homogeny, spesific Cs L odor, and have pseudoplastic thixotropic flow characteristics. The semipermanent hair dyes gels products have red colors, pH of 6,5-6,25, homogeny, spesific Cs L odor, and have pseudoplastic thixotropic flow characteristics. The optimum formula of demi permanent is formula gel that contained of 6% extract of Cs L and the optimum formula of permanent hair dyes gel is formula that contained of 10,50% extract of Cs L.

Keywords: Hair, dyes, c*aesalpinia sappan* L, carbomer, gel, demipermanent, semipermanent,

Identification and Screening of Rare Actinomycetes Isolated from *Neesia altissima Bl*.

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ABSTRACT

The antibiotics resistance in pathogenic bacterial has inspired some research for finding more and better agents. Actinomycetes is the main source of antibiotics and endophytic actinomycetes isolated from medicinal plants has considerable potential as like the host. The aim of this research is to identify the rare actinomycetes that isolated from *Neesia altissima* Bl. and to screen their antagonistic activity against diarrhea-causing bacteria in order to find new potential secondary metabolites. Samples of *N. altissima* were collected from mount Halimun-Salak National Park. Endophytic actinomycetes were isolated from roots of *N. altissima* by surface sterilized method. Screening of antagonistics activity was conducted against five diarrhea-causing bacteria such as *Bacillus cereus* ATCC 10876, *Escherichia coli* ATCC 25922, *Salmonella typhimurium* ATCC 25241, *Shigella flexneri* ATCC 12022, and *Staphylococcus aureus* ATCC 25923 by using diffusion disc methods. The endophytic actinomycete showed in vitro antibacterial activity against all of test bacteria except *Bacillus cereus*. The phylogenetic tree generated from 16S rRNA sequence showed that the sequence from an endophytic actinomycetes isolate nested in the clade large clade of the sequences belonging to the genus *Nonomuraea*. Sequence of isolate UICC B-94 formed a monophyletic clade with *Nonomuraea jabiensis* strain A4036 and *Nonomuraea rubra* strain AC 615. It is apparent that sequence of isolate UICC B-94 belongs to *Nonomuraea* sp. The morphology of *Nonomuraea* sp. UICC B-94 showed posisporus, cylindrical of hypha's structures on the International Streptomyces Project (ISP2) medium. The on going research have carried out chemical analysis identification and scanning electron microscope observation.

Keywords: Endophytic actinomycetes, 16S, identification, rare actinomycetes, *neesia altissma*.

In Vitro Culture of Physalis angulata l. Leaf in Various MS Modification Medium

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ABSTRACT

Physalis angulata L. is plant widely used in traditional medicines, therefore to keep its availability the cultivation is required, one way to ensure its availability is by using *in vitro* culture. Research aims to know response of *P. angulata*'s leaves explant on medium MS supplemented with MS vitamins + 2,4-D 0,3 mg l^{-1} (M1); MS supplemented with MS vitamins + 2,4-D 0,4 mg l^{-1} (M2); MS supplemented with MS vitamins + NAA 0,5 mg l^{-1} & BAP 0,5 mg l^{-1} (M3), MS supplemented with B5 vitamins + 2,4-D 0,3 mg l^{-1} (M4); MS supplemented with B5 vitamins + 2,4-D 0,4 mg l^{-1} (M5); MS supplemented with B5 vitamins + kombinasi NAA 0,5 mgl & BAP 0,5 mg l^{-1} (M6). The explant were cultured with photoperiodisity in 12 hours. The result show there are four categories response, the first, explant response to form a callus (K), explant response to form adventitious root (A), next is the callus formation that followed by the growth of adventitious root (KA), and the last one callus formation that followed by the growth of adventitious root and adventitious shoot. The explant could form K and KA in every medium, but the one that form A only found in M2. However, the explant that form KAT only found in several medium, which are medium M3 and M6. Overall, the explant show response many formed in medium M6. By this research, the explant could response to several action, such as through organogenesis and calogenesis.

Keywords: Explant response, *physalis angulata* L.

Content of Polyphenol Compound on Mangrove and Macroalga Extracts

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ABSTRACT

Polyphenol or phenolic is compound containing one or more hydroxyl group of aromatic ring [1]. This compound have some activities like antibacterial, antiseptic, and antioxidants. Natural resources like mangrove and macroalga were known containing this compound. The purpose of research was to investigate polyphenol content on mangrove and macroalga. Materials used in this research were mangrove (*Avicennia* sp.) leaves, and whole part of macroalga (*Caulerpa racemosa*). Sampels were dried for 5 days then macerated in order to get an extract. Macerated were done using methanol for 48 hours and 24 hours. Polyphenol content were determined using phytochemical screening on both extracts. Quantitave test were carried out to determine catechin and tannin as polyphenol compound. The result showed that both extract contained polyphenol compound. According to quantitave test, mangrove has higher content of catechin and tannin which were 12,37-13,44 % compared to macroalga which were 2,57-4,58%. Those indicated that both materials can be source of polyphenol compound with higher content on mangrove. Moreover, according to this result, these resources can be applied in medical and pharmaceutical industry.

Keywords: Polyphenol, extract, *avicennia* sp., *caulerpa racemosa*, catechin, tannin

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The Effect of Maceration Length of Time on the Yield of Mangrove and Macroalga Extracts

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ABSTRACT

Total amount of yield on natural resources extract can be influenced by sampling method. According [1], sampling can be done in the morning and-or afternoon to prevent maximum photosyntesis. This research is aimed to investigate the effect of maceration length of time on yield of mangrove (*Avicennia marina*) and macroalga (*Caulerpa racemosa*) extracts. The materials used in this research were mangrove leaves and whole part of macroalga. Mangrove was sampled in the morning, while macroalga was in the afternoon. Samples were dried for 5 days. Weight of dry samples used was 70 grams. Maceration of sampels were done for 48 hours (first maceration) and 24 hours (second maceration), respectively using methanol. The result showed that highest chemical yield was found on mangrove extract after first maceration while the lowest one was on macroalga extract after second maceration which were 32,43% and 10,43% respectively. Those condition possibly due to each extract had different absorption time on methanol and length of maceration.

Keywords: Maceration, chemical yield, extract, *avicennia marina*, c*aulerpa racemosa*

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Development of Dissolved Oxygen Model by using Gastropod as Bioindicator with Emphasis on Shell Length Distribution: A Case Study in Blanakan, West Java

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ABSTRACT

Dissolved Oxygen (DO) is considered as the most important water quality parameter in aquaculture ponds [1]. The dynamic and availability of DO is related to the existence of aquatic organisms that also include benthic organism and gastropod in particular. The aim of this study was to evaluate the potential of gastropod communities as bioindicators for monitoring oxygen availability and water quality in aquaculture ponds through modelling approach that located in aquaculture ponds in Blanakan, West Java. Gastropod samples were collected directly from ponds by using Ekman grab sampler. DO was monitored in situ along with pH, salinity, and temperature measurement. A regression model was developed to predict the relationships between gastropod shell length with dissolved oxygen in ponds. The DO average in ponds was 7.63±0.59 mg/l and ranged from 5.4 (DOmin) to 8.6 mg/l (DOmax). *Melanoides* sp. and *Thiara* sp. were known as gastropod species in ponds in Blanakan. The average shell length of *Melanoides* sp. at DOmin was 6.91±3.26 mm and at DOmax was 6.29±1.68 mm. DO levels in ponds have affected significantly the shell length of *Melanoides* sp. (F=4.2811, p=0.00). The average shell length of *Thiara* sp at DOmin was 5.01±3.10 mm. Likewise, model results showed correlation between measured DO and *Melanoides* sp. shell length (r^2 = 0.20) and population as well (r^2 = 0.56). The shell length and population of *Melanoides* sp. is correlated and influenced by DO level in aquaculture ponds Blanakan, West Java. Shell length of *Melanoides* sp. is suitable to be used to predict the DO in the ponds.

Keywords: Bioindicator, dissolved oxygens, gastropods, model, population

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Characterization of Chitin and Chitosan Synthesized from Red Snapper (*Lutjanus sp*) Scale Wastes

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ABSTRACT

Chitin (poli [β - (1 $\rightarrow$ 4) -2- asetamido-2-deoksi-glukosa]) and chitosan (beta (1- 4) 2-amino-2-deoxy-D-glucose) are known as the most abundant natural amino polysaccharide and they are estimated to be produced annually almost as much as cellulose. It leads to great interest as an industrialized resource and also as functional material of high potential in various fields. Marine products are widely known as source of chitin and chitosan. Shells of crab and shrimp have been studied and extensively used for producing chitin and chitosan [1]. However, study on chitin and chitosan derived from fish sources is still limited. Red snapper (*Lutjanus* sp) is common tropical fish that known as important source of marine products in particular Indonesia. Correspondingly, the consumption of red snapper has generated significant amont of discarded scale wastes recently and hence can cause adverse impact to the environment. The solution for managing the environment impact related to the fish scale wastes is by utilising the scale as alternative sources of chitin and chitosan. Therefore, this research aimed to characterise the chitin and chitosan derived from the red snapper scale wastes. Method in this research consisted of deproteination and demineralization for producing chitin and followed by deacetylation process to synthesize chitosan. Structural data and surface morphology of the chitin and chitosan obtained were analyzed using FTIR, EDS and SEM. Proximate analysis showed that content of moisture, ash, and nitrogen in chitin were 3.20%, 2.40%, 0.04% while in chitosan were 6.14%, 1.18%, 0.03% respectively. Furthermore, amount of C, O, Na, Al, P and Ca elements were obtained from chitin and chitosan sample by energy dispersed spectroscopy respectively. The Degree of Deacetylation for both chitin and chitosan showed high value more than 75%. Hence, by considering the chemical properties of red snapper scales, it confirms that this species is a promising alternative sources for both chitin and chitosan.

Keywords: Chitin, chitosan, characterization, fish scales, red snapper

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Identification of Maturase K (matK) Gene in Trinitario Cacao Plant *(Theobroma cacao L.)* from Lampung and Central Java

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ABSTRACT

The research was conducted to know the genetic variation in the Trinitario cacao plant (*Theobroma cacao* L.) obtained from the exploration and selection in Lampung Province, named HJ1, HJ2, HJ3 and HJ4 and the elder Trinitario cacao crop, named DR2. The identification was performed by comparing the DNA sequence of the *mat*K region in chloroplasts DNA genome. Genomic isolation was carried out on samples of an old and fresh cacao leaf. Furthermore, the amplification was conducted using two different primers, named Mac 02 (872 bp) and Mac 09 (1.153 bp). The sequencing results obtained indicate genetic variations in samples that amplified using Mac 09 primer. Dendrogram that was constructed using UPGMA method showed that the cacao plant from the exploration and selection (HJ1, HJ2, HJ3 and HJ4) are grouped into one cluster, and the DR2 plant are the elder of that four cacao plant.

Keywords: Dendogram, trinitario cacao, matK, sequencing, genetic variation

Assessment and Mapping of Land Use Trade-Off in the Orangutan Habitat

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ABSTRACT

This study aims to analyze trade off among 6 (six) type of dominant land uses to consider Orangutan livelihood and landscape sustainability. The results of this study will assist landscape's planners and policy makers for selecting development scenario or policy within the landscape, especially to reduce human and wildlife conflict as impact of development. This study was conducted in Orangutan sub species *Pongo pygmeus pygmeus* habitat in West Kalimantan, Indonesia. We used net present value analysis to identify land use economic benefit of land uses and deployed expert judgment to identify suitability of the land uses to Orangutan livelihood. The study shows that palm oil plantation is the dominant land use type in non-forest area category and natural forest is in forest area category within the site. Palm oil contributed highest economic benefit (average IDR 11,223,890 per year) compare to other land use type, but also the worst land use type for supporting orangutan conservation (index suitability for Orangutan is only 21.8). The development of agroforestry which planted more than 3 valuable economy commodities will be used as alternative in forest buffer area development that can provide better gain for economic (benefit IDR 10,006,667 per year) and Orangutan conservation (index suitability for Orangutan is 43.5). In achieving sustainability at the landscape level, it needs to consider the sustainability of the umbrella species, such as Orangutan. The existence of the umbrella species will also protect other biodiversity, forest and its environmental services.

Keywords: Trade off, land use, orangutan conservation, landscape sustainability, west kalimantan

Comparative Study of Freshwater Crayfish, *Cherax sp.* (*Crustacea: Decapoda: Parastacidae*) from Papua, Indonesia based on Length-Weight Analyses

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ABSTRACT

The freshwater crayfish is one of the most important fish species as the protein resources. Lake and rivers are the habitat of crayfish in Papua. Morphological characters of crayfish, such as color, total body length and body weight were influenced by the habitat. The purpose of the study, therefore, was to compare the total body length and body weight as well as the unique color of crayfish from Uter lake (Atinjo district), Seremuk river (Haha village), Baliem river (Pike village; Hubukiak district, Jayawijaya), and Baliem river (Wesaput village; Wesaput district). The total body length and body weight were then analyzed by Principle Component Analysis (PCA) using XLSTAT software. The body weight average of crayfish from Uter lake (Atinjo district), Seremuk river (Haha village), Baliem river (Pike village; Hubukiak district, Jayawijaya), and Baliem river (Wesaput village; Wesaput district) were 8.39 g (n=3), 6.62 g (n=10), 95.07 g (n=7), and 34.59 g (n=10), respectively. While the total body length average of crayfish from Uter lake (Atinjo district), Seremuk river (Haha village), Baliem river (Pike village; Hubukiak district, Jayawijaya), and Baliem river (Wesaput village; Wesaput district) were 74.95 mm (n=3), 72.41 mm (n=10), 163.64 mm (n=7), and 118.52 mm (n=10), respectively.

Keywords: Freshwater crayfish, morphological characters, papua

The Total Body Length and Body Weight Examination among Gudgeon Fish Population, Oxyelotris heterodon, Weber, 1907 (Pisces: Eleotridae) of Sentani Lake, Papua, Indonesia

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ABSTRACT

The gabus Sentani fish lived in the Sentani Lake, Papua, since million years ago. Nowadays, the population of those species are getting extinct becaused of the overexploitation, whereas the culture effort of this species has not been developed, yet. The purpose of the study, was to examine the total body length and body weight collected from some villages surrounding Sentani Lake such asIfar village, Sosiri village, and Putali village. The body weight average of gabus fish from Ifar village, Sosiri village, and Putali village were 373.53 g, 426.86 g and 118.34 g respectively. While the total body length average of gabus Sentani fish from Ifar village, Sosiri village, and Putali village were 279.30 mm, 223.30 mm and 222.06 mm, respectively. Growth model was $W=0.021067L^{3.086}$ with R^2 value was 35.8%, and r value was 0.598. Gabus Sentani fish, *Oxyeleotris heterodon* (Weber 1907) exhibited positive allometric (b>3).

Keywords: *Oxyelotris heterodon*, morphological characters, sentani lake.

Morphometric Study Of Mantis Shrimp *Harpiosquilla harpax* (De Haan, 1844) (Crustacea: Stomatopoda) In Pelabuhan Ratu and Cirebon Waters, Indonesia, Based On Length-Weight Relationship And Condition Factor

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ABSTRACT

Length-weight relationship and condition factor of mantis shrimps (*Harpiosquilla harpax*) from Pelabuhan Ratu waters and Cirebon between May and July 2016 were studied. A total of 46 specimens ranging from 10.63 to 21.68 cm in total length and 12.23 to 90.89 g in total weight were collected. The value of exponent "b" obtained for length-weight relationship ranged from 2.687 to 3.3503. The range of K values which was from 0.78 to 1.21 indicated that the mantis shrimps examined from both locations were in good and healthy conditions. The "b" values indicate allometric growth for mantis shrimps collected for both regions.

Keywords: Mantis shrimp, length-weight relationship, condition factor, cirebon waters, pelabuhan ratu waters

The Distribution and the Abundance of Manthis Shrimp Larvae in Pelabuhan Ratu and Cirebon Waters

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ABSTRACT

The aim of this research is to study the distribution and the abundance of manthis shrimp larvae in Pelabuhan Ratu and Cirebon waters. Manthis shrimp larvae were identified based on carapace structure and the length of carapace. This research was conducted from May to August. Sampling was carried out at four station and sample were collected in triplicate of each station. The size of plankton net used was 30 x 30 cm^2 and 500 µm in mesh size. To collect the larvae, the plankton net was unloaded at the sea water surface and was towed at a speed of 1-2 knot s for 10 minutes. The number of larvae obtained from Cirebon waters as much as 13 larvae were *Miyakea nepa* (Fig. 1), while one larva derived from Pelabuhan Ratu waters was *Harpiosquilla harpax* (Fig. 2). The abundance of larvae at Station A1, A2, and A3 of Cirebon waters were 11 ind/10 m^3, 6 ind/10 m^3, and 7 ind/10 m^3, respectively. While at Station C1, B2, D2 of Cirebon waters, the abundance of larvae as much as 29 ind/10 m^3, 13 ind/10m^3 and 38 ind/10 m^3, respectively. On the other hand, the abundance of larva at Station C3 from Pelabuhan Ratu waters was 2 ind/10 m^3. The distribution and the abundance of manthis shrimp larvae influenced by the habitat, environmental factors, larvae behavior, and sea tides.

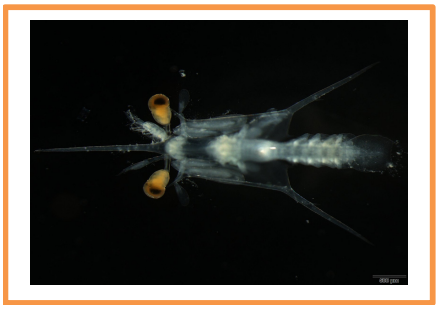

Figure 1. Mid stage larva *Miyakea nepa* from Cirebon water

Figure 2. Early stage larva *Harpiosquilla harpax* from Pelabuhan Ratu water

Keywords: Abundance, distribution, mantis shrimps larvae, cirebon, pelabuhan ratu waters

Test Activities of Extract Anti-Plasmodium Tuber Bidara Upas (*Merremia mammosa (Lour.) Hallier f*)

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ABSTRACT

Malaria is an infectious disease a public health problem, both globally and in Indonesia. Various attempts have been made to tackle the malaria parasite but the prevalence remains high. This is because of vector resistance to insecticides and the resistance of *Plasmodium* to anti-malarial drugs, especially chloroquine. In this case, the medicinal plants are potential targets for pharmaceutical research and development of alternative antimalarial. Over the past decade, several studies have been conducted to develop antimalarial drugs from various plants, one of which is a plant bidara upas (*Merremia mammosa* (Lour.) Hallier f). Results of phytochemical screening of nine samples of n-hexane extract the tubers bidara upas (*Merremia mammosa*) drawn from nine locations in Java showed that n-hexane extracts nine bidara upas tuber contains flavonoids, saponins and terpenoids. So that there were no differences compound of the nine samples tested. Of the nine samples were tested phytochemical screening, was taken a representative sample to be tested anti-plasmodium, namely samples of cultivated plants originating from Jogyakarta, namely Juragan Jamu. The test results anti-plasmodium of n-hexane extract the tubers bidara upas demonstrate that the plant is bidara upas anti-plasmodium with IC50 values of 3.36.

Keywords: *Merremia mammosa*, antimalarial, bidara upas

Analysis of Physical and Chemical Effluent Vaname Shrimp (*Litopenaeus vanname*) in Production Business Service Center of Aquaculture Karawang, West Java

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ABSTRACT

Vaname shrimp culture system that changes from the traditional system into an intensive system had an impact on the environment. Application of intensive cultivation to increase production also bring other impacts including environmental pollution such as effluent ponds. In BLUPPB Karawang, pond effluent directly discharged into public waterways without any prior treatment. Ponds management (physical and chemical parameters) measurement are needed to maintain good quality of pond water in the effluent. The study was conducted from November 2015 until April 2016 at Balai Layanan Usaha Produksi Perikanan Budidaya (BLUPPB) Karawang, West Java. The purpose of this study was to obtain data on physical and chemical parameters in pond and effluent water, to analyze heavy metals content in sediment of the pond at outlet channel. Samples were taken at three locations (pond, effluent ponds and pond sediments at the outlet channel). All values were compared with standart reference. The results showed that the value of physical and chemical parameters in pond water tend to be well maintained, but in the effluent the value of the physical parameters such as TSS was 203 ppm, turbidity was 51 NTU and parameters of chemical BOD was 46 ppm. This values exceeded the quality standards established by KEPMENKP NO: 28 / MEN / 2004. The average results of the measurement of heavy metals in sediment in the pond outlet channel for the metal were 1.66 ppm for Zn, 0.73 ppm for Cu and 1.74 ppm for Cr. Those values of heavy metals are below the maximum limits set within the standards quality by IADC / CEDA (1997).

Keywords: Vaname shrimp, pond, effluents, heavy metals, quality standards, BLUPPB karawang

The Local Knowledge of Edible Plants used by Karo Ethnic in Semangat Gunung Village, Karo Regency, North Sumatra, Indonesia

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ABSTRACT

Research on the local knowledge of edible plants used by Karo ethnic in Semangat Gunung Village, North Sumatra has been done. The aim of this study was to reveal plant species that used by the people of Karo ethnic as food. We used ethnobotanical approach which included open-ended, semi-structural interview, participate observation, and exploration method. One eldervillage, 2 traditional healers, and 30 respondents have been selected as sources of information. Descriptive statistics have been used to analyze the gathered data. A number of 109 species which belong to 83 genus and 45 families known to be used as food sources by Karo people. Four families have the highest number of food plant species, they are Solanaceae (8 species), Poaceae (7 species), Fabaceae (6 species), and Zingiberaceae (6 species). All of those 4 families are found in the village, both wild and cultivated. Solanaceae is used as fruits, vegetables, and spices. Poaceae is used as the staple food, alternative staple food, snacks, spices, and indigenous foods. Zingiberaceae is used as spices.

Keywords: Edible plants, karo ethnic, semangat gunung, *pagit-pagit*, *panicum repens*

Physiology Response on Indigenous Cattle Breeds In West Sumbawa, Indonesia

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ABSTRACT

Heat stress in cattle welfare is a growing concern because of increase in ambient temperature due to global warming. Physiological adaptation is as a way to survive and reproduce by regulation internal body temperature. West Sumbawa is dry tropic area in eastern Indonesia where its temperature range is 24-38°C and relative humidity is 50-90%. This study aimed to determine the physiological response of indigenous cattle i.e. Bali cattle and Sumbawa Ongole cattle to the environment in West Sumbawa. Skin and rectal temperature and respiration rate within one minute were measured as physiology profiles from seven Bali cattle and two Sumbawa Ongole cattle. They were measured every 7.00 am and 15.00 pm for five consecutive days in August 2016. The results of measurements physiology profiles differ significantly between morning and afternoon among cattle breeds. Body temperature and respiration rate were significantly different among breeds ($p<0.05$). Body temperature was lower but respiration rate of Sumbawa Ongole was higher than Bali cattle. Increased respiration rate of breeds was positively correlated with THI value ($p<0.05$), but neither was body temperature. Physiological response of Bali cattle to environmental West Sumbawa through the increase in body temperature, whereas Sumbawa Ongole cattle through increasing in respiration rate.

Keywords: Indigenous cattle, physiology adaptation, heat stress, THI

The Productivity of Fishing Spanish Mackerel (*Scomberomorus commerson*) using A Hand Line in Water of Bangka Regency

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ABSTRACT

Mackerel is one of the main targets of hand line fishing in water of Bangka Regency. The mackerel catch data were collected by following the hand line fishing operation as many as 46 trips from November 2015 to January 2016. Sampling method were used purposive sampling. The productivity data of hand line fishing were calculated based on the month of fishing operations (harvest time, normal time and famine time). The average productivity of hand line fishing in November 2015, December 2015 and January 2016 were 26,36 kg/trip; 27,67/trip kg and 81, 14 kg/trip. Handline fishing productivity in November and December was not significantly different, however there was a significant different in January productivity.

Keywords: Handline, mackerel, month of fishing operation, water of Bangka regency.

The Local Knowledge of Medicinal Plants by Minangkabau Ethnic in Guguak Sarai, West Sumatera, Indonesia

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ABSTRACT

Research was carried out in Guguak Sarai, West Sumatera, Indonesia. The purpose of this study was to document the local knowledge of medicinal plants by Minangkabau ethnic. Data were collected using ethnobotanical approach through open ended, semi structured interview and exploration method. The sample consisted of 3 key informants and 94 respondents with provisions age $\geq$ 30 years old. Data were analyzed qualitatively using descriptive statistics. Total 158 medicinal plants species which belongs to 124 genera and 54 families were reported to be used in against 52 diseases. Among the diseases, gastrointestinal disorders had the highest number of medicinal plants to be used (37 species), skin diseases (36 species), postpartum cures (29 species), urinary tract disorders (26 species) and rheumatism (19 species). Fabaceae (Leguminosae) was the dominant families (12 species) followed by Euphorbiaceae, Lamiaceae, Poaceae (each of 10 species) and Asteraceae (9 species).

Keywords: Ethnomedicine, *gambia, jambu lipo,* minangkabau, *psidium guajava*, *uncaria gambir*.

Studies of Adaptive Traits of Bali Cattle in Buleleng District, Bali and Barru District, South Sulawesi

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ABSTRACT

Bali cattle have high adaptability, so distribution area spreads across in Indonesia. These studies aimed to determine the effect of environmental factors on physiology performance of Bali cattle in Buleleng district and Barru district. Cattle were measured on skin and rectal temperature, respiration rate within a minute across 5-days. Ambient temperature, relative humidity, wind speed, and solar radiation rate were measured as environmental factors. Our finding indicated that environmental factors between the two district were different ($p < 0.05$), but not the temperature and wind speed. In Buleleng, the range of relative humidity from 82.6 ± 14.4 % and solar radiation from 30.6 ± 24.5 kLx, whereas in Barru the range of relative humidity from 75.4 ± 12.6 % and solar radiation 50 ± 23.4 kLx. Although both regions have different environmental conditions, respiration rate of cattle was different between the two districts ($p < 0.05$). Cattle respiration rate in Buleleng was 26-34 BPM, whereas in Barru was 22-28 BPM. Our results indicated that the changes in environmental conditions affect changes in cattle physiology profile in each district. Thus, Bali cattle have adaptability in a variety of environmental conditions.

Keywords: Bali cattle, physiology adaptation, environmental factors

Comparative Leaf Anatomy of Lowland and Highland Nepenthes (*Nepenthaceae*) Species

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ABSTRACT

Nepenthes (*Nepenthaceae*) is one of the unique plants with organ bags to adsorb nutritional needs. This dicotyledonous plant is able to live in the lowland and highland. Differences their habitat influence it's anatomical differences, such as leaves. This study aimed to compare the leaf anatomy between lowland and highland *Nepenthes* species. We examined *Nepenthes gracilis, N. rafflesiana, N. mirabilis, N. hookeriana, and N. reinwardtiana* from group of lowland species. We also examined *Nepenthes pectinata, N. aristolochioides,* and *N. singalana* from group of highland *Nepenthes* species. Each species was represented by three adult leaves of 1-3 individual plants. Each leaf was made transverse section by using a hand mini microtome and paradermal section was made by leaf screaping technique. Paradermal and transverse section was dehydrated by using graded series of alcohol. Transverse section was stained with safranin 1% and fastgreen 1%, while the paradermal section with safranin 1%. Microscopic observations were performed using light microscope. The comparative test data was quantitative anatomy *Nepenthes* using ANOVA test. The results showed differences in anatomy because of differences habitat. Lowland *Nepenthes* has fewer hypodermic layers, smaller and more numerous stomata, and thinner cuticle layer than highland species. These anatomical features expected to be important modification to adapt with local ecological factors.

Keyword: Anatomy, nepenthes, habitat, lowland, highland

Sustainable Management of Mangrove Crabs (*Syclla serrata*, 1775) in Sambas Regency

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ABSTRACT

Mangrove crabs (Syclla serrata) is one fishery export commodities with high economic value. The purpose of this research in general is to calculate the amount of fishing effort mud crab, utilization and determine the strategy of sustainable management of mangrove crabs in Sambas district. The study was conducted in December 2015 - March 2016 in the Paloh in Sambas Regency with land and sea survey methods.

The analysis of the biological characteristics include sex ratio, TKG, fecundity, condition factor, Lc, Lm, and a decent sized catch. whereas sustainable management analysis using rapid appraisal methods for Fisheries (RAPFISH). Result Analysis of Potential Lestari (MSY) mangrove crab in Sambas district is 94 040 kg / unit with Fmsy is 52 units and CPU Eopt is 1679.2 kg / unit. The range of mangrove crab carapace length of males caught is 62 mm - 152.5 mm, while the female crabs between size 67.5 -132.5 mm. Allometric growth pattern is positive. mangrove crabs caught males have higher percentage than females (1.25: 1). Percentage of mangrove crabs mature and immature gonads was 56.57% and 43.43%.

The status of sustainability management in multidimension point of view, Mangrove crab activities in Sambas Regency is sustainable enough condition (index value of 53.1). The strategies that need to do based on priority scale are: 1) setting up the fishing tools, 2) Determination of the selectivity of fishing tools, 3) Restriction of fishing activities, 4) improving the quality of human resources, 5) Settip up the changes of temporary target catch according to season, 6) Management of side catches value (by catch), 7) Improving monitoring of fishing, 8) Developing of fishing tools that are environmentally friendly, 9) Increase the value of GDP, 10) Admission of resource ownership, 11) Policy in fisheries management that considering the value of local fishermes, 12) Increase the Role of Fisheries Sector, and 13) Status of conflict.

Keyword: Sustainable, rapfish, sambas, paloh

Leaf Anatomical Characterization of Five Nepenthes Species from Lingkat Lake and Gunung Tujuh Lake, Kerinci Seblat National Park, Jambi

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ABSTRACT

Nepenthes is one of genera which have key characters on leaf and pitcher as modification. However, wide varieties of morphological features on pitcher intraspecies and between species could be tough for identification proccess. Kerinci Seblat National park were choosen because lack of update data on wild type *Nepenthes* there. All the five *Nepenthes* species were collected from Lingkat Lake and Gunung Tujuh Lake. The objective was to characterize the leaf anatomy of collected *Nepenthes* species and to provide taxonomic identification using its anatomical features. Observation on leaves and pitcher divided into two different methods. Pitcher were separated into lid and body part, then observed by stereo microscop. Leaves were separated into paradermal and transversal slices, dehydrated with alcohol series, stained with safranin and fast green and observed under light microscop. The result showed that there were spesific differences between species that could be potential to be key characters. That features include nectar glands size and distribution, digestive glands size and distribution, stomata size and density, hypodermis thickness, and wide of primary vascular tissue.

Keyword: Anatomy, nepenthes, kerinci

Leaf and Root Anatomical Characteristics of Two Dendrobium Species (Orchidaceae) in Relation to Their Potential Adaptation to Drought Stress

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ABSTRACT

Dendrobium capra and *Dendrobium arcuatum* are closely related in phylogeny, but they have very contrasting vegetative morphology and habitats. *Dendrobium capra* is known as well-adapted species to dry lowland teak forest habitat in East Java, where most of trees have dropped their leaves in summer. Different with *Dendrobium arcuatum* which has adapted to mid or high land moist forest at elevation up to 800 m dpl. In order to investigate their potential adaptation to drought stress, we have analyzed and compared the leaf and root anatomical characteristics of both species. Transversal sections have been made using hand mini microtome, dehydrated in graded alcohol series and stained with safranin 1 % and fastgreen 1%. Leaf scraping technique has been used to prepare paradermal sections and then dehydrated in graded alcohol series and stained with safranin 1 %. Quantitative anatomical characteristics between D. *capra* and *D. arcuatum* have been compared using t-test. The result showed that there were significant differences on anatomical characters between both species. Compared with *Dendrobium arcuatum*, *Dendrobium capra* was characterized by drought tolerance showed from its leaf and root anatomical structures. Anatomical adaptations to drought and dry habitat on *D. capra* were: thicker cuticle layer, thickened cell wall on epidermis, presence of hypodermis with thickened wall, thicker mesofil, broader sclerenchyma thickening in surrounding primer vascular bundle, lower sum of stomata, thicker velamen layers, and thicker sclerenchyma wall on primer vascular bundle.

Keywords: Leaf, root, dendrobium, adaptation, drought

Ambient Temperature Effects on Growth of Milkfish at Aquaculture Scale in Blanakan, Subang

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ABSTRACT

Growth and survival of fishes can be influenced by temperature [1]. Variation among size like weight and length could be the preference how temperature works on growth of fishes [2]. This could be key factor in determining in production as well as market demand since people like heavy and large fishes. The main objective of this study was to investigate the effects of temperature and growth of milkfish (*Chanos chanos*) from weight and length parameters in Blanakan fish farm. Attempts were made to estimate optimal temperatures for growth for fish of different sizes in order to optimize culture conditions for rearing milkfishes at aquaculture scale in Blanakan, West Java. Milkfishes were reared in the aquaculture Blanakan ponds because they can adapt very well. The weight and length of milkfishes were measured together with water temperature. The results showed the temperature min (t_{min}) and max (t_{max}) were ranged from 29 – 35 ^{O}C. There were significant differences in mean weight ($p = 0.00$) between temperature with the fish reared in t_{max} group having the lowest mean weight (99.87 ± 11.51 g) and fish reared in t_{min} group having the highest mean weight (277.17 ± 33.76 g). Likewise, the significant differences were also observed in mean length ($p = 0.00$) between temperature with the fish reared in t_{max} group having the lowest mean length (176.50 ± 12.50 mm) and fish reared in t_{min} group having the highest mean length (183.60 ± 23.86 mm). Therefore, this paper confirmed the significant effects of temperature on the fish growth reared in aquaculture ponds. More, maintaining aquaculture to lower temperature can be considered as way to keep growth of milkfish well.

Keywords: Length, milkfish, weight, size, temperature

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Management of Sustainable Hairtail (Trichiurus spp.) Resources and Smoked Fish Business Processing in Prigi Gulf Trenggalek East Java

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ABSTRACT

Hairtail (*Trichirius Sp.*) is included in superfamily Trichiuroidea and grouped as a demersal fish. It is one of raw materials for smoked fish product. The decreasing of population of the fish in Prigi Gulf could be a jeopardy for sustainability of smoked fish business in the area. This research was aimed to determine the level status of Hairtail population and to examine strategies for preserving the bussiness activity. Method used in this research includes biological and economical prespectives. To determine the danger level status AHP Technique was used.

The results showed that according to biological prespective the growth of the fish population was algoritmic negatif. Sex ratio was 1:1,2 male to female respectively. According to Gonad Maturity Level, it is found that the majority of sample have Gonad Maturity Level Score 4 at 33,5%, so that the majority of sample has gonad in mature condition. CPUE graphic shows that the fish population still could be enhanced by improving fish catching technique. Potential sustainable yield of hairlail was estimated around 2.424.884 kg per year. Total Allowable Catch (TAC) was aqual to 1.939.908 kg per year (80% sustainable potency). Resources utility was equal to 18,42 % TAC

On economical prespective, the business was estimated as financially visible since it has multidimensional sustainable index 60,42. Sequentially, strategies recomended for preserving the business activity are: provision of processing equipment; extension program on good and hygiene processing practices; and establishment of information and communication center for fisherman and stake holders.

Keywords: Hairtail (*Trichiurus* spp.), management, sustainable, smoked Fish, prigi.

Bioeconomy Overview of Fish Resources Ikan Tembang (*Sardinella fimbriata, Valenciennes* 1847) in Kota Tegal and Rembang in Central Java Province

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ABSTRACT

This study was conducted in February 2015 until May 2015 where fish of tembang landed in Fishing Port Beach PPP Tegalsari in Kota Tegal and PPP Tasikagung in Rembang. This study aimed to analyze the condition of the bioeconomy of fish resource of tembang on the management regime MSY, MEY and Open Access and view depressiation. Parameter calculating depreciation rates used consisted of biological parameters and economic parameters. Biological parameters used by the Fox, Clark-Yoshimoto-Pooley, Walter-Hilborn and Schnute models to gain coefficient catching ability (q), the environmental carrying capacity (K) and growth rate (r). And the economic parameters used consisted of the cost structure of arrest (real cost), the price of fish and discount rate. The real costs obtained arrest of the cost of fuel, ice / salt, logistics, wages / salaries, licensing and other fees. Fish production in research location produced by vessel type of purse seine (purse seine). The sampling method is purposive sampling and the data is processed using microsoft excel 2013 and Maple 18. The processed data includes the number of fish caught, the number of boat trips, and production value. activity overfishing biologically and economically alleged to have occurred in the two study sites. The level of overfishing that occurred in Tegal and Rembang district, respectively 9.17% and 6.66%. The percentage loss in value sustainable rent in the town of Tegal and Rembang, respectively 44.28% and 9.68% of the GDP in each region

Keywords: Bioeconomy, fish song, purse seine, tegal city, rembang

Effect of Thermal Stress on HSP90 Expression of Bali Cattle in Barru District, South Sulawesi

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ABSTRACT

Heat shock protein 90-kDa is induced stress protein that expressed in response to stress and play crucial roles in environmental stress tolerance and adaptation. This study aimed to determine effect of environmental heat stress on *HSP90* expression of Bali cattle. Heat stress was measured from temperature humidity index in the morning and evening across 5-days on August 2016. The blood samples of Bali cattle were taken from *venous jungularis*. *HSP90* was derived from RNA isolation of whole blood then was followed reverse transcription two steps. Quantitative real time polymerase chain reaction was performed to analyze the transcript variants of *HSP90,* followed by comparative $\Delta\Delta C_t$ to determine HSP90 expression. The results of THI measurement indicated THI on afternoon was higher than in the morning. Difference in environmental conditions in the morning and afternoon effected changes on rectal temperature but neither did on Hsp90 expression.

Keywords: Bali cattle, thermal stress, HSP90 expression

Stock Assessment of Banana Shrimps (*Penaeus merguensis*) in Bengkalis Regency Waters and Its Management Options

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ABSTRACT

Bengkalis Regency waters were one of intensified area with banana shrimp resource utilization activities. The data showed that banana shrimp production was highly (540.38 ton) than other shrimp species (317.7 ton) in 2014. This research conducted in Bengkalis District begin from January until November 2014. Data collected through a survey and interview methods. The research aimed to analyze status stock of banana shrimp based of biologist aspects, sustainable yield, utilization rate, and determining management option. Analysis of the research used two models that is: (1) Analytical modeling consist of length-weight analysis, growth, and mortality of banana shrimp in Bengkalis using FISAT II program; (2) Holitic modeling consist of CPUE analysis, fishing effort and the potential analysis for sustainable management of banana shrimp resources. Allometric growth patterns banana shrimp was negative if meant that the length growth faster than the growth of the weight, while the females banana shrimp condition factor larger than males banana shrimp; The average size of the first captured (Lc) were larger than the average size of the first ripe gonads (Lm) that indicates the current utilization rate still supports resource conservation of banana shrimp; The growth rate of the female shrimp faster than the rate of growth of shrimp male, and the peak of the highest recruitment occurred in the period from March to May and September to October. Sustainable potential (MSY) shrimp fishery in Bengkalis as much as 386.34 tons / year with the optimum fishing effort amounted to 567 units of trammel net. The level of utilization of the banana shrimp already exceeded the optimal effort that should be allowed to be captured. Shrimp management options in Bengkalis to be done are the restriction fishing effort, rules on mesh size selective, relocation of fishing ground, fishing ground closure and catch season.

Keywords: Banana shrimp, Bengkalis regency waters, FISAT II, management options, stock assessment

Relationship between Cyanobacteria Community and Water Quality Parameters on Intertidal Zone of Fish Ponds, Blanakan, West Java

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ABSTRACT

The presence of cyanobacteria in the intertidal zone is strongly influenced by changes on physical and chemical parameters [1]. In milkfish ponds, Cyanobacteria community had been indirectly affected by the mixing of sea water and fresh water during low tides. To determine the relationship between the Cyanobacteria community and water quality parameters, phytoplankton samples were taken both vertically and horizontally in three fish ponds at Blanakan Vllage on July and August 2016. The water quality parameters measured were temperature, DO, salinity, and pH. Based on the enumeration results of 36 samples of phytoplankton, 5 genus Cyanobacteria (Merismopedia, Microcystis, Lyngbya, Oscillatoria and Trichodesmium) were obtained. Cyanobacteria is a subdominant group after Diatomae with dominance index between 2-21%. Average of density ranged between 128-3563 plankters/10 dm^3. High dominance level (97-99%) between Cyanobacteria and Diatoms cause phytoplankton diversity indices in all three fish ponds were very small (0.0851 to 0.8734). Based on the analysis of the three main components (Principle Component Analysis) it was known that the presence of five Cyanobacteria genus was determined by the differences of water quality parameters observed. Merismopedia was more affected by salinity and DO fluctuations. Oscillatoria, Trichodesmium and Lyngbya were determined by changes in temperature, whereas Microcystis was more affected by pH.

Keywords: Blanakan, cyanobacteria, dominance, density, community

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An Alternative Simple Method for Preparing and Preserving Cross-Sections of Leaves and Roots in Herbaceous Plants: Case Study in Orchidaceae

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ABSTRACT

This alternative method provide a simple and faster procedure for preparing cross-section of leaves and roots in herbaceous plants, especially for orchid (Orchidaceae) living specimens. This method has used a clamp-on hand sliding microtome (Allmikro; Haga, Germany) to make cross-sections of leaves and roots, and the sections were kept inside the microtubes containing preservation liquid. This preservation technique allowed the sections to be restained and to be used for further usage in future. This method was more practical than paraffin embedding method, because it doesn't need steps of paraffin embedding and deparaffinisation. It may also provide better cross-section results than free-hand sectioning method. The procedure is very feasible and is recommended for use in plant anatomy observation.

Keywords: Simple, method, cross-section, herbaceous, orchid

Analysis of Heavy Metals (Pb and Zn) Concentration on the Sediments of Blanakan Fish Ponds, Subang, West Java

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ABSTRACT

Blanakan fish ponds receive water resource from Kali Malang river and other waterways that are connected with Ciasem Gulf. Industrial and domestic activities along the river can cause pollution, especially heavy metals. Zn is an essential element that needed by organism, while Pb is non essential element that are not needed. Discharge of waste water from industries and anthropogenic activities continuously not only pollute the water but also the sediments and biota live on it. This research was aimed to know the heavy metals content in the sediments of Blanakan fish ponds. Sediment samples were taken on July and August 2016 at three location with two replication. Fish Pond 1 located near Kali Malang river and human settlement, Fish Pond 2 located between Fish Pond 1 and Fish Pond 3, and Fish Pond 3 located near Blanakan river and Ciasem Gulf. Heavy metals were analyzed using *Atomic Absorption Spectrophotometry* (AAS) Shimadzu 6300. The result of Pb measurement showed that Fish Pond 1 had higher average concentration compared Fish Pond 2 and Fish Pond 3 which was 0,55 ppm. Standard for Pb in sediments according to Canadian Standard for Contaminated Sediments is 22 ppm. Based on Zn measurement, it was known that average of Zn concentration also higher on Fish Pond 1 compared to Fish Pond 2 and 3 which was 1,93 ppm. According to Canadian Standard for Contaminated Sediments, standard for Zn in sediments is 60 ppm. This indicated that heavy metals in sediments of fish ponds were below standard. Statistical analysis using t-test showed that there were no significant difference of heavy metals content among fish ponds.

Keywords: Blanakan, fish ponds, sediments, Pb, Zn

Fecundity of Rosy Treadfin Bream (Nemipterus furcosus) in Bangka, Bangka Belitung

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ABSTRACT

ROSY TREADFIN BREAM *(Nemipterus furcosus)* is one of important economic fishes in Bangka. The sustainability of rosy treadfin bream is threatened by degradation of natural habitat. Information of reproductive is needed for further management. The objective of this study was to examine fecundity of rosy treadfin bream. The mean values of temperature was 28.83 ± 0,37°C, respectively. Sex ratio during sampling showed that female rosy treadfin bream greater than male population. Berried female rosy treadfin bream found from March until November 2015. The greatest number of berried female rosy treadfin bream showed in Juli with with berried female value of 25. Rosy treadfin bream fecundity was 19951 and 66628, respectively. The fecundity data can be used to acces the reproductive potensial of fish stock and also as an assessment on stock size of their natural population. To ensure sustainable utilization of fish, protecting adult during major spawning is needed (Wu et al. 2008).

Keywords: Fecundity, sex ratio, Rosy Treadfin Bream

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Catch Rate Analysis of Raw Material for Fish Smoke Processing at Fish Smoke Processing Centers Probolinggo City, East Java

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ABSTRACT

Kurisi (*Nemipterus* sp.), kembung (*Rastrelliger* sp.) and peperek (*Leiognathus* sp.) are the catch and landed fishes at the Port of Coastal Fisheries Mayangan, Probolinggo and become the main raw material in the production of smoked fish at Sentra Fish Processing Smoke City Probolinggo.The sustainability analysis used includes catching, processing and marketing of the product. The aims of this study were to determine the trend of raw materials CPUE smoked fish, to know the continuity ofsmoked fish processing, and toanalyze the good strategy in the sustainable management of fishery resources. The study was conducted from January 2016 to April 2016 at the Port of Mayangan Coastal Fisheries and Fish Processing Centers Smoke Kota Probolinggo. The research method used were CPUE analysis, profitability analysis, and forecasting analysis.
The rate of kurisi catch (CPUE) in 2015 was increased of 6197.79 tons per unit from 2011, while in the same year, mackerel and fish peperek decreased of 13.67 tons per unit and 0.494 tons per unit. Based on profitability analysis, the sustainability of smoked fish processing business is quite profitable. In addition, based on analysis forecasting it can be predicted that the volume of smoked fish sales have increased year 2016-2019. The strategies of sustainable management of fishery resources in Kota Probolinggo, among others, are to implement of quotas of arrests, to use environmentally friendly fishing gear,to avoid destructive fishing method, to improve quality product,to increase value-added product processing, the consolidate of integrated information systems, and to increse surveillance in fishing effort.

Keywords: Smoked fish, CPUE, profitability analysis, sustainability strategies

Composition of Cyanobacteria in Kali Blanakan and Kali Malang as Klekap Constituent for Milkfish Feed Resources

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ABSTRACT

Lyngbya is a member of Cyanobacteria genus which has potency undergoes explosive population. Moreover, this genus is capable in absorbing heavy metal and producing toxin. There are still few studies concentrating about its abundance in Kali Blanakan and Kali Malang (its branch) as water source for surrounding ponds. This research was aimed to understand *Lyngbya* abundance related to water quality at Kali Blanakan and Kali Malang. Sampling were done at 6 stations with 4 stations at Kali Blanakan and 2 stations at Kali Malang on August 2016. Plankton were collected using plankton net 80 µm. Then samples were identified and enumerated. Water quality parameters like temperature, pH, salinity, and DO were measured. The highest abundance of *Lyngbya* was 600 ind/10 L and the lowest abundance was 25 ind/10 L. This indicated that the abundance of *Lyngbya* was far from potency of blooming and producing toxin in excessive amount. According to [1], the threshold for recommending that local health departments post warning signs in the Department of Environmental Quality/ Utah Department of Health guidance is 100,000 cells/mL. The result of water parameter quality measurement also showed that there is no sign of blooming activity, except low DO. Furthermore, more advanced studies are needed to understand the potency of related phytoplankton, focused on its blooming and toxin production.

Keywords: *Lyngbya*, abundance, water quality

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Eurycoma longifolia Extract Increases Intracellular Production Activity of Luteinizing Hormone (LH) in Pituitary

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ABSTRACT

Pratomo's et al. (2010) shows that administration of the boiled water (extract) of *Eurycoma longifolia* (*E. Longifolia*) 18 mg/200 g body weight (bw) actually increases basophil cells in anterior pituitary. Meanwhile, it is observed that basophil cells in anterior pituitary are producer cells of LH and FSH. In addition, Pratomo et al. (2012) determines that cell activity rate producing intracellular FSH does not increase in amount significantly after administration of *E. longifolia* onto the third day. The research attempts to prove the performance of *E. longifolia* to producer cells of luteinizing hormone (LH) in the anterior pituitary. Applied approach by technical method of immunohistochemistry staining uses antibody anti-LH. Observation is established to treatment group of *E longifolia* in dose of 18 mg/200 g bw on the 1st day and 3rd day, compared to control group of 1 ml distilled water on the 1st day and 3rd day. Research results that administration of the extract of *E longifolia* onto the third day has increased the activity of producer cells of LH in pituitary, synthesizing intracellular LH obviously. It can be concluded that *E longifolia* constitutes strong trigger in producer cells of LH to synthesize LH hormone.

Keywords: *Eurycome longifolia*, pituitary, LH *trigger*.

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Morphology and Protein Analysis from Three Variant of Oil Palm Pollen; Dura, Pisifera, & Tenera

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ABSTRACT

Oil palm is a plant that widely cultivated in Indonesia, with an area of about 11 million hectares in 2014. There are three main variants that most cultivated; Dura, Pisifera, and Tenera. Oil palm pollen was spread through the wind, because it has a relatively small size and the large amount. The very wide area of oil palm plantation and those characteristics of oil palm pollen dispersion makes oil palm pollen may give negative effect to the people around plantation. One of the negative effects of oil palm pollen dispersion is allergy. Research on the morphology and protein characters of the oil palm pollen from three variants has not done yet. This research aims to observe the morphology and protein character from three variants of oil palm pollen. The study begins with the pollen collection from three variants of oil palm which is taken from Jakarta, Depok (West Java), and Dharmasraya (West Sumatera). Oil palm pollen was observed using the light microscope (stain and unstained method) and scanning electron microscope. Oil palm pollen protein was extracted and the molecular weight of these proteins was analyzed using SDS-PAGE method. The result of this research was the morphology character from three variants of oil palm pollen have successfully been observed. Those three variant of oil palm have no differences and show the triangular shaped with round edge. The aperture of the pollen was observed as tricolpate with connected colpus. The ornamentation of exine shows that those three variants have psilate ornamentation (smooth) at the front side and peripheral side, while at the back side has microreticulate ornamentation (small pores). Three variants of oil palm pollen protein shows the same characteristics. The molecular weight of the protein was ranged from 10 KDa to 100 KDa. The information of oil palm protein molecular weight can be usefull for the next research to figure out component of proteins that consist inside the oil palm pollen.

Keywords: Oil palm, pollen, protein

Separation Method of Anomaly Source on the Time Lapse Microgravity Data

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ABSTRACT

At the time lapse microgarvity anomaly survey for the purpose of searching for subsurface targets in order to obtain an anomaly caused by the survey target. To isolate the source of the anomaly generally use an existing filter. However for certain purposes must be constructed to generally receive less than the maximum results. One reason is the source of the anomaly that we do not need is still attached to the preliminary data. As it is known that the source of time lapse microgravity anomaly caused by subsidence and fluid dynamics in the form of increases and decreases in groundwater levels. Therefore the survey should minimize one source of these anomalies adjust Filter field conditions. In this study built filter called MBF (Model Based Filter), a filter built with attention-dimensional parameter source of the anomaly.This filter is different from the existing ones, such as those developed by [1] using the Wiener filter to separate the source of the gravity anomaly of measurement data. [2] and [3] using a filter to separate the source of the anomaly Stripping shallow and deep.

Keywords: Gravity, anomaly, time lapse, filter

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Spring Characteristics in Rawapening Watershed

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ABSTRACT

Rawapening watershed is formed in a volcanic region and is the headwater of Tuntang River that disembogues into Rawa Pening Lake. Rawa Pening Lake was formed due to gravitational tectonic events that form many faults and folds. Those events result in aquifers that create many springs in Rawapening watershed. This research is conducted to determine the springs distribution based on physical characteristics of the discharge area and the types of springs in Rawapening watershed. Associative and descriptive analysis are used to explain the springs' condition based on height, slopeness, geological formation, and the soil utilization.

Geological History of Mengkarang Formation for Enhancing the Geodiversity of Merangin Geopark

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ABSTRACT

Todays, Merangin area, a national geopark in Jambi Province, is proposed to be global Geopark to the UNESCO. To make it success, Merangin Geopark should fulfil the essential requirement, i.e. having outstanding rock outcrop and influence the global process or geological history of the world [1]. The most attractive outcrop in Merangin Area is the Permian Mengkarang Formation with abundance of floral fossil [2,3,4]. As the oldest exposed formation in Jambi, Mengkarang Formation has its unique tectonic process that made this formation exposed in the surface with the shape of inversed "U" curved [5]. Therefore, this research aimed to model the geological history of Merangin as fullilment of the Global Geopark requirement. This research used three methods, first of all, field work that consists of the stratigraphic measurement, geological structure investigation, rock sampling, and GPR data acquisition of the Merangin area. The next method was the laboratory work that consists of petrographic and paleontological analysis. The last method was the studio work that consists of the stratigraphic parameter analysis in this area, structural geology analysis, validation of the structural geology and formation contact conformities using GPR, and modelling the geological history of this area. The result of this research show that the historical geology in Merangin area has its unique tectonic, sedimentation, and denudation process that made the Permian Mengkarang Formation exposed to the surface in unique "U" shape. This research will add knowledge about Merangin Geopark to help fulfilling the requirement of proposed Merangin Global Geopark.

Keywords: Merangin geopark, mengkarang formation, geological History

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Combination of Well Data Analysis, Seismic Inversion and Amplitude Versus Offset for Reservoir Characterization in B-1 Field, South Palembang Sub Basin

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ABSTRACT

The research area is located in the southwest of south palembang sub basin. There are four oil fields which named A, B, C and D which operates nearly 20 years. The field is producing oil from Sandstone of Muara Enim Formation also the focus of the reservoir in this study. Location of the research is called B-1 Field, an expansion area or step out from B Field. Based on results of seismic interpretation states that B-1 Field is a wing of the anticline structure of B field. Accumulation of hydrocarbons presence in the top structure area which made no further activity for development in B-1 Field. But there is an opportunity of hydrocarbon traps at lower part that caused by Startigraphic traps. Stratigraphic traps formed by gradual facies changes in the vertical direction indicated based on evidence of isolated strong seismic amplitude that shows in several seismic lines. The combination of well data analysis, analysis of seismic inversion and AVO analysis is performed in order to evaluate the indication of stratigraphic traps and map hydrocarbon prospects in this area. Based on the results of bandlimited inversion, there is a local anomaly in B-1 Field that has an acoustic impedance and density larger than the surrounding area also correlated with the results of AVO analysis. That phenomenas suspected as hydrocarbon accumulation in stratigraphic traps. The results of intercept * gradient AVO attribute analysis found 2p class anomalies means sandstone saturated with oil.

Keywords: Avo, seismic inversion, south palembang sub-basin

Seismotectonic Study to Improve the Awareness of Earthquake in Merangin National Geopark, Jambi

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ABSTRACT

Merangin district, Jambi Province, is the national Geopark because it has unique geological diversity from other areas. This can be proved by the discovery of Permian rocks in Merangin district [1]. However, based on earthquake vulnerability maps, Merangin district has high earthquake activity level [2]. This condition can be caused due to the influence of the active fault presence in Geopark Merangin district. Therefore, the aim of this research is to know the whereabouts of active fault and how big its earthquake potential that can be happen in the area. The methods conducted in this research was direct measurement method in the field, in the form of geological structure mapping. It is also conducted by studio analysis method, which are including lineament analysis of the ridge or valley from DEM SRTM satellite imaginary and analysis of earthquake potential using earthquake history data and the geometry of the faults. The geological structure mapping in the area shows that the joint direction oriented Southeast-Northwest. Meanwhile, the analysis of geological structure through DEM showed that the faults in the area also have direction relatively the same as the joint. These two variables have been verified using statistical analysis of t_{test}. It shows that the geomorphology in the area of research was influenced by tectonic activity which tend to be active. From earthquake data, this area had history of earthquakes with shallow depth. Earthquake point positions occur around the fault which was interpreted through DEM. It shows that the earthquake itself has correlation with fault activity in the area of research. Meanwhile, from the data of fault geometry and seismic moment (M_o) showed that in the area of research has the earthquake potential from middle to high-scale. Thus, it can be concluded that there are active faults in the area of research and it has the potential from medium to high-scale of earthquake, approximately from 5 to greater than 6 SR.

Keywords: Merang in geopark, active fault, earthquake, joint, DEM, seismotectonic

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Continuity of Permian Mengkareng Formation through GPR Interpretation in Merangin Geopark

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ABSTRACT

Permian Mengkarang Formation was part of continental margin (Gondwana Land) which separated in Devon Period. In this period, Gondwana Land experienced glaciation at the Paleo South Pole [1]. However, the fossils that found in Mengkarang Formation were tropical flora, made the Merangin was certified as one of the National Geopark. It also shows that the geological process (stratigraphy and tectonic) in Region Merangin has occurred before the Indonesian archipelago was formed, namely the Permian to Triassic period [2]. Ground Penetrating Radar (GPR) was chosen as an effective geophysical method to study shallow subsurface geology [3]. GPR and seismic reflection method have the same common principle to identify the facies and sub-sequence stratigraphy but they are different in implementation [4]. Therefore, this study aims to deliver the vertical continuity of Permian Mengkarang Formation in high resolution unit. This research combined the geological field work, which was in the form of petrographic analysis, and geophysical analysis. GPR data show that the dielectric constants of the rock layers are in the range of 3 to 7 and their electromagnetic wave velocity are in the range of 120 to 170 mm/ns. The GPR sections show the absence of the unconformity delivered in the intercalation between mudstone, sandstone, and tuff. These results were confirmed by the results of measure section and petrographic analysis of rock samples that show the same sequence of rock types. Thus, it can be concluded that the Permian Mengkareng Formation is continue up to 20 m depth.

Keywords: Merangin geopark, mengkarang formation, GPR

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The Identification of Shale Gas's Characteristics in Telisa Formation, AH Field, South Sumatera Basin Based on Geomechanical Analysis and Seismic Interpretation

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ABSTRACT

The Shale Gas's characterization of Telisa Formation, AH Field, South Sumatera Basin was done through geomechanical' analysis and seismic interpretation. There are several geomechanical parameters that were studied, such as brittleness, rock strength, and internal friction angle. The multi-attribute analysis was conducted to see the sweet spots. Ant-tracking, most negative curvature, and variance are powerful attributes to see the distribution of paleofractures, faults and structural trends [1]. There are several data were used such as geochemical data (rock-eval pyrolisis), well logs, well tops, and post-stack 3D seismic data. The techniques that could be used to differentiate the source from the non source were Passey's and Bowman's method. The use of Bowman's method gives high confidence for doing this task by using the "shale line". Passey's and multiple linear regression's method could be utilized to predict the depositional environment. Multiple linear regression's method gives higher accuracy when calibrated with shale's geochemical data. The empirical relations were formulated to predict the equations of brittleness, rock strength, and internal friction angle in Telisa Formation.

Keywords: Shale gas, geomechanical, telisa, and South Sumatra Basin

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Pore Pressure Prediction in Laminated Shally Sand Reservoir: a Case Study of Bintuni Basin

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ABSTRACT

Pore pressure prediction was carried out using well log and velocity determination data to evaluate pore pressure character of laminated shally sand reservoir in Bintuni Basin, West Papua. The majority of thin laminated reservoir are below resolving power of logging tool and main factor of reservoir behavior, which typically exhibits composition mineral of lithic, micaceous, glauconitic, and a strong relationship with conductive mineral. Based on total gas mudlogging data there are some potential gas reservoir in the depth of below 1300 m subsea. As part of the study, abnormally high pore pressure respectively was delineated in some intervals and designed for cases where compaction disequilibrium is the cause of fluid expansion on the compaction state of the impermeable sediments and on diagenetic processes of smectite-illite transition dan lateral transfer/ centroid effect. Eaton's method was used to estimate pore pressure gradient in this research work and seismic velocity model analysis generating with effective stress with empirical Bowers and Terzaghi method, when data horizontal and vertical pressure data distributed using probabilistic neural network method [1]. Time structure of pore pressure distribution map shows the correlation of pore pressure anomaly not only in height structure but also exists in low structure at southern part of the map. Knowledge of such pore pressure prediction is critical for exploration and production of field development.

Keywords: laminated shally sand, seismic velocity model, effective stress, overburden and pore pressure

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Spectral Decomposition Application to Delineate Laminated Shaly Sand of Gas Bearing Reservoir of Steenkool Formation in Bintuni Basin

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ABSTRACT

Tectonic setting of Bird Head Papua Island becomes an important model for hydrocarbon exploration in Eastern of Indonesia. Current exploration started with the oil seepage finding in Bintuni and Salawati Basin is continuously developed in Eastern of Indonesia. Biogenic gas in shallow layer turns out to be famous in hydrocarbon exploration [1]. Hydrocarbon accumulation appearance in shallow layer and type of dry gas, appeal biogenic gas for further study. This paper is proposed to delineate the hydrocarbon potential in a shallow layer of Steenkool Formation in Bintuni Basin by implementing the low frequency shadow zone anomaly. The low frequency shadow zone anomaly is gained by observing time-frequency analysis of the individual frequency starting from low to high frequency. Our result shows that the potential zone of hydrocarbon zone is identified by high intensity of time-frequency map of low frequency and low intensity of high frequency.

Keywords: steenkool formation, bintuni, low frequency shadow zone anomaly

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Geomechanics Assessment of shale Gas Reservoir: a Case Study of Pematang Formation, Central Sumatera Basin

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ABSTRACT

Pematang formation located at Central Sumatera has prospective shale gas in field 3Dkis, which has potential number of gas and oil inplace. However it has a big challenge for developing because of its unidentified shale property. From core analysis and petrophysical data analysis, it was shown that the formation is dominated by shale and laminated by sand layers. There are significantly large deposit of shale beneath sand layer. This paper aims to perform brittleness modeling based on the integration of geophysical and geomechanical data analysis [1]. The ratio of Brittleness index were used to differentiate ductile shale and brittle shale. This process is performed by using geostatistical distribution from well. The result shows that brittleness index is identified in average of 0.65 at depth range of 6308 feet to 7432 feet in the east and northeast from the existing wells. Finally, the predicted brittleness index distribution can be useful for mapping the brittle area to perform hydraulic fracturing on shale layers in order to produce gas.

Keywords: shale gas, geomechanic, Pematang formation and Central Sumatra Basin

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Shale Gas Characterization Based on Geochemical and Geophysical analysis: Cased Study in Brown Shale, Pematang Formation, Central Sumatra Basin

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ABSTRACT

Geochemical and geophysical analysis of shale gas have been carried out in Brown Shale, Middle Pematang Formation, Central Sumatra Basin. This paper aims at delineating sweet spot shale gas hydrocarbon, which is based on organic richness parameters such as total organic carbon (TOC), maturity, and TOC modeling referred to Passey and Multi Linear Regression (MLR) method [1]. The petrophysical analysis data on 2 existing wells exhibits the present of oil and gas in lacustrine depositional environment, which is indicated by rocks sample taken from Side Well Core (SWC). Our interpretation on acoustic pre-stack inversion resulted in distribution map of potential interest zone that is indicated with highest TOC value. Detailed analysis of organic richness material to Middle Pematang Brown Shale formation shows that TOC value ranging from 0.15 to 2.71 wt%, which is potential for shale gas reservoir. In term of maturity was identified the ranges from 373oC to 432oC, which is supported by shale sample of Ro 0.58. In addition, the kerogen type is considered to the mix of type II/III (oil/gas prone), which has potential to generate oil and gas environment.

Keywords: shale gas, geochemical, geophysical, Pematang formation, Central Sumatra Basin

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Determining Chalk Sand Distribution of Ekofisk Formation using Probabilistic Neural Network (PNN) and Step-Wise Regression: Case Study of Danish North Sea

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ABSTRACT

Danish North Sea Fields consist of several formation (Ekofisk, Tor, and Cromer Knoll) start from the age of Paleocene to Miocene. The integration of seismic data and well log dataset were carried out to predict porosity distribution of rocks Chalk in the Danish North Sea field. The integration is performed using the inversion and multi-attribute seismic. The acoustic impedance (AI) is extracted from model based seismic inversion algorithm. The AI is then considered as the external attributes in doing multi-attribute analysis. Multi-attribute analysis is used to generate the transformation of linear and non-linear between well log properties. For the linear model, the transformation using step-wise linear regression (SWR). For non-linear model of probabilistic neural networks (PNN), the transformation using an optional attribute of the SWR as input. Finally, the attribute analysis is conducted using Probabilistic Neural Network (PNN) algorithm, which produce better porosity compared with the results of steo-Wise Regression (SWR) [1]. The predicted porosity in the target zone ranging from 23% to 30%, which is identified as chalk layer.

Keywords: seismic inversion, SWR, PNN, porosity, Danish North Sea

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Characterization of Shale Hydrocarbon Potential in Tanjung Formation, Barito Basin, South Kalimantan

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ABSTRACT

Exploration and exploitation in Indonesia now is still focused on conventional hydrocarbon energy than unconventional hydrocarbon energy such as shale gas. Shale gas is one of unconventional energy with rich and mature organic material, besides used as source rock, can be specified type capable of functioning as a reservoir oil and gas [1]. Tanjung Formation is a source rock of Barito Basin located in South Kalimantan that potentially as shale hydrocarbon. In this paper, integrated four methods using organic geochemical analysis, mineralogy, petrophysics and seismic interpretation that become the basis of knowing the relationship of material organic richness, maturity and brittleness index for potential shale hydrocarbon in Tanjung Formation. The first step is organic geochemical and mineralogy analysis in Tanjung Formation, the organic material richness ranging from 1.26 – 5.98 wt% (good – excellent), the depth of early mature window is 2170 m, with brittleness index average 0.44 – 0.56 (less Brittle) and kerogen type II/III that potentially produces oil and gas. The second step is petrophysics analysis which includes calculation TOC and brittleness index continuously, the result of this petrophysics analysis been validated with a laboratory analysis that obtained regression values 0.923 and 0.916. The next stage is seismic interpretation with acoustic impedance inversion method to see the distributions of shale hydrocarbon with value 17718 – 28222 ft/s*g/cc, the direction spread of shale hydrocarbon potential are in east and southeastern of the study area.

Keywords: Shale hydrocarbon, tanjung formation, organic geochemical, mineralogy, petrophysics and acoustic impedance inversion

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Fault Seal Analysis to Predict the Compartmentalization of Gas Reservoir, Case Study of Steenkool Formation Bintuni Basin

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ABSTRACT

This study is aimed to analyse the mechanism of trapping of hydrocarbons in the field of a relatively new play in the Bintuni basin particularly Steenkool Formation. In this field, it has been drilled the first well to the shallow target in the Steenkool formation and managed to find new gas reserves in shally sandstone layer. In the structural frame work there is the potential barrier for compartmentalization that draw attention to analyse how the patterns of structural of fault become compartment of reservoir. In order to measure the risk associated with prospects on a field bounded by faults, it is important to understand the processes that contribute to fault seal. The method of Fault Seal Analysis (FSA) is one of the methods used for the analysis of the nature of a fault whether the fault is sealing or leaking the fluid in the reservoir [1]. Trapping systems that are compartmented by faults play an important role in creating a trap of hydrocarbon. The ability of a fault to seal fluid is quantitatively reflected by the value of Shale Gouge Ratio (SGR). SGR is the calculation of the amount of fine grained material that fills fault plane (fault gouge) as a result of the movement mechanism of fault. The results of this study is a valuable resource for the systematic evaluation of the analysis of hydrocarbon prospects in the field.

Keywords: Fault seal analysis, compartmentalization, steenkool formation, bintuni basin

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The Geochemical Assessment of Telisa Shale Gas Reservoir : Case Study of South Sumatera Basin

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ABSTRACT

The geochemical assessment of shale gas reservoir of Telisa Formation in South Sumatera Basin was carried out to identify the new play concept. There geochemical parameters that were analyzed and identified in this work including organic richness (TOC), kerogen type, and thermal maturity [1]. In addition, the multi-attribute analysis, which consists of ant-tracking, most negative curvature, and variance are powerful attributes was performed to delineate the sweet spots of shale gas potential in term of paleofractures, faults and structural trends. Our analysis shows that organic richness of shale gas reservoir is classified fair to good. The kerogen type is considered to the mix of type II/III (oil/gas prone) up to type III (gas prone). In term of maturity the Telisa shale shale gas reservoir can be categorized in to mature stage, which represents oil window up to wet gas window.

Keywords: shale gas, geochemical, Telisa formation, South Sumatra Basin

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Reservoir Property Modeling : Porosity, Water Saturation and Net to Gross of Sandstone Reservoir: a Case Study of Tarbert Formation, North Sea Basin

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ABSTRACT

North Viking Graben Field, which is geologically located in northern part of North Sea Basin had a complex geological structure. It can lead to uncertainty in mapping of Tarbert formation of sandstone reservoir which is known as deltaic reservoir [1]. This is conducted to characterize Tarbert formation sandstone reservoir based on petrophysical evaluation and reservoir properties modelling using 3D seismic PSTM , 3 wells complete with well log, geological marker and well report data. The results show the distribution of Tarbert formation sandstone reservoir using modelling of reservoir properties such as porosity, water saturation and net to gross for each reservoir target zone. The property reservoir modelling has been successfully mapped with the range of total porosity from 12 to 20 %, effective porosity from 6 to 15 %, water saturation from 10 – 40 % and net to gross from 60 to 80 %.

Keywords: porosity, water saturation, net to gross and reservoir modeling

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Lacustrine Syn-Rift Reservoir Maping using Spectral Attributes: A Case Study of the Pematang Brownshale Central Sumatra

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ABSTRACT

Pematang Brownshale is the lake sediment, which proved to be the main source rock in Malacca Strait Area. So far Brownshale is only considered as source rock, but the well data show intercalated sand layers encountered within the Pematang Brownshale, where several downhole tests proved this series as a potential hydrocarbon reservoir. Pematang Formation is a syn-rift sequent deposited in Malacca Strait area following the opening of central sumatra basin during a Late Cretaceous to Early Oligocene proven as potential source rock and reservoir. The purpose of the study is to identify the distribution of sandstone reservoir in Pematang Brownshale using spectral attributes. These works were carried out by integrating log data analysis and frequency maps extracted from spectral attribute (CWT) [1]. All these data are used to supports interpreted reservoir distribution in Pematang Brownshale. Based on CWT analysis the anomalies are only visible on the frequency of 15 and 10 Hz maps which are categorized as low frequencies [2-3]. Low frequency anomaly shadows is commonly used as an indication of the presence of hydrocarbons. The distribution of these anomalies is quite an area of approximately 3840.66 acres or equal to 1554.25 km^2 where the low frequency pattern interpreted as deltaic lacustrine feature. Applying the Pematang Brown Shale in Malacca Strait Area as a potential reservoir would consider other basin with similarity have potential for new play.

Keywords: Pematang brownshale formation, malacca strait, spectral attributes

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Geochemistry Analysis Of Shale Gas based on Log And 3D Seismic in Pematang Formation XY Well, Sumatera Tengah Basin

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ABSTRACT

In the terms of the log response, in particular zones, Shale will have very high gamma ray activity and high resistivity. In order to shale gas could be a good reservoir, there are several criteria that must be met, such as: Total Organic Carbon (TOC), the level of maturity (Ro), the thickness, permeability, mineralogy, fracture rate, and pore pressure [1]. Evaluation of the content of Total Organic Carbon (TOC) can be performed using data wireline logs. From this evaluation the data calibrated with laboratory analysis. The study was conducted at three wells in Pematang Formation, Central Sumatra Basin and calculations performed on Pematang Brown Shale. The determination of TOC is determine by multivariate regression method, which results shows more representative results for wells that have data TOC cutting. From the three wells, the wells geochemical data from PM-1 is used as a reference for the correction of the data log. Then the calculation resulting from the TOC content value on average at Brown Shale Formation is between 0.26 wt% - 2.66 wt% (poor - good).

Keywords: Shale, TOC, multivariate regression

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Application of Seismic Attribute in Shale Hydrocarbon Quantity Analysis Case Study: Field X, Talang Akar Formation, South Sumatera Basin

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ABSTRACT

Shale layer which has been used as the research target is located in Talang Akar Formation, South Sumatera Basin which has been deposited in sagging phase. Low deposition energy at transgression period was resulting abundant shale deposit. Based on expectation if these abundant shale deposit has the criteria either as source rock or as hydrocarbon reservoir, it has been done a research with objective to analize the quantity of shale hydrocarbon itself. This research has been processed using several Geosciences aspect to evaluate these shale layer characteristic. Petrophysical analysis has been used to separate the lithology of shale as the target layer from others; Geochemical analysis has been used to determine the target's organic richness (which represent the quantity of shale hydrocarbon parameters) and thermal maturity; and Geophysical analysis has been used to characterize and distribute the shale hydrocarbon quantity parameter in the target formation through using Accoustic Impedance (AI) inversion as the seismic attribute. The Petrophysical and Geochemical analysis results showed there are two interest zones, in the depth interval of 2030-2182m (zone A) and 2204-2396m (zone B). Both zones is predicted as shale layer which has "very good" organic richness criteria and has sufficient maturity. Based on the results of the AI inversion and the distribution of organic richness (TOC) parameter interpretation, it can be seen that there are the distribution of rocks which has relatively low impedance and relatively high TOC within the depth interval range of zone A and B. These two zones (zone A and B) are predicted has the potential to explored as "unconventional hydrocarbon resource.

Keywords: Shale hydrocarbon, AI Inversion, unconventional hydrocarbon

Spatial habitat of Eel larva habitat at Cimandiri Estuary, West Java

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ABSTRACT

Estuary ecosystem is known as suitable breeding sites for fishes because this particular habitat is receiving continous organic matters from riverways and constant sunlight due to its depth that allow sunlight penetration. Cimandiri estuary is one of estuary in south of Java Island that located near Indian Ocean and known as suitable habitat for eel larva that routinely collected by local peoples for rearing. Eel habitat related to the dynamic of space. This dynamic influenced by season, water flow, tide, bathimetry, salinity and oxygen demand. The geograhic information system is an approach that can study that habitat dynamic through modelling. Furthermore, spatial model for eel larva habitat is required for land use planning that aims to achieve sustainable eels larva rearing and conserve estuary habitat as well.

Keywords: eel larva habitat, estuary, dynamic, spatial, geographic information system

The Degradation Level of Mangrove At Lhokseumawe, Aceh

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ABSTRACT

Aceh is one of the 34 provinces in Indonesia that has the highest population with high level of hazard. This research was conducted in Lhokseumawe, East Coast of Aceh. This paper was based on secondary data from analyzed SPOT 5 satellite imaginary. This study examines the relationship between the level of damage to mangrove with the distribution of mangrove forests forming vary spatial patterns and spread in the administrative area of Lhokseumawe. The method performed by descriptive and quantitative analysis method. Data processing method performed by descriptive and quantitative method by pearson product moment statistic method. The degradation level of mangrove divided into 3 classes such as the good condition, moderate condition, and bad condition. The result is 14% of the good condition of mangrove extent about more than 60.000 m^2, 32% moderate condition with an area of 30.000-60.000 m^2 and 54% extent of bad condition about less than 30.000 m^2.

Keywords: Degradation, distribution, lhokseumawe, mangrove

Spatial Pattern Local Wisdom Education of Mangrove in Lhokseumawe , Aceh

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ABSTRACT

Aceh is one of the provinces with high level of hazard. Tsunami disaster in 2004 has caused the loss of coastal forests and mangroves in the Aceh province. The loss of these resources has a direct impact on the survival victims of the tsunami and subsequent impact. it takes a conservation program that is continuous and educative through the education, in this case the application of local wisdom education of mangrove. This research was conducted in Lhokseumawe city, Aceh East Coast. The distribution of mangrove forests and the spread of schools forming spatial patterns vary and spread in the administrative area of Lhokseumawe become a reference in the application of local wisdom education of mangrove. Data processing method performed by descriptive and quantitative method by pearson product moment statistic method. Of the total number of junior high schools in the city of Lhokseumawe as many as 41 Public Schools, Private and Religious School, there are 31 schools with priority for local wisdom education implemented mangrove. Priority I as many as 18 schools, 10 schools priority II and 3 school for priority III, with learning competency standards that differ from each other.

Keywords: Local wisdom, Mangrove

Determining Fault Structure using First Horizontal Derivative (FHD) and Horizontal Vertical Diagonal Maxima (HVDM) Method: A Comparative Study

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ABSTRACT

Fault is an important parameter in both hydrocarbon and geothermal exploration. It could be able as a secondary permeability that controlee and improve fluid flow within a reservoir. Fault zone is usually related to high permeability zone as well as indicated by any high density contrast. There is a relatively new HVDM method that could be applied to determine and indicate a subsurface normal or reverse fault. This study is comparing the method with the conventional ones, the FHD method. Both methods are principally working based on the existing of lateral density contrast of gravity data. The FHD value is obtained from root sum square of horizontal X first derivative and horizontal Y first derivative of gravity data, meanwhile the HVDM value is obtained by horizontal, vertical and diagonal coefficient root sum square of 2-Dimensional DWT. The comparison of both, FHD and HVDM, methods are applied toward synthetic model and real gravity data. Identification of fault structure on FHD and HVDM are shown by maximum value. Based on the result of synthetic model gravity data, FHD could determine fault structure in a better way than HVDM whereas on gravity real data FHD and HVDM have a slightly similar response. As we do not have supported proven geology and geophysical data, the study could not verify and justify yet the real gravity data.

Keywords: Fault structure, FHD, HVDM, synthetic model gravity, gravity data

Comparative Study Between Kuster-Toksoz and Differential Effective Medium (DEM) Method for Determining Pore Type in Carbonate Reservoir

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ABSTRACT

Characterizing or understanding carbonate rocks is always challenging. It is because carbonate rock has a complex pore system due to its diagenesis which is very intense. Diagenesis process caused changes in the mineralogy and texture of the original frame which make pores type variation in carbonate rocks. Carbonate's pore system is affecting propagation wave velocity, so that seismic responses in carbonate rocks are poorly understood. Pore type of carbonate rock could be determined by rock physics method such as Kuster-Toksoz and Differential Effective Medium (DEM). Both methods generate some physical parameters models of the bulk and shear moduli of rocks. The input parameters are bulk and shear moduli of matrix and inclusion, geometry factor and fraction of inclusion. After performing both methods, effective bulk and shear moduli are extracted and rock's pore type also could be determined from each method. Both methods have similar function, but they have different way to generate the effective bulk and shear moduli. The results of both methods are compared and controlled by well data. Based on that comparison, DEM method is the one that has higher coefficient correlation of pressure and shear wave velocity than Kuster-Toksoz method. So that, DEM method is considered as the more suitable method for carbonate rock in determining pore type of carbonate rocks and predicting its shear wave velocity.

Keywords: Kuster-Toksoz, DEM method, pore type, carbonate rock, shear wave.

Carbonat Reservoir Characterization and Pore Fluid Identification using Extended Elastic Impedance (EEI) Iversion at Field "A"

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ABSTRACT

A study case of carbonate reservoir characterization and pore fluid identification of Field "A" located at East North Java Basin was done. EEI inversion is used as tool to find the distribution of hydrocarbon beneath the surface. EEI or simply elastic impedance which the general case of acoustic impedance (only at normal incident) correlate with some certain elastic parameters with specific angle that called as the best chi angle, χ. EEI spectrum (χ = -90^o through χ = 90^o) was correlated with few elastic parameters, i.e. v_p/v_s ratio, lambda-rho, mu-rho, porosity, saturation water, poisson's ratio, and Vclay. Those parameters used for lithology and pore fluid discrimination. However, only v_p/v_s ratio, lambda-rho, and mu-rho those have good enough correlation with EEI at certain angle. Then three EEI volume models for each parameter was made and inverted. EEI volume which correlated with mu-rho that used for lithology discrimination shows the very high mu-rho value that indicates as carbonate reservoir spread to the North West direction relative to the three wells used in this study. And then both of the EEI volume correlated with v_p/v_s ratio and lambda-rho that used for pore fluid discrimination show that the pore fluid is gas, according to the very low v_p/v_s ratio value.

Keywords: Extended elastic impedance, carbonate, best chi angle, East North Java Basin.

Carbonate Reservoir Characterization with Pore Type Inversion using Differential Effective Medium (DEM) Model at "X" Field, East Java

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ABSTRACT

Pore system in the carbonate reservoirs are very complex than in clastic rocks. There are three types of classification of pore types in carbonate rocks: interparticle, stiff, and crack. The complexity of the pore types can cause changes in P-wave velocity by 40 %, as well as create a carbonate reservoir characterization becomes difficult when the S wave estimation is done only with the type of dominant pore (interparticle). Therefore, modeling the elastic moduli of rocks become essential to solve the problem of complexity of pore types in carbonate rocks. Differential Effective Medium (DEM) is a method of modeling the elastic moduli of rocks that takes into account the heterogeneity of types of pores in carbonate rocks by adding a pore-type inclusions little by little into the parent material (host material) until the proportion of the material is reached. In addition, to the elastic moduli which have taken into account the heterogeneity of pore type. The inversion result shows that carbonate reservoir at "X" field is dominated by crack pore type and the relation between S wave and P wave is expressed by $V_s = -0.05V_p^2 + V_p - 1.1$ *and not in linear correlation.*

Keywords: Carbonate rocks, elastic moduli, Differential Effective Medium (DEM), pore type

The Mapping of Distribution Reservoir based Stochastic Inversion Method Integration with Seismic Multiattribute MZ Fields, Central Sumatra Basin

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ABSTRACT

MZ field is a field that has a good prospect to be developed. This study, discusses about the distribution of lithology and porosity in this formation, especially within depth interval between the Top Sihapas and Top Pematang. The method that has been used is stochastic inversion methods with seismic integration Multiatribut by applying neural network PNN (Probabilistic Neural Network). Stochastic methods is used to predict the probability mapping sandstone as the result of impedance varied with 50 reaslisasi will produce a good probability. Stochastic inversion results become input for Multiatribute method which is used to predict the gamma ray log, log density and porosity logs. To obtain the number of attributes that are used, process of step wise regression. The results of these it is conducted attributes which would then be used in the process of neural network PNN. This PNN method chosen because it has the best correlation of others neural network method. Results of a multiattribute analysis are in the form of pseudo-gamma ray volume, density volume and volume of pseudo-porosity. The results show the distribution of lithology, density and porosity. Of this volume then obtained horizon slice to the target zone. The Horizon slice, that has been generated from stochastic inversion analysis using multiattribute integration, show that structural trap in southeastern area is along the anticline. It is because there is distribution of sandstone in highly area with high probability, low density, and high porosity.

Keywords: Stochastic Inversion, seismic multiattribute, central sumatra basin

Reservoir Distribution of Stratigraphy Trap using Red Green Blue (RGB) Blending from Spectal Decomposition in "TS Field"

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ABSTRACT

Author has to do research about interpretation of stratigraphy trap for thin layer using Red Green Blue (RGB) Blending from Spectral Decomposition in "TS Field". Research zone in "TS Field" is exploration zone in West Natuna Basin, Riau Island. Sandstone in "TS field" are thin cause have thickness minus two times of tuning thickness. Time structure map is used result of picking horizon on marker between A3 and A4 have 6.5 meter of thickness. After doing seismic interpretation for making time structure map, has applied spectral decomposition using algoritm *Fast Fourier Transform (FFT).* Time window used based on dominant frequency is 28 ms. Choosen for iso frequency based on time frequency. For high frequency is 40 Hz with blue color, mid frequency is 35 Hz with green color, and low frequency is 30 Hz with red color. And next RGB Blending, so can do interpretation of stratigraphy trap like channel sand.

Keywords: Thin layer, spectral decomposition, Fast Fourier Transform (FFT), RGB Blending

Subsurface Structural Modeling Manifestations of Mt Endut Using Vertical Electrical Sounding (VES) Method

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ABSTRACT

The hot springs is located in Lebak, Banten province, about 40 km in the southern Rangkasbitung city is one of the manifestation of geothermal which has been surveyed by PSDG team in 2006. On that survey, acquisition data were using resistivity methods with schlumberger configuration from southwest to northeast. From the results of surface geological surveys, local hot springs Cikawah manifestation dominated by Quaternary volcanic rocks of Mount Endut product that breaks through Tertiary sedimentary bedrock. Horizontal fault and normal trend rejuvenation of the northeast - southwest makes row of hot springs manifestation in Cikawah. Geothermal manifestations such as hot water Cikawah has the highest temperature (88 ^{0}C), the hot water discharge 5 L / sec, neutral pH, chloride type, in partial equlibrium, and there are in the between of the balance of Cl-Li-B. Resistivity data shows conductive layer at a depth of approximately 500 meters below Cikawah hot springs, that suspected associated with argillic alteration intrusive rocks. High resistivity anomaly are suspected associated with thick igneous intrusive rocks.

Keywords: Manifestation, vertical electrical sounding, resistivity, Cikawah

The Importance of Bulk Density Determination in Gravity Data Processing

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ABSTRACT

Gravity geophysical method aims to investigate subsurface condition by measured contrast density of rock formation underneath, therefore the density of rock is one of the important parameter in calculating gravity data. Assigning proper value of rock density will strengthen “sound” of gravity data to deliniate geological information such as structure, intrusion, bedrock and rock porosity. Getting a proper rock density value is depend on what method is used to determine the density of rock. On the "green area" where average rock density value has not provided by insitu density measurements of outcrops or drill hole, then common approach is using Parasnis analytical method (1952), Nettleton graphical method (1939) and average value of rock density in the earth's crust (2.67 gr / cm3). The result of gravity data processing at site “X” and “Y” where rock density is determined by those three methods show that laterally, contour produced by Complete Bouguer, Regional and Residual anomalies, neglecting the exact value of Bouguer Anomaly, are show similar pattern, however vertically, the Bouguer anomaly profile using average rock density in the earth’s crust i.e 2,67 g/cm3 is presented geological structure more obvious than the other two methods.

Keywords: Bulk density, parasnis, nettleton, average density

Application of Seismic Attribute Method to Identify Strike Slip Fault Structure Carbonate Reservoir Basin Area East of Java

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ABSTRACT

Has conducted seismic attribute analysis method to determine the strike slip fault structure are supported using seismic data. This research area is the area of East Java Basin with Tuban Formation Miocene. The object of research is categorized carbonate reef types and interesting to be analyzed in the form of the carbonate reservoir strike slip fault zone due to the difficulty in interpreting the strike slip fault structure in carbonate reservoirs. The method used is seismic attribute, that spectral decomposition of Continuous Wavelet Transform (CWT) attribute, similarity attribute, curvature attributes and variance attribute. Results of analysis of variance four attributes indicate attributes are not visible on the map attribute whereas the spectral decomposition CWT attributes, curvature and similarity is clearly visible on the map attributes. Strike slip fault has the southwest toward the northeast.

Keywords: Strike slip fault, continuous wavelet transformation (CWT) attribute, *similarity* attribute, *curvature* attribute, *variance* attribute

Analysis Geothermal Prospect of Endut Mountain used Gravity and Geochemistry Methods

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ABSTRACT

Endut mountain geothermal area is attached in Lebak district, Banten province, about 40 km to the south of the town of Rangkasbitung. In 2006 an investigation of geology, geochemistry, and geophysics be held to determine the geothermal prospects of Endut mountain. Geological conditions of Endut mountain be dominated by quarter volcanic rocks as the product of Endut mountain that breaks through Tertiary sedimentary bedrock[1]. Intrusive rocks be produced in the southern part of the investigation area that supposedly formed before volcanic activity of Endut mountain. Fault flat and trending normal rejuvenation of the northeast - southwest result in the manifestation of a row of hot springs Cikawah (T = 88 ° C, neutral pH, chloride-type). While the horizontal faults trending north-west - southeast alleged media which gave rise to the manifestation of hot springs Handeleum (T = 57 ° C, neutral pH, carbonate type)[1]. The hot springs Cikawah and Handeuleum are in partial equilibrium. Subsurface temperatures around 180oC estimated from geotermometer SiO2 and NAK. Based on gravity method of geophysical data, indicate an igneous intrusions in Cikawah may be the source of heat for geothermal systems Cikawah. Meanwhile, in the southwest location of intrusion investigations indicate that acts as a heat source for geothermal systems Handeuleum. Under the surface there is a body of igneous rock daya- west trending northeast are probably the andesitic rocks older than the products of Endut mountain[2].

Keywords: Endut Mountain, geothermal, geochemical, gravity, faults

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Application of Remote Sensing Analysis and MT Method to Identification Mt. Endut Geothermal Prospect Zone

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ABSTRACT

Mount Endut is located at Lebak Regency, Banten Province, 40 km southward Rangkasbitung City, with geographic UTM position between 9261000-9274000 N and 639000-652000 E. Preliminary survey which have been made at Mt. Endut is Geological and Geochemical Survey in 2006 and MT survey in 2007 with 27 measurement point. All survey conducted by Pusat Data dan Studi Geologi (PSDG). According to result of premilinary survey, Mt. Endut is dominated by quartenary volcanic rock produced by Mt. Endut, which breakthrough tertiary sediment layer [1]. NE to SW normal fault produced surface manifestation, namely Cikawah hot spring (T=53-88˚C, pH=7.74-7.98) and Handeleum hot spring (T=57˚C, pH=7.7). According to SiO_2 and NaK geothermometer, subsurface temperature of Mt Endut is ranging from 162 to 180˚C [1]. In order to make sure location of prospect area, boundary of reservoir and depth of reservoir, remote sensing fracture fault density (FFD) method combining with MT method is needed. FFD method commonly used to determine area of prospect, while boundary and depth of reservoir determine by resistivity structure analysis from MT data. By combining this two method, FFD and MT, with gravity, geology and geochemistry as support data, and conceptual model as final output, result from this study hopefully can help determine productive drilling zone and also reducing exploration risk at exploration stage.

Keywords: remote sensing, fracture fault density, magnetotellurics, resistivity, structure, landsat 8, gunung endut

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Analysis of Gravity Data Beneath Endut Geothermal Field using Horizontal Gradient and Euler Deconvolution

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ABSTRACT

The Endut geothermal field is located in Banten Province, Indonesia. The geological setting of the area is dominated by quaternary volcanic, tertiary sediments and tertiary rock intrusion. This area has been in the preliminary study phase of geology, geochemistry, and geophysics. As one of the geophysical study, the gravity of the area was surveyed in an attempt to delineate the subsurface structure and to better understand the relationship between the geothermal systems and the subsurface structure. The gravity bouguer anomaly data were analyzed using integrated gradient interpretation techniques, such as the Horizontal Gradient (HG) and Euler Deconvolution (ED) methods. These techniques detected boundaries of body anomalies and faults structure that were compared with the lithologies in the geology map. The analysis result will be useful in making a realistic conceptual model of the Endut geothermal area.

Keywords: *Gravity, geothermal, Endut, gradient*

Stratigraphic Trap Potential Bekasap Formation on High Basement, XYZ Field, Central Sumatra Basin, Based on Stratigraphic Analysis and Seismic Attribute

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ABSTRACT

The research site, located in XYZ field, is part of the Central Sumatra Basin. This study examines stratigraphic trap potential Bekasap Formation onlap system on high basement, based on sequence stratigraphic concept. Which is intended to determine the stratigraphic trap potential of the Bangko formations where hydrocarbons accumulate. Thus, the discovered stratigraphic traps are expected to be alternatives to hydrocarbon trap so that they can restrain the rate of decline oil production in XYZ field.
The primary data in this study are well log, core, and 3D seismic, and the secondary data are that of biostratigraphy and formation pressure data. The seismic-well tie is conducted to tie the seismic data to well log prior to seismic mapping. This study generates well log correlation and mapping isochore, RMS amplitude seismic and low frequency 10 Hz and 15Hz map. The integration of all collected data is to support the analysis of the depositional environment modeling and to determine potential stratigraphic traps of the Bekasap Formation.
Bekasap Formation consists of estuarine channel facies, estuarine shoreline bar and estiarine bar. The facies shows that the Bekasap Formation in XYZ Field is generally deposited on the estuarine environment to the shallow marine. Potential stratigraphic trap on Bekasap Formation is isolated bar located in the southern part of XYZ Field with total resources 5,400.54 MBO.

Keywords: Bekasap onlap, low frequency, stratigraphic trap.

Reservoir Hydrocarbon Identification using Spectral Decomposition : S-Transform and Empirical Mode Decomposition (EMD)

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ABSTRACT

Non-stationer signal from seismic survey can't interpreted directly in time domain analysis. Spectral decomposition is one of spectral analysis method that can analyze non-stationer signal in frequency domain. Fourier Transform method commonly used for spectral decomposition analysis, however this method had limitation to show *low frequency shadows*. *S-Transform* and *Empirical Mode Decomposition* (EMD) is another method of spectral decomposition that can be used to enhanced *low frequency shadows*. In this research, comparison of *S-Transform* and EMD methods can show the difference imaging result of *low frequency shadows* zone in Eldo Field, Jambi Province. Spectral decomposition result based on EMD method can show better imaging of *low frequency shadows* zone in tuning thickness than *S-Transform* methods.

Keywords: Spectral decomposition, S-Transform, Empirical Mode Decomposition (EMD), low frequency shadow

Fracture Modeling for Basement Reservoir: Case Study at North East Betara Gas Field, South Sumatra Basin

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ABSTRACT

North East Betara field is sitting on the northern edge of prolific South Sumatra Basin. It has produced gas from Lower Talang Akar Formation sandstone and over 90 wells have been drilled. A 3D seismic vintage was acquired in 2001 and reprocessed in 2012 to enhance subsurface image. In 2013 an exploration well NEB Base-1 was drilled and made gas and condensate discovery from subsequent pre-tertiary Basement which is confirmed as granite. The well proved fractured basement reservoir play on paleohigh of the structure. Main methods for fracture prediction have been seismic attributes extraction and structural geology studies of basement provided by image logs on a few exploration wells. Ant-Tracking attribute is widely employed to image seismic event discontinuities due to complex faults which is responsible for the generation of natural fractures. Combined with high resolution image logs, it is possible to create fracture model for reservoir mapping. In 2014 delineation well NEB Base-2 was drilled on second paleohigh and unfortunately it did not find any gas indication from pre-tertiary basement target. Having both well data from 2 basement wells, fracture network is simulated with novel Artificial neural Network (ANN) algorithm. We found that compartmentalization on basement involved old faults and both paleohighs have undergone different structural history which resulted in separated fractures distribution.

Optimize of Distribution and Characterization of Sand Reservoir by using Extended Elastic Impedance (EEI) Method in "G" Old Field

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ABSTRACT

To characterize the hydrocarbon reservoir, we need to consider the reservoir's physical parameter such as gamma ray and lambda-rho. Conventional seismic method could not display all physical parameters in volume data as vertically displayed on well log data. As geophysical method was improved physical parameters that existing in well log data can be displayed in volume data by using Extended Elastic Impedance (EEI) method. In proven field, we apply EEI method to enhance fluid distribution and reservoir characterization of the field. EEI method is resulting volume data that representing both fluid distribution and lithology distribution. Fluid distribution is represented by volume data of lambda-rho, Vp/Vs ratio, density, water saturation and resistivity, whereas lithology distribution is represented by volume data of mu-rho, porosity and gamma ray. Both fluid and lithology distribution are displayed in sliced volume data. In the result of study, EEI method produces considerably good quality of volume data which has EEI spectrum correlation as minimum as 0.50. Also each of obtained χ angles of physical parameters are well distributed according to projection categories that were introduced by Connoly and most obtained χ angles have only slightly different, if not exactly same, with χ angle values that were obtained by others previous researchers. In general, all used physical parameters clearly shows that the hydrocarbon reservoir is existed around some structural traps. Most of reservoirs have fluid content of oil-gas mixing and gas dominated. Additionally, due to un-existing of shear-wave data in the old field, we use shear-wave synthetic data that is derived or generated from other well log data by using genetic algorithm.

Keywords: Extended elastic impedance, fluid distribution, lithology distribution, reservoir characterization, shear-wave synthetic data

Characterization of Gumai Formation Using Poisson Impedance in Nenggala Field, Sub-Cekungan Jambi

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ABSTRACT

Sandstone in Gumai Formation on Nenggala Field, Jambi Sub-Basin, has never done conducted study on facies changes laterally. Boundary of facies could assist in determination of hidrocarbon zone. Acumulation zone has good porosity and permeability with reference shale content limit of *80 GAPI*. This study can describe the shape of the distribution and depositional environment of sediments. The methods used are Simultan Inversion to clarify the direction of sediment distribution, and Poisson Impedance for identifying shale content that affect to permeability zone. Hope can help to ilustrate the boundary of lithology, depositional environment, and quality of reservoir with based Poisson Impedance method. Contrast Poisson Impedance values shown in the map are separated into sandstone zones with shale dominant and not. Sandstone of Gumai Formation has average values of Poisson Impedance *4.060,57 (gr/cc)*(ft/ms)* with the depositional environment is Delta system, Front Delta. The sandstone came from west of Nenggala Field, that Tigapuluh high, and settle to south east when sea level decreased.

Keywords: Simultaneous inversion, poisson impedance

Urbanization Process Simulation Using Markov-Chain and Cellular Automata in Malang City East Java Indonesia

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ABSTRACT

A reliable land use model for sustainable city planning and management is one of components to improve the process of decision making. This study aimed to evaluate the urbanization process spatially based on Markov chain and cellular automata (CA), and describe its application to the simulation of land use changes in the city of Malang, East Java. The temporal spatial land use map scale 1 : 250.000 from year 1990, 2000, 2010, 2016 from Landsat with spatial resolution f 30 meters, and population data of Malang City were analyzed. A typical CA system consists of four phases; joining the land use map, modelling the land use changing potential, CA simulation, and Validation Model. The results showed simulation urbanization process causes changes in urban land use and spatial patterns of building density.
Keywords: Urbanization process, simulation, cellular automata, land use change

Simulation of Land Use Change and Its Effect on Potential Deforestation Using Markov Chain - Cellular Automata

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ABSTRACT

Land resources has an important role in promoting economic growth and at the same time it reflect the relationship between human beings and nature. Changes in land use caused by human activity continues over time and may became a threat to the natural space. The threat of deforestation in North Bengkulu district may caused an increase in greenhouse gas emissions, reduced biodiversity, destruction of the hydrological cycle, and other support systems. The high pressure on forests encourage periodic monitoring in space and time (spatio-temporal) using Markov Chain - Cellular Automata which include the distribution pattern and its potential to deforestation on each type of forest. Data collection methods include land cover maps of 1997, 2007 and 2016 which processed to forecast the deforestation in 2035 coupled with the logistic regression physical factors. The results showed that there is a significant change of land use in North Bengkulu. The dominant factor causing such changes is the plantation and open land. The model of land use change in 2035 is dominated by forests turned to plantations by 78.6% of the area with Kappa validation of 89.43%. In general, the changes urged to the west (forest). The higher potential of deforestation lies in the forest conservation area. The results of the study are expected to provide a reference for future spatial planning, forestry and urban design mitigation of negative impacts, especially greenhouse gas emissions (GHG).

Keywords: simulation, land use, deforestation and Markov Chain-Cellular Automata

The Goodness of Fit Test for Extreme Rainfall Distribution Analysis in Jabodetabek Metropolitan Area

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ABSTRACT

Understanding the return periods is fundamentally important for analysis of extreme rainfall events. Extreme rainfall events is stochastic phenomenon that becoming the most frequent cause of floods. Jabodetabek metropolitan area as a strategic place always hit by severe flood every year hence predicting the returns periods of rainfall is critically crucial for flood risk management and also for design hydraulic and flood-control infrastructure such as: drainages, pumping stations, weirs, sewers, etc. In order to determine return periods calculation accurately, the probability distribution is used. As there is many types of probability distribution, aim of this research is to determine the best fitting probability distribution based on the goodness of fit test. Three variations of goodness of fit test is used namely Kolmogorov-Smirnov test, Anderson-Darling test, and chi-square test. In this research, the goodness of fit test have been applied to some meteorological-climatological stations that located in Jabodetabek Metropolitan Area. The goodness of fit test using Kolmogorov-Smirnov test, Anderson-Darling test, and chi-square test, shows that mostly of meteorological-climatological stations in Jabodetabek are fit with the Log-Pearson III distribution therefore calculating return periods using this type is the most suitable than the other. The result of this research hopefully can improve the accuration of return periods calculation in order to support flood prevention & control management program and selecting the the best and optimum design of hydraulic infrastructure in Jabodetabek Metropolitan Area in the future.

Keywords: Goodness of fit test, extreme rainfall, return periods, flood management, Jabodetabek metropolitan area

Reservoir Prospect Assessment in Northern Part of Exito Field Based on Seismic and Inversion Attribute Interpretation

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ABSTRACT

Exito Field is one of the operational fields of Mahakam Delta, East Borneo. Geological structures that control this area are plunging anticlines that strike to the north. Drilling wells of this area only in southern part of Exito Field. This study is focused on gamma interval of Exito Field. This gamma interval is the most productive reservoirs in this area, which is bounded on the top and bottom by Vico Indonesia markers. The aim of this study is to assess reservoir prospect by performing seismic and inversion attributes interpretation. Seismic attributes interpretation, which is root mean square (rms) amplitude, is intended to map the direction of the paleo current reservoir. In another hand, seismic inversion is used to delineate the reservoir porosity. In addition, dip-meter data from gamma interval is used to convince paleo current analysis. Our interpretation shows that northern part of Exito Field has a good prospect in term of porosity and paleo current.

Keywords: *Reservoir prospect, exito field, seismic, inversion attribute*

Spatial Pattern Local Wisdom Education of Mangrove at Lhokseumawe, Aceh

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ABSTRACT

Aceh is one of the provinces with high level of hazard. Tsunami disaster in 2004 has caused the loss of coastal forests and mangroves in the Aceh province. The loss of these resources has a direct impact on the survival victims of the tsunami and subsequent impact. it takes a conservation program that is continuous and educative through the education, in this case the application of local wisdom education of mangrove. This research was conducted in Lhokseumawe city, Aceh East Coast. The distribution of mangrove forests and the spread of schools forming spatial patterns vary and spread in the administrative area of Lhokseumawe become a reference in the application of local wisdom education of mangrove. Data processing method performed by descriptive and quantitative method by pearson product moment statistic method. Of the total number of junior high schools in the city of Lhokseumawe as many as 41 Public Schools, Private and Religious School, there are 31 schools with priority for local wisdom education implemented mangrove. Priority I as many as 18 schools, 10 schools priority II and 3 school for priority with learning competency standards that differ from each other.

Keywords: Local wisdom, Mangrove, education

Assessment of Soil Erosion Risk in Komering Watershed, South Sumatera, using SWAT Model

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ABSTRACT

Changes in land use watershed led to environmental degradation. Estimation of soil erosion loss is often difficult due to the some factors such as climate, topography, land use, and human activities. This study aimed to predict soil erosion hazard and sediment yield using the *Soil and Water Assesment Tools* (SWAT) hydrological model. The SWAT was chosen because it can simulate model with limited data. The study area is Komering watershed (914.4 Ha) in South Sumatera Province. There are two factors land management intervention: 1) land with agriculture, and 2) land with cultivation. These factors selected in accordance with the regulations of spatial plan area. Application of the SWAT demonstrated that the model can predict surface runoff, soil erosion loss and sediment yield. The erosion risk for each watersheds can be classified and predicted its changes based on the scenarios which arranged. In this paper we also discussed the relationship between distribution of erosion risk and watershed's characteristics in a spatial perspective.

Keywords: SWAT Model, erosion risk, land use changes, sediment yield, Komering watershed

The Return of "Gasoline Station-Park" Status into Green-Open Space in DKI Jakarta Province

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ABSTRACT

The construction of public refueling stations (gasoline stations) in 1970 increased drastically due to the government support through a Memorandum Office of the Governor of DKI Jaya (DKI Jakarta), which lead to a number of the park (green open space or RTH) converted into a gasoline station. Now, to meet the target of RTH (13,94% RTH based RTRW DKI Jakarta 2010), the policy was replaced by Decree No.728 of 2009 and Governor Instruction No.75 of 2009. It was recorded that land function of 27 gasoline stations unit must be returned. The aim of this study is to determine the suitability of change of function of gasoline stations-Park with green open space using site and situation based approach. The method used is a combination of AHP and rangking method. Site for flood-prone variable, space of the gasoline station, the status of land. Situation for variables of other public space, the availability of other gasoline stations, service gasoline stations, road segments, and the proportions of the room built. Analysis of the research used quantitative descriptive analysis. The results showed that three of the five gasoline stations were suitably to converted into a green open space (RTH).

Keywords: Gasoline station, open green space, suitability, conversion, combination of AHP and rangking

Calculation the Highest Leak Level of Water Pipe Lines Region at PDAM Tirta Kahuripan using Fuzzy C–MEANS and ARCGIS Method Analysis

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ABSTRACT

Water is basic necessity for human's life. Water which is distributed to the public, should be in decent condition, healthy, and protected from metal pollutants. At Indonesia, Its handled by a government institution commonly is PDAM (Indonesian regional water utility company). PDAM Tirta Kahuripan handle water distribution in Bogor area and part of Depok city. Based on data, PDAM Tirta Kahuripan had approximately more than 46% water loss, its cause geology factor, human activity, etc. Therefore in this paper, we try to make decision system of water loss at PDAM pipes line, using cluster Fuzzy C – Means method analysis. Then, we mapping this result using Arcgis software. Based on this method, we could be determine which one the region shows the most water loss and also identify the highest leak level of water pipe lines at PDAM Tirta kahuripan.

Keywords: Water loss, leak of water pine line, fuzzy C – Means and Arcgis method analysis.

Impact of Sand Mining Activities on the Environmental Condition of the Komering River, South Sumatera

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ABSTRACT

Sand mining activities in the Komering river, South Sumatera, has been existed around a long time and continues to grow along with the increase of development that occurred in the district of OKU Timur. The purpose of this study is to examine the impact of sand mining activities to environmental conditions of the river Komering. Field studies have been conducted during the period of April-June 2016 for observing the condition of the river channel, water quality measurement and mining activities. Analysis of the results of field studies combined with GIS and Remote sensing analysis conducted to measure the impact of mining activities both spatially and temporally. The results showed that the sand mining activities on the river Komering has led not only to the degradation of water quality but also damage the river channel. In this paper we also discussed the relationship between distribution of water quality and channel damage with the mining activities in a spatial perspective.

Keywords: Komering river, sand mining, environmental condition, water quality, channel damage.

Mt. Pancar Geothermal System: Structure Assessed from Gravity and Hydrogeological Interpretations

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ABSTRACT

Mount Pancar geothermal prospect area is located in Bogor, West Java Province. Geologically, Mount Pancar geothermal prospect area consists of Quartenary volcanic formation, the Quartenary volcanic formation in Mt. Panisan, and the Tertiary sedimentary rocks around Mt. Pancar. The existence of geothermal system in this area is characterized by the appearance of surface manifestations, such as warm ground, altered rocks, and hot springs in the western side of Mt. Pancar. The hot springs are found in Kawah Merah (T = 70^{o}C) with average debit of 1.28 litres/sec and Kawah Putih (T = 51^{o}C) with neutral pH, minor silica sinter, and indicated as chloride water. Both of the hot springs are predicted as an outflow from Mt. Pancar geothermal system. The reservoir temperature of Mt. Pancar geothermal system, as indicated by Na/K geothermometry, is in the range of 180-190^{o}C. The appearance of surface manifestations is controlled by geological structure as a pathway of geothermal fluid to the surface. Gravity survey with spacing 200 meters was conducted on 155 stations in order to detect the presence of geological structure that control these manifestations. Complete Bouguer Anomaly map from gravity processing data shows that Mt. Pancar is dominated by the low anomaly value in the center of Mt. Pancar and continues to the north-east direction. 2-dimensional density modeling is performed in profile which connects among Mt. Pancar, Kawah Merah, dan Kawah Hitam. It indicates the presence of geological structure, like graben which controls the appearance of both manifestations.

Keywords: Gravity, manifestations, geothermal system, Mt. Pancar, Indonesia

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Assessment of Low to Moderate Geothermal System over Mt. Pancar Area (Bogor) based on Remote Sensing and Geochemical Studies

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ABSTRACT

Remote sensing can be applied as the first guidance in exploration stage of developing geothermal system. Remote sensing method can give important information such as the distribution of surface temperature, lithology boundaries, the spreading of surface manifestation, and geological structure. Remote sensing method is used to analyze geothermal system in Mt. Pancar geothermal prospect area, West Java Province. Some indications of geological structure that control geothermal system are found from remote sensing result in Mt. Pancar geothermal prospect area. Besides, general lithology of rock unit such as lavas and pyroclastics are found by using this method. From remote sensing method, Mt. Pancar is identified as a product of intrusive lavas. Geochemical studies are done to complete this research by taking several samples of hot springs which are accompanied by measurement of temperature, pH, and debit in Kawah Merah and Kawah Putih. From geochemical studies results, the temperatures of Kawah Merah and Kawah Putih are 70°C and 50°C respectively. Both of the surface manifestations have neutral pH and indicated as chloride water. These indications show that both manifestations are outflow zone of Mt. Pancar geothermal system.

Keywords: Remote sensing, geochemistry, low to moderate temperature, geothermal system, Mt. Pancar, Indonesia

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Application of Continuous Wavelet Transform (CWT) and RMS Amplitude Seismic Attributes against Sandstone Reservoirs Distribution Field "Silk" North Sumatra Basin

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ABSTRACT

Keutapang Formation located in North Sumatera basin is one of the back arc basin in Indonesia which has produced oil and gas. In this research, Keutapang formation dominated by sandstone and shale lithology. Continuous Wavelet Transform (CWT) and RMS Amplitude attribute method used for sandstone reservoir mapping because it can map out a thin layer and effective to amplitude contrast changing. The result of (CWT) apllication in 30 Hz frequency could map well on the sandstone layer continuity in Keutapang Formation. For RMS amplitude attribute analysis result with 20ms window can map out the distribution of sandstone well. High amplitude RMS response is sandstone while shale showed by Low Amplitude RMS area. The interpretation of sandstone reservoir distribution of and RMS Amplitude attribute generated as the channel sedimentation.

Keywords: Continuous Wavelet Transform (CWT), RMS Amplitude, channel

Brittleness Analysis from Well Log and 3D Seismic Data in Pematang Formation, Central Sumatera Basin

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ABSTRACT

The Shale Gas Revolution in the United States has led other countries to do the same way to increase their national oil and gas reserves meanwhile the fossil fuel has decreased from time to time until now. There is a misconception to assume that all shale characteristics are all the same while every shale gas plays are unique. There are 4 screening criteria that define the quality of the shale in order to be a good unconventional reservoir. The first is TOC, the second is the maturity of the rock, the third is brittleness, and the last is the thickness of shale formation. The brittleness is the ability of the rock to fail. Most of successful hydraulic fracture stimulation performed on a more brittle shale formation since ductile shale will close down the fractures. So the purpose of this study is to define the brittleness characteristics on "SP" field and to understand lateral distribution of brittleness parameter using 3D seismic data. The brittleness analysis of a rock will use XRD analysis results to compute brittleness index and well log data from 3 wells to calculate young modulus, poisson's ratio, brittleness average, and lambda mu rho. Meanwhile, 3D prestack seismic data will be used to perform simultaneous inversion to have the basic parameter of seismic data which is Vp, Vs, and density. All of these 3 parameters can be used to calculate modulus young, poisson's ratio, brittleness average, and lambda mu rho. From the XRD analysis, the data fell into less brittle to brittle formation zone which has value of larger than 0.34 considered as less brittle formation zone and larger than 0.51 considered as brittle formation zone. Using well log data analysis, it can be understood that the higher the value of young modulus and the less the value of poisson's ratio is categorized as more brittle. The simultaneous inversion analysis showed the same brittleness trend and good lateral distribution of brittleness average parameters. So in the field of study, the brittle formation zone has a young modulus value of 31 – 34 Gpa and poisson's ratio value of 0.25 – 0.27. And by using simultaneous inversion analysis the area that has a good brittleness average can be seen clearly.

Keywords: Shale gas, brittleness index, brittleness average, young modulus, poisson's ratio, simultaneous inversion

Stratigraphic and Seismic Attribute Analysis: Case Study of Bekasap Formation on High Basement, Central Sumatra Basin

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ABSTRACT

Stratigraphic and seismic attribute analysis has been applied to Bekasap formation on high basement of central Sumatra basin. This study is intended to examine stratigraphic trap potential i.e., onlap system, where hydrocarbon accumulate. The discovery of this stratigraphic traps are expected to be an alternative as a new hydrocarbon trap that can replace the declining rate of oil production in this field. The primary data in this study consists of well log data, core, and 3D seismic data, which is complemented with the secondary data including biostratigraphy and formation pressure data. The secondary data is used to identify the depositional environment and facies modeling. Seismic attribute analysis is performed by applying low frequency shadow zone assessment, which is associated with the fluid content. Our analysis based on stratigraphic and seismic attribute analysis shows that Bekasap formation is identified as estuarine channel facies, estuarine shoreline bar and estiarine bar. The facies shows that the Bekasap formation in this field is generally deposited on the estuarine environment to the shallow marine. The potential stratigraphic trap on Bekasap formation is isolated by bar, which is located in the southern part of this field.

Keywords: Stratigraphic, seismic attribute, bekasap formation and central Sumatra basin

Shales Characterization on "RK" Field Tanjung Formation, Barito Basin, South Kalimantan for Shale Hydrocarbon Potential

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ABSTRACT

Exploration and exploitation in Indonesia now is still focused on conventional hydrocarbon energy than unconventional hydrocarbon energy such as shale gas. Shale gas is one of unconventional energy with rich and mature organic material, besides used as source rock, can be specified type capable of functioning as a reservoir oil and gas. Tanjung Formation is a source rock of Barito Basin located in South Kalimantan that potentially as shale hydrocarbon. In this research, integrated four methods using organic geochemical analysis, mineralogy, petrophysics and seismic interpretation that become the basis of knowing the relationship of material organic richness, maturity and brittleness index for potential shale hydrocarbon in Tanjung Formation. The first step is organic geochemical and mineralogy analysis in Tanjung Formation, the organic material richness ranging from 1.26 – 5.98 wt% (good – excellent), the depth of early mature window is 2170 m, with brittleness index average 0.44 – 0.56 (less Brittle) and kerogen type II/III that potentially produces oil and gas. The second step is petrophysics analysis which includes calculation TOC and brittleness index continuously, the result of this petrophysics analysis been validated with a laboratory analysis that obtained regression values 0.923 and 0.916. The next stage is seismic interpretation with acoustic impedance inversion method to see the distributions of shale hydrocarbon with value 17718 – 28222 ft/s*g/cc, the direction spread of shale hydrocarbon potential are in east and southeastern of the study area.

Keywords: Shale hydrocarbon, tanjung formation, organic geochemical, mineralogy, petrophysics and acoustic impedance inversion

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Fracture Analysis of Bekasap Formation, Central Sumatra: Application to Solving Sanding Problem in Production Well

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ABSTRACT

Y field has sanding problems when producing hydrocarbons and as it results in a drastic efficiency decrease in pump. Sanding problems can be solved in several ways, such as mechanical (sand cat, gravel pack), chemical (Sand Aid) and selective perforation way (perforation interval selection and oriented perforation). Sanding problems solved by means of mechanical and chemical but it costly. This thesis has done by using selectively perforating in the direction of maximum horizontal stress to solves the sanding problems and the result make production of sand decreased that is almost the same as the mechanical and chemical way to reduce the cost. In this study used 3 images data log and 3D seismic attributes to determine the direction of maximum horizontal stress. At 3 image log data has interpretated the direction of fracture, breakout and induced fracture. At three image log data, the insitu stress fracture have a horizontal maximum stress direction which direction same to tectonic stress. The direction of horizontal maximum stress from image data was N 040^{o} E - N 220^{o} E. The orient perforation can be used towards N 040^{o} E - N 220^{o} E which applied the local area around the image data only. To know fractures direction deployment in Y field by using seismic attribute analysis. Seismic attribute analysis method was used variance, ant track and curvature. Method of seismic attribute variance and ant tracks were analogued to the pattern of fractures in the same direction with a fracture log image was N 055^{o} E - N 095^{o} E and the pattern has not changed from the North to the South Y Field, but the pattern attribute curvature did not similar to the folds image log fracture analyst. Due to the similarity direction of the image log fracture with the attribute variance and ant track, so that the maximum horizontal stress of the image log analysis can be used in determining the perforation directional in the Y Field that was N 040^{o} E - N 220^{o} E.

Keywords: Sanding, fracture, horizontal maximum stress and oriented perforated

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Digital Image Steganography Using Edge Adaptive Based Cryptography Chaos

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ABSTRACT

Steganography and Cryptography is the method used to secure the information. Cryptography is used the principle of a Chaos by using Cat Arnold Map function to assure randomness. While in steganography, the method is used Least Significant Bit Matching Revisited (LSBMR). *Embedding* region were on edge digital imagery to ensure the message was not detected in the image by visual. The method used to detect the edge region by using Canny edge Detection. The test results obtained by Peak Signal to Ratio (PSNR) is 72-44 dB for data messages with a size of 10% of the media cover.

A Time Series Model: First-order Integer-valued Autoregressive (INAR(1))

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ABSTRACT

Nonnegative integer-valued time series arises in many applications. A time series model: first-order Integer-valued Autoregressive (INAR(1)) is constructed by binomial thinning operator to model nonnegative integer-valued time series. INAR(1) is depend on one period from the process before. Parameter of the model can be estimated by conditional least squares (CLS). Specification of INAR(1) is following the specification of AR(1). Forecasting in INAR(1) uses median forecasting or Bayesian forecasting methodology. Median forecasting methodology obtains integer s, which is cumulative density function (cdf) until s, is more than or equal to 0.5. Bayes forecasting methodology forecasts h step ahead by generate the parameter of the model and parameter of innovation term using Adaptive Rejection Metropolis Sampling within Gibbs sampling (ARMS), then finding the least integer s, where cdf until s is more than or equal than u. u is a value taken from the $Uniform(0,1)$ distribution. INAR(1) is applied on pneumonia case in Penjaringan, Jakarta Utara, from January 2008 until April 2016 monthly.

Identification of Hydrothermal Alterations using Dar-Zarouk Parameters and Concept of Anisotropy for 2D Resistivity Data

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ABSTRACT

Measurement of geoelectric method is commonly using homogeneous and isotropy approachment. However, this approachment are not entirely same as the earth's real condition. Therefore, it needs to be measured with inhomogenous and anisotropy approachment. This approachment uses the parameter of Dar-Zarouk. The parameter of Dar-Zarouk is used to calculate the values of resistivity media and coefficient of anisotropy. This thesis for identifying hydrothermal alteration which not uniform in the field, the inhomogenous and anisotropy approachment is very appropriate to be used and expected to give cross section of true resistivity in subsurface imaging to be clearer.The results of the model using the parameters of Dar-Zarouk sharpen the anomaly, hence the existence of alteration could be more visible and easier to be identified.

Keywords: hydrothermal alterations, silification zones, Dar-Zarouk parameters, anisotropy, resistivity

Encrypting the Compressed Image by Arithmetic Coding with Logistic Map

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ABSTRACT

Logistic map is a recursive function that qualify chaos criteria while meet certain condition, so can be used to construct a cryptograph system. Meanwhile arithmetic coding is one of lossless compression method that based on statistic approach. The use of logistic map will be combined with arithmetic coding to construct a cryptograph system. Scheme that will be used in this system are permutation, compression and diffusion, so that produce better security and privacy. In this thesis, topics that will be discussed are logistic map, chaos function, arithmetic coding, algorithm implementation of encrypting the compressed image by arithmetic coding with logistic map, and the endurance analysis of this cryptograph system from several attack methods.

Implementation of Random-key Cuckoo Search Algorithm with 3-Opt in Traveling Salesman Problem

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ABSTRACT

Traveling Salesman Problem or TSP is a problem to determine the route to be taken in order to minimize the traveling time, cost, or distance needed. In this research, Random-key Cuckoo Search or RKCS algorithm along with 3-opt is used to solve TSP. Cuckoo Search or CS algorithm is based on the parasitic behavior of cuckoos which lay eggs in the other birds' nest (host nest) to let the host birds hatch and breed their young cuckoo chicks. RKCS algorithm along with 3-opt includes Levy flights and 3-opt algorithm. Levy flights is used to update the weight while 3-opt algorithm is used to improve the route. Based on the results of the five benchmark problems (eil51, berlin52, eil76, kroA100, and eil101) which are acquired from TSPLIB, solving TSP by using RKCS algorithm along with 3-opt results in an optimal solution in the form of minimum total distance which is similar to Best Known Solution (BKS). The minimum total distance which is obtained is not influenced by the value of the parameter.

Identification of Non Volatile Compound in Cloves (*Syzygium aromaticum*) from Java

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ABSTRACT

Cloves (*Syzygium aromaticum*) is one of Indonesia's commodities which has an important role in many sectors, such as food, pharmaceutical, cosmetics, etc. Cloves contain volatile compounds and non volatile compounds. These compounds can be separated through steam distillation process which produce essential oil and distillation residue. These non volatile compounds extracted from the distillation residue by maceration with ethanol, and purified by gravity column chromatography to produce 13 fractions. These fractions analyzed using High Performance Liquid Chromatography (HPLC). HPLC analysis at 13 fraction showed that the 6th fraction is the simplest fraction. This fraction then analyzed by Liquid Chromatography - tandem Mass Spectrometry (LC-MS/MS). LC-MS/MS analysis showed that one of the non-volatile compounds contained in cloves is chlorogenic acid. Charecterization using FTIR showed that compounds in the 6th contain fungtion group O-H; =C-H sp2; C=O and these peak aromatic ring in fingerprint range. The characterization result support HPLC and LC-MS/MS result.

Keywords: cloves, residue, non volatile, maceration, gravity column chromatography, HPLC, LC-MS/MS, phenolic, chlorogenic acid

Model for Influenza Spread using Continuous Time Markov Chain

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ABSTRACT

Mathematical model for the spread of influenza using SIS (Susceptible Infected Susceptible) Epidemic Model for constant total human population size is discussed in this paper. This influenza model was made with stochastic approach. Stochastic model that used in this paper is Continuous Time Markov Chain (CTMC). Transition probability, expectation, and limiting distribution for the number of infected people were constructed in CTMC with assumption that the number of infected people might change by increasing one, decreasing one, or still in the time interval that tends to zero ($\Delta t \to 0$) . The expectation for the number of infected people cannot be solved directly, but we will know that the mean of the stochastic SIS epidemic model is less than the deterministic solution. From limiting distribution analyses, probability that there are no infected people at $t \to \infty$ is one. Some numerical simulation for the spread of influenza is given to give a better interpretation and a better understanding about the model interpretation.

Study of Synthesis Ligand 2-(1,5-diphenil-4,5-dihydro-1*H* -pyrazol-3-yl)pyridine as Fluorosensor Heavy Metal Ions Cu^{2+}, Cd^{2+} dan Pb^{2+}

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ABSTRACT

Ligand 2-(1,5-difenil-4,5-dihidro-1*H* pirazol-3-yl)piridin has been synthesized by Ciupa et al. (2013) method. The synthesis used aldol condensation reaction and Wolff-kishner reduction. The orange precipitated was collected and gave 19,91% yield 0,2987 gram). Ligand has been characterized by FTIR, H-NMR, UV-vis and Spectrofluorophotometer. The structur of the complex formed from the third metal is square planar with formula of complex are $[CuL_2]^{2+}$ $[CdL_2]^{2+}$ dan $[PbL_2]^{2+}$. The application in this research is fluorosensor of heavy metal ions Cu^{2+}, Cd^{2+} dan Pb^{2+}. With the addition of heavy metal ions Cu^{2+} and Pb^{2+} that ligand gave fluorosensor type on-off. It conclude by quenching when ligand coordinated with Cu 2+ and Pb 2+ ions. And ligand gave fluorosensor type off-on when addition of heavy metal ion Cd^{2+}. These ligan can detect of heavy metal ions from $2x10^{-4}$ M to a concentration of $2x10^{-6}$. It conclude by enhanching when ligand coordination with Cd^{2+} ion and the ligand have selectivity towards Cd^{2+}.

Comparative Study of Two Methods of Fractionation Bromelain from Pineapple Core Extract (*Ananas comosus*)

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ABSTRACT

Enzyme can be purified through fractional precipitation, this can be done by salt or organic solvent. In this research, purification of bromelain from pineapple core by fractional precipitation is done by 2 compound, ammonium sulfate and ethanol. Fractional precipitation by ammonium sulfate proved to be more effective as it yields a higher specific activity. Specific activity by ethanol and ammonium sulfate is 4.6480 U/mg at 0 – 60% saturation and 8.2243 U/mg at 50 – 80% saturation.

Ca-doped LTO using Waste Eggshells as Ca Source with Improve of Discharge Capacity for Anode Material of Lithium-Ion Battery

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ABSTRACT

Ca-doped $Li_4Ti_5O_{12}$ (LTO) in the form of $Li_{4-x}Ca_xTi_5O_{12}$ (x = 0, 0.05, 0.075, and 0.1) have been synthesized using simple solid state reaction. The materials preparation involved waste eggshells in the form of $CaCO_3$ as Ca source. The structural and capacity of as-prepared samples were characterized using XRD and CV. XRD revealed that all amount of dopant had entered the lattice structure of LTO successfully. The crystalline sizes were obtained by using Scherer equation. No significant differences are detected in lattice parameters (~8.35 Å) and crystalline sizes (~27 nm) between all samples. CV characterization with scan rate of 100μV/s shows that $Li_{4-x}Ca_xTi_5O_{12}$ (x = 0.05) has highest charge-discharge capacity of 177.14 mAh/g and 181.92 mAh/g, respectively. Redox-potentials of samples show no significant differences with the average of 1.589 V.

Effect of the Quantity of Carbonate Components on the Formation of Carbonated Hydroxyapatite via Hydrothermal Synthesis

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ABSTRACT

Carbonated hydroxyapatite is a biomaterial with high biocompatibility with human bone, moreso than regular hydroxyapatite, making it an acceptable synthetic bone graft material. The purpose of this research is to study the effect of sintering temperature and time on carbonated hydroxyapatite samples synthesized using the hydrothermal method with $CaCO_3$ as one of its components. The samples are then characterized using Fourier-transform infrared spectroscopy, x-ray diffraction, and a scanning electron microscope. IR spectra show that the CO_3 content in each sample is proportional to the amount of $CaCO_3$ used in the synthesis of said samples. Diffraction patterns from XRD show an increase in apatite content and a decrease in calcite content as sintering temperature and time increases, with temperature increases having a stronger effect on the samples than time increases. Calcite disappears completely after sintering at 900 ^{O}C for 2 hours.

Keywords: Calcite, carbonate apatite, FTIR, hydrothermal synthesis, sintering, XRD

Subacute Toxicity Test of Ethanol Extract *Artocarpus camansi* Leaves on Hepar of Male Rats (*Rattus norvegicus* L.) Sprague-Dawley Strain Reviewed From Serum Glutamic Pyruvic Transaminase (SGPT) and Serum Glutamic Oxaloacetic Transaminase (SGOT) Levels

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ABSTRACT

The present study was conducted to determine the dose considered to be tolerant and toxicant on repeated administration of ethanol extract of leaves *Artocarpus camansi* of serum glutamic pyruvic transaminase (SGPT) and serum glutamic oxaloacetic transaminase (SGOT) levels in hepar's male Sprague-Dawley rats (*Rattus norvegicus* L). Twenty five rats were devided into five groups, consisting of normal control group (KKN), the treatment group were given ethanol extract of *Artocarpus camansi* leaves with four variance doses, 47; 191; 764; and 3056 mg/kg bw (KP1, KP2, KP3 and KP4) respectively. Analysis of blood samples carried out using IFCC's method. Mean of SGPT and SGOT levels : KKN (32.60 ± 5.41) and (33.60 ± 8.29) U/L; KP1 (35.20 ± 6.37) and (36.00 ± 5.70) U/L; KP2 (42.20 ± 6.37) and (41.20 ± 7.42) U/L; KP3 (49.80 ± 6.05) and (47.20 ± 4.76) U/L; after that (111.40 ± 6.34) dan (109.4 ± 6.34) U/L. Least significant difference (LSD) ($P < 0.05$) test showed that there are real differences between KP4 with KKN, KP1, KP2, and KP3. It showed that the dose of 3056 mg/kg bw of ethanol extract of *Artocarpus camansi* leaves were able to give the toxic effects to the hepars.

Study of *bcl-2* and *bax* mRNA Expression to Apoptosis Incidence in Granulosa Cells of Endometriosis Patients

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ABSTRACT

Endometriosis is a disease in female reproductive system which marked by the present of endometrium tissue outside the uterus cavity. Endometriosis affects the reproductive system by decreasing oocyte quality as an impact of granulosa cells apoptosis in the follicle. Apoptosis in granulosa cells has been known activated through intrinsic pathway which is influenced by BAX (pro-apoptosis) and BCL-2 (anti-apoptosis) proteins. This research was conducted to know the mRNA expression of *bcl-2* and *bax* in granulosa cells of endometriosis patients using real-time PCR and statistic tests (T-test). The result shows that there is significance difference ($p < 0,05$) of *bax*/*bcl-2* expression between granulosa cells of endometriosis patients and granulosa cells in women without endometriosis.

Keywords: Apoptosis, *B-Cell Lymphoma-2* (*bcl-2*), *BCL-2 Associated-X* (*bax*), endometriosis, granulosa cells

Implementation of Regularized Markov Clustering Algorithm on Protein Interaction Networks of Schizophrenia's Risk Factor Candidate Genes

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ABSTRACT

Schizophrenia has been suffered by over 21 million people worldwide. Genetic and environmental issues are one of the contributing factors in the development of this disease. Some research shown that several related genes may increase the risk of this disease. Candidate genes that obtained from several research turns up linked in a large network of protein-protein interaction (PPI). Therefore, it is necessary to study the PPI network of the candidate genes. Regularized Markov Clustering Algorithm (RMCL) is a graph clustering method which is the modification of Markov Clustering Algorithm (MCL). The RMCL process that is built using R programming language applied to PPI networks of schizophrenia's risk factors candidate genes data that obtained from BioGRID database. RMCL algorithm simulation performed with different parameter of inflation. Then, the results of the RMCL algorithm simulation compared with MCL algorithm simulation with the same parameters. RMCL algorithm provides results in the form of overlapping clusters, which mean there are relation between clusters. Thus, based on the results of RMCL algorithm simulation, there are relation between protein clusters of several candidate genes, one of which is the relation of NRG1 and CACNG2 gene product.

Keywords: PPI; regularized markov clustering; schizophrenia

Courses Scheduling in Mathematics Department Universitas Indonesia

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ABSTRACT

Courses scheduling is a common problem faces in a university. In this paper, a case study in Mathematics Department Universitas Indonesia is presented, which has constraints such as rooms and lecturers availibility, and some study preferences. One of the way to solve scheduling problem is by using graph coloring. In this research, the scheduling problem is solved by simulated the problem using genetic algorithm for coloring graph.

Solving {0-1} Knapsack Problem Based on Amoeboid Organism Algorithm

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ABSTRACT

Knapsack Problem (KP) is optimization problem to choose object from set of objects which have profit and weight and the object will be placed in limited storage with total of profit is maksimum. First, will be explained about representing {0-1} Knapsack Problem ({0-1} KP)to directed graph. After {0-1} KP is represented in directed graph, so transforming value of edge on directed graph and dicari lintasan terpendek antar dua node. To search shortest path, use Amoeboid Organism Algorithm with adjacency matrices from directed graph and conductivity matrices as input. Output from this algorithm is produce conductivity matrices with element which have value approach 0 and . Element which have value approach 1 represent shortest path on graph. Shortest path on graph is optimal solution in {0-1} KP.

Keywords: {0-1} KP, shortest path, Amoeboid Organism Algorithm, conductivity

Determinant of Antiadjacency Matrix of Union and Join Operation from Two Disjoint of Several Classes of Graphs

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ABSTRACT

Let G be a graph with $V(G) = \{v_1, \dots, v_n\}$ and $E(G) = \{e_1, \dots, . e_m\}$. We only consider undirected graphs with no multiple edges in this paper. The adjacency matrix of G, denoted by $A(G)$, is the $n \times n$ matrix $A = [a_{ij}]$, where $a_{ij} = 1$ if $e = v_i v_j \in E(G)$ or otherwise $a_{ij} = 0$. The antiadjacency matrix of G, denoted by $B(G)$, is the $n \times n$ matrix $B = [b_{ij}]$, where $b_{ij} = 0$ if $e = v_i v_j \in E(G)$ or otherwise $b_{ij} = 1$. Properties of the determinant of adjacency matrix of some simple graphs have been studied by many researchers. However, the determinant of anti-adjacency matrix has not been explored yet. If G_1 and G_2 are disjoint graph, then the joining of two graphs G_1 and G_2, denoted $G_1 \nabla G_2$ is defined by taking copies of G_1 and G_2 and adding edges so that each vertex in G_1 is adjacent to every vertex in G_2. In this paper, we show the properties of determinant of joining two graphs, G_1 and G_2.Union of two graphs, denote $G_1 \cup G_2$ is a graph formed by taking copies of G_1 and G_2. The objectives of this paper are to identify some properties of determinant antiadjacency matrix of joining and union operation from two disjoint graphs. This paper also emphasizes on investigating the determinant of some special graph class formed by joining and unioning operation of two disjoint of several classes of graphs, such as Bipartite graphs, Cycles, Complete graphs, Stars and Wheels.

Composition and Diversity of Fish Species in Seagrass Bed Ecosystem at Muara Binuangeun, Lebak, Banten

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ABSTRACT

Research of composition and diversity of fish species in seagrass bed ecosystem at Muara Binuangeun, Lebak, Banten, had been conducted at May and November 2015. The method that was used during research was Catch per Unit of Effort (CPUE) with push net and boat net as fishing gear. Fishing was conducted during low tide. Collected sample were preserved with 10 % Formalin Solution and then identified in laboratory. In total, 286 fish were collected from 17 family and 38 species. Fish species with the most relative abundant was *Moolgarda* sp. (17,13 %) and the highest relative frequency was *Istiblennius edentulus*. Diversity index value of seagrass bed ecosystem was 2,973. Different sampling time showed different composition of fish, in example of *Arothron immaculatus*.

Extreme Value Theory (EVT) Application on Estimating the Distribution of Maxima

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ABSTRACT

Extreme Value Theory (EVT) has emerged as one of the most important statistical theories for the applied sciences over the last 50 years. EVT provides a firm theoretical foundation on building statistical model describing extreme events. The distinguishing feature of an extreme value analysis is the ability to quantify the behavior of unusually large values even when those values are scarce. One of the key result from EVT is the ability to estimate the distribution of maximum value, that usually called as maxima, using the asymptotic argument. In order to build such models, the Fisher-Tippett theorem which specifies the form of the limit distribution for transformed maxima will be greatly used. Furthermore, it can be shown that there are only three families of possible limit laws for distribution of maxima, which are the Gumbel, Frechet, and Weibull distributions. A standard form of these three distributions is called the generalized extreme value (GEV) distribution.

The Ontogeny Studies of *Tarebia granifera* (Lamarck, 1822) from Indonesia (Gastropoda: Cerithioidea: Thiaridae)

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ABSTRACT

The freshwater gastropod genus Tarebia H. Adams & A. Adams, 1854, are commonly living in rivers, lakes, and other limnitic habitats. In Indonesia, only Tarebia granifera (Lamarck, 1822) were found to have a wide distribution. The systematics and identity of this spesies is still doubtfull due to high variation of shell morphology especially on shell height as well as shell surface and sclupture. To determine the valid identity of Tarebia granifera in Indonesia, the ontogeny studies have been conducted. The results showed that Tarebia granifera has a fairly high reproductive capability. One single individu of Tarebia granifera able to produce 9 to 203 embryonic shell which remained in broodpouch in various stages of 0.22 mm to about 5 mm in size.

Keywords: *Tarebia granifera*, Thiaridae, ontogeny, embryonic shell, broodpouch

The Relation Pattern of the Dominant Intelligence,the Dominant Learning Style, the Most Preferred Teaching Style to the Category of Average Achievement of "X" Junior High School Student

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ABSTRACT

This Research was conducted to find the Pattern of the Dominant Intelligence, the Dominant Learning Style, and the Teaching Style which are the most preferable for the Category of Average Achievement of students in Junior High School coded "X". The differences in intelligence, learning styles and teaching styles for each student made student's achievement scores different, so this pattern is needed to be considered.In order to empirically analyze this pattern, this research used multiple correspondence analysis. The results showed that most of the students have Dominant Intelligence Interpersonal Intelligence with their Kinesthetic as the learning style and majority of these students liked teacher who teach with intellectually oriented style.When the student get a teacher who teach with intellectually oriented, student's achivement scores will be optimum (high). Besides the *intellectually oriented* teaching style, the *people oriented* teaching style also applicable for SMP "X". Applying this research to each class resulted almost same. In order to optimize the performance scores of the students in SMP "X", it is not easy to make the studnets change their dominant intelligences and learning styles. Rather, making adjustment of the teaching style for each class is needed.

Keywords: Dominant intelligence, learning style, teaching style, students, multiple corespondence analysis

Green Synthesis of Silver Nanoparticles (AgNP) Using Red Dragon Fruit Peel (*Hylocereus polyrhizus*)

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ABSTRACT

Silver nanoparticles (AgNP) have been successfully synthesized using red dragon fruit peel extracts (RDFP) or *Hylocereus polyrhizus* in a fraction of the water. The AgNP synthesis RDFP optimum at a concentration of 1.91 x 10-3% (w/v) or 0.21 % with stability for 7 days. AgNP@RDFP characterized by Fourier transform Infrared (FT-IR), UV-Visible Spektrofotmeter UV-Vis spectrum shows absorption area range Surface Plasmon Resonances (SPR) of AgNP 430-447 nm. Characterization of FT-IR showed a functional group of compounds called polyphenols and flavonoids.

Keywords: Green synthesis, silver nanoparticles, *Hylocereus polyrhizus*,

Spatial Pattern of Water Scarcity Areas in Lebak, Banten

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ABSTRACT

Water becomes more and more difficult to get because the population keeps increasing while the water doesn't. Lebak is one of the areas where the western rain has a wetter climate compared to the eastern beach in Java Island, along with a lot of potential water source. Water scarcity in a long dry season. The start of the dry season and the start of the wet season is determined with De Boer method, by using the data of rainfall within the duration of 30 years (1986 - 2015) from 13 station points. The spatial pattern of water scarcity area is determined from the overlay between the interpolation during the dry season on average and average dryness level. Variable of rock types, soil types, elevation, and slope levels are used to determine the domination of physical characteristic of the water scarcity area. Yearly average spatial pattern then compared with the pattern from year 2015. The result of the pattern in Lebak shows it becomes higher in the north and south. In those areas, they are dominated by tertiary sediment rock type, latosol soil type, 0 – 100 meter above sea level, slope (< 8%). The duration of dry season and the dryness level on 2015 and the yearly average pattern have different patterns. Villages which has problem with water availability on 2015 are usually because of the high dryness level.

Keywords: *:* water scarcity area, rock types, soil types, elevation, slope

Ultrasound-Assisted Synthesis of Curcumin Analogs Promoted by Activated Eggshells

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ABSTRACT

Curcumin has been widely known as multifunctional natural products which exhibit various biological activities [1]. However, the biggest limitation for the large scale application of curcumin is its poor bioavailability. This research presented a cheap, mild and efficient solvent-free synthesis of monocarbonyl analogs of curcumin via Aldol condensation using activated chicken eggshells (ACE) catalyst [2]. Dibenzalpropanon as a product of aldol condensation was prepared by mixing benzaldehyde and acetone in a simple glass tubes in the presence of ACE under ultrasonic irradiation (78 % yield), while dibenzalcyclohexanone produced from the reaction of benzaldehyde with cyclohenxanone (81 % yield). The products have been characterized by FTIR, UV-Vis spectrophotometer and GC-MS instruments.The FTIR spectra show a significant absorption of carbonyl group that attached to double bond in α,β-position at 1630-1660 cm^{-1}. The molecular cation of m/z of 234 and 274 is in agreement with the products structures.

Keywords: curcumin, activated chicken eggshells, ultrasound, Aldol condensation

Estimation of Shape β Parameter in Kumaraswamy Distribution using Maximum Likelihood and Bayes Method

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ABSTRACT

This paper discusses about Maximum Likelihood (ML) and Bayes method in estimating the shape β parameter in Kumaraswamy distribution. Both of the methods will be compared according to Mean Square Error (MSE) obtained from each estimator. At Bayes method, it will be used two Loss functions, those are Square Error Loss Function (SELF) and Precautionary Loss Function (PLF). Then, Posterior Risk obtained from both of loss functions will be compared. The comparison will be applied to hydrologycal data as a recommendation for the best method in representating the data. Hydrogical data that will be used is a water storage in Shasta Reservoir. It can be gotten from California Data Exchange Center. Then, using Mathematica Software and the formulas from both of the methods will yield a statistic which can describe the data well and also can predict the next observation for a reservoir in a certain time.

Conditional Value at Risk for Continuous Loss Random Variable

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ABSTRACT

Value at risk (VaR) is a widely used risk measure. Despite its popularity, VaR has some limitations. VaR is unable to quantify loss beyond VaR and not a coherent risk measure. Thus, the researchers introduced conditional value at risk (CVaR) as a measure of risk which overcomes VaR limitations. CVaR is able to quantify loss beyond VaR and moreover it is coherent. In this undergraduate thesis, conditional value at risk and its characteristics also the relation between VaR and CVaR will be studied.

Dengue Hemorrhagic Fever and Typhoid Fever Association Based on Spatial Standpoint Using Scan Statistics in DKI Jakarta

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ABSTRACT

Concurrent infection with multiple infectious agents may occur in one patient, it is appeared frequently in dengue hemorrhagic fever (DHF) and typhoid fever. This paper depicted association between DHF and typhoid based on spatial point of view. Since paucity of data regarding dengue and typhoid co-infection, data that be used are the number of patients of those diseases in every district (*kecamatan*) in Jakarta in 2014 and 2015 obtained from Jakarta surveillance website. Poisson spatial scan statistics is used to detect DHF and typhoid hotspots area district in Jakarta separately. After obtain the hotspot, Fisher's exact test is applied to validate association between those two diseases' hotspot. The result exhibit hotspots of DHF and typhoid are located around central Jakarta. The further analysis used Poisson space-time scan statistics to reveal the hotspot in term of spatial and time. DHF and typhoid fever are more likely occurred from January until May in the area which is relatively similar with pure spatial result. Preventive action could be done especially in the hotspot areas and it is required further study to observe the causes based on characteristics of the hotspot area.

Keywords: Dengue hemorrhagic fever, Typhoid fever, Scan statistics, Fisher's exact test, Association

Subsurface Structure Identification on the South Lampung using *Horizontal Gradient* (HG), *Euler Deconvolution* (ED) and *Second Vertical Derivative* (SVD) Method on the Gravity Data

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ABSTRACT

The existence of a geothermal system in Rajabasa volcano, south Lampung can be identified by the presence of geological structures that control this area. Gravity method is an appropriate method to determine the presence of geological structures beneath the earth's surface of differences in the density of rock. The method is able to detect subsurface geological structures, such as the fault structure. Identification of the presence and type of fault structures using advanced processing of gravity method such as analysis derivatives methods. One of derivatives methods are commonly used are Horizontal Gradient (HG) methods and Second Vertical Derivative (SVD) methods. The method are able to determine the vertical contact between the body below the earth's surface and produce the anomaly contour map. Contour map produced in combination with the results of the analysis of Euler's method Deconvolution (ED) to detect depth estimates of the fault structure. Results of this study there are several faults visible from a contour map both method HG and SVD either according to the data geological or that has not been integrated to the data geological with depths ranging from 365 meters to 1146 meters. Information from the results of advanced processing gravity data are integrated by geological structures model and geological data area of research.

Keywords: *Euler Deconvolution* (ED), geothermal system, *Horizontal Gradient* (HG), *Second Vertical Derivative* (SVD)

Application of Evolutionary Game Theory for Green Purchasing in Manufacturing Industry

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ABSTRACT

Suppliers and manufacturers have significant roles in manufacturing industry. They are involved in a trading relation in order to obtain profit in economic viewpoint. The trading relation can be a competition or a cooperation. In this paper, the trading relation that will be studied further is cooperation. This relation is called cooperation relation. Cooperation that is meant here is cooperation in implementing green purchasing system. In this paper, the cooperation tendency between suppliers and manufacturers will be analyzed by using Evolutionary Game Theory (EGT). By using EGT, an evolutionary game model is developed to observe the cooperation tendency between suppliers and manufacturers. The cooperation tendency between suppliers and manufacturers is the decision that is obtained, which is to cooperate or not to cooperate in implementing green purchasing system, from the combination of strategies that are used by suppliers and manufacturers themselves. In this essay, the cooperation tendency between suppliers and manufacturers will also be analyzed by conducting an experiment. Based on the evolutionary game model that is developed and the resulting outcomes from the experiment, the variables that are involved in this cooperation tendency problem which is being discussed in this paper and their approximated values that can make suppliers and manufacturers cooperate will be known.

Keywords: cooperate, evolutionary game theory, green purchasing, manufacturer, recycling, supplier

Strict Avalanche Criterion (SAC) Test on Lightweight Blockcipher Algorithms

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ABSTRACT

Diffusion and confusion are the most important things in block ciphers, so each of lightweight block ciphers suggested for testing by cryptographic randomness tests. Strict Avalanche Criterion (SAC) Test is desirable propertyof block cipher, including lightweight block cipher. SAC is recommended by Fatih Sulak for testing the cryptographic randomness on Block Cipher and Hash Function. In this paper, SAC Test is applied on some lightweight block cipher, like KLEIN-64, L-BLOCK-80, and PRESENT-80. Based on 1-bit avalanche of data sets, the randomness of KLEIN-64, L-BLOCK-80, and PRESENT-80 achieved after 1, 3 and 3 round respectively. Based on 8-bit avalanche of data sets, the randomness of KLEIN, L-BLOCK, and PRESENT achieved after 1, 3 and 4 round respectively. Based on message rotation of data sets, the randomness of KLEIN, L-BLOCK, and PRESENT achieved after 1, 2 and 1 round respectively. This paper shows that KLEIN has better randomness than L-BLOCK and PRESENT.

Unexpected Synthesis of Cinnamaldehyde-Dimedone Adduct using Samarium (III) Chloride

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ABSTRACT

In the present work, 1,8-dioxooctahydroxanthene can't be obtained from the reaction between cinnamaldehyde and dimedone (ratio 1:2) using samarium(III) chloride as a Lewis acid catalyst. The unexpected product formed is 5,5-dimethyl-2-(3-phenylallylidene)cyclohexane-1,3-dione as a result of 1:1 adduct. The product is obtained in low to good yield and the optimum protocol can be achieved by running the reaction using 10% mol $SmCl_3$ in water at room temperature for 2 h. This product is preliminary screened for its radical scavenging test with moderate activity.

Study of Spatial Changes in Delta Ci Punagara Year 1972-2015 using Landsat Satellite Imagery Data

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ABSTRACT

Delta is dynamic and constantly changing shape due to interaction of the river and the sea. Delta Ci Punagara since 1972 become broader, potentially deform spatially. The aim of research to analyze the spatial changes in the delta and the factors that influence it. Method of overlapping maps have to see the shoreline change and changes in land use with Landsat data processing in 1972, 1994 and 2015. Based overlay maps in 1972, 1994 and 2015 occurred in the delta erosion and accretion, thereby transforming the delta of the irregular into Bird-Foot. Abrasion in the northern zone (Ci Punagara estuary and vicinity) leads to the east and the results of sediment to the east of the location of abrasion. Abrasion in the western zone (estuary Ci bladder and vicinity) leads to south and the results of the sediment to the south of the location of abrasionThe factors that most influence the change comes from the delta spatial factors, namely fluvial sedimentation while currents and waves as a factor controlling the spread of sediment in coastal delta. Currents and waves are parallel to the shoreline causing abrasion and produce accretion region. Small tidal tends to build up the beach. Increased discharge of Ci Punagara followed by increased sedimentation due to changes in land use, especially depletion of forests leads expanding inland delta.

Keywords: Spatial changes; abrasion; accretion; physical factors; land use

Effect of Sr Substitution on the Electrical Properties of $La_{1-x}Sr_xFeO_3$ Nano-crystalline Materials

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ABSTRACT

$LaFeO_3$ is a material with Perovskite structure which electrical properties got investigated a lot, because as a p-type semiconductor it showed good gas sensing behavior through resistivity comparison. Sr doping on $LaFeO_3$ is able to improve the electrical conductivity through structural modification. Using the Sr atoms doping concentration (x) from 0.1 to 0.4, $La_{1-x}Sr_xFeO_3$ nano crystal pellets were synthesized using sol-gel method, followed by gradual heat treatment and uniaxial compaction. XRD characterization shows that the structure of the materials is Orthorhombic Perovskite. Topography of the sample by SEM reveals grain and grain boundary existence with emerging agglomeration. The electrical properties of the material, as functions of frequency, were measured by Impedance Spectroscopy method using RLC meter. Through the Nyquist plot and Bode plot, the electrical conductivity of $La_{1-x}Sr_xFeO_3$ is contributed by grain and grain boundaries. It is reported that $La_{0.6}Sr_{0.4}FeO_3$ sample has the most superior electrical conductivity of all samples, and the electrical permittivity of both $La_{0.8}Sr_{0.2}FeO_3$ and $La_{0.7}Sr_{0.3}FeO_3$ are the most stable.

Photocatalytic Performance of Fe_3O_4/TiO_2/Ag Nanocomposites for Photocatalytic Activity under Visible Light Irradiation

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ABSTRACT

In this work, Fe_3O_4/TiO_2 nanocomposites with additional silver metal were used as catalyst for methylene blue removal in aqueous solution. Fe_3O_4/TiO_2/ Ag Nanocomposites with various weight percentages of Ag (5wt%, 15wt%, and 25wt%) were successfully synthesized using the sol gel method. All samples were characterized using X-Ray Diffraction (XRD), and Uv-Vis spectrometry was used to determine the crystalline phase and optic properties of the sample nanocomposites. The catalytic activity of the samples was carried out using photocatalytic experiment. The result showed that addition of silver could enhance the catalytic performance significantly. The photocatalyst Fe_3O_4/TiO_2/Ag 25wt% showed highest photocatalytic activity. The experiment also indicated that holes are the main reactive species in the photodegradation mechanism in methylene blue. Lastly, nanocomposites have a good stability after being reused for four times of cycling process.

Discoloration of Organic Dyes using Zeolites Supported Fe-doped ZnO under UV Light Irradiation

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ABSTRACT

Various weight percentages of zeolites (10%-40%) had been coupled into Fe-doped ZnO (Fe:ZnO) nanoparticles using the co-precipitation method. The photocatalytic acivity of Fe:ZnO/Zeolites nanocomposites was monitored under UV light irradiation in discoloring methylene blue and methyl orange. The result shows that certain amount of natural zeolite in Fe:ZnO could increase the photocatalytic activity of the nanocomposites. The synthesized samples were characterized using some measurements such as Fourier Transform Infrared Spectroscopy (FTIR), X-ray diffraction (XRD), and Brunauer-Emment-Tellet (BET) surface area analysis. The FTIR spectra of the samples show the existance of zeolites in the samples. XRD patterns show that no crystal structure changes in ZnO after doping with Fe and supported with zeolites.

Identification of Maturase K (*matK*) Gene on Cacao (*Theobroma cacao* L.): Trinitario (from Lampung and Sumatera Barat) and Forastero (from Sulawesi and Introduction)

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ABSTRACT

Maturase K gene (*matK*) is a gene found in chloroplast. The *matK* used as a marker to determine genetic variation of Indonesian's Trinitario and Forastero cacao and cacao's introduced from England. Samples of cacao used in the study are Sul-1, MCC-01, and Pa-191 grouped as Forastero and HJ-5 and PB-1 grouped as Trinitario. The results of research showed that *matK*'s sequence of the five samples has successfully identified and there were variations in nucleotides sequence of *matK* which were amplified by mac02 primer on Sul-1 and Pa-191 and by mac09 primer on PB-1. Subsequently, the data obtained were formed into dendogram grouped between Trinitario and Forastero.

Magnetic $LaMnO_3/Fe_3O_4$ as Reusable Catalyst for Photocatalytic Degradation of Methylene Blue

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ABSTRACT

In the present work, $LaMnO_3/Fe_3O_4$ nanocomposites with different molar ratios (1:1, 1:0.5, 1:0.3, 1:0.1, and 1:0.05) have been successfully synthesized using the co-precipitation method. The prepared nanocomposites were characterized using X-ray Diffraction (XRD) and Vibrating Sample Magnetometer (VSM). The photocatalityc activity was evaluated using visible light irradiation. Methylene blue (MB) was used as a model of organic pollutant. The obtained nanocomposites exhibited much higher photocatalytic activity and stability than pure $LaMnO_3$ under visible light irradiation. The result showed that $LaMnO_3/Fe_3O_4$ with the molar ratio of 1:0.5 showed superior photocatalytic activity than others. The active species on photocatalytic activity was investigated by measuring the photocatalytic degradation in the presence of scavenger.

Enhanced Photo-, Sono- and Photosonocatalysis of Methylene Blue via SnO_2 Nanoparticle Supported on Nanographene Platelets (NGP)

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ABSTRACT

In our previous study, we have reported the catalytic (photo- and sono-) performance of SnO_2 nanoparticles in methylene blue (MB) removal from aqueous solution [1]. In this study, SnO_2/nanographene platelets (NGP) composites were fabricated by depositing SnO_2 nanoparticle onto nanographene platelets surface to develop photo-, sono-, and photosonocatalysts, SnO_2 nanoparticle and SnO_2/NGP composites were successfully synthesized using the sol-gel and coprecipitation method, respectively. The nanographene platelets (NGP) content was varied from 5, 10, and 15 weight percentages (wt%). The optical properties and thermal stability of the samples were characterized using X-ray Diffraction (XRD), Fourier Transform Infrared (FTIR), and Thermal Gravimetric Analysis (TGA).The catalytic ability of the samples was investigated using photo-, sono-, and photosono degradation of MB which was observed when nanographene platelets (NGP) were added into SnO_2 nanocomposite. The photo-, sono- and photosonocatalytic activities of SnO_2/NGP composites on dyes were analyzed by measuring the change in absorbance of dyes under UV-spectrophotometer.The degradation of the organic dyes has been calculated by monitoring the degradation in concentration of the dyes before and after irradiation of UV light, ultrasound, and both of them respectively. The influence of other parameters such as catalyst dosage, pH and scavenger has also been investigated. The results showed that SnO_2/NGP composite with 10 weight percent (wt%) has better catalytic performance than pure SnO_2 nanoparticle. The reusability tests have also been done to ensure the stability of the used catalysts.

Photo-, Sono- and Sonophotocatalytic Degradation of Methylene Blue using Fe_3O_4/ZrO_2 Composites Catalysts

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ABSTRACT

In the present work, magnetite material Fe_3O_4/ZrO_2 with various molar ratios (1:1, 0.5:1, 0.3:1 and 0.1:1) was prepared by the two-step method (sol-gel followed by the ultrasonic-assisted method). The as-prepared samples were fairly characterized by various characterization methods, such as X-ray Diffraction (XRD), Vibrating Sample Magnetometer (VSM), Fourier Transform Infrared (FT-IR) and Thermal Gravimetric Analysis (TGA). The catalytic performance of the as-prepared samples was evaluated based on the degradation of methylene blue under UV light, ultrasound and combination of UV and ultrasound irradiation. The results revealed that the sample with Fe_3O_4 : ZrO_2 molar ratio of 0.5 : 1 showed the best catalytic performance under UV, ultrasound and UV + ultrasound irradiation. The degradation of methylene blue follows the order: sonophotocatalytic > sonocatalytic > photocatalytic. In addition, the effect of various scavengers has also been studied. Furthermore, all prepared samples could be used as a convenient recyclable catalyst.

Photo-, Sono-, and Photosonocatalytic Activity of Metal Oxide Nanocomposites TiO_2/CeO_2 for Degradation of Dye

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ABSTRACT

In present study, TiO_2 nanoparticles was modified by the addition of CeO_2 to increase efficiency and improve catalytic activity under visible light, ultrasonic irradiation, and combination of both irradiation. The as-prepared CeO_2 nanoparticles have been incorporated to mixture of TiO_2 with various molar ratio ((x) TiO_2 : (1-x) CeO_2 = 0.25 : 0.75 ; 0.5 : 0.5 and 0.75 : 0.25). Then the pristine TiO_2, CeO_2 and TiO_2/CeO_2 nanocomposites were identified by X-ray Diffraction (XRD) and the surface area was measured using BET measurement. The XRD results indicated that the CeO_2 was a face centered cubic structure and the TiO_2 was anatas structures. The as-prepared samples exhibit a good catalytic for the decolorization of methylene blue (MB) under visible light, ultrasonic irradiation, and combination of visible light and ultrasonic irradiation. The enhanced performance might be due to the lower recombination of charge carriers and surface properties of TiO_2/CeO_2. To further studies the catalytic mechanism the scavenger and initial solution experiment were also tested. Moreover, TiO_2/CeO_2 nanocomposites shows good cycle stability toward continuous four cycles runs of catalytic experiment for the degradation of MB.

Degradation of Methylene Blue (MB) Using ZnO/CeO2/Nanographene Platelets (NGP) Photocatalyst: Effect of Various Concentration of NGP

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ABSTRACT

ZnO/CeO_2 photocatalysts were loaded on to nanographene platelets (NGP) layer sheets to form ZnO/CeO_2/NGP composites. The synthesized process was achieved by using two step methods: Sol-gel followed by the hydrothermal method, the concentration of NGP was varied by 5 wt%, 10 wt%, and 15 wt%. The as-prepared ZnO/CeO_2/NGP samples were characterized by X-ray diffraction (XRD) and Brunner Emett-Teller (BET). The XRD spectra of all samples exhibit a good agreement with hexagonal wurtzite ZnO and face centered cubic phase of CeO_2, additionally a new peak could be indexed for graphitic like structures from NGP. The BET result shows that the incorporation of NGP could enhance the specific surface area of ZnO/CeO_2 nanocomposites. Furthermore, it is found that addition of NGP in ZnO/CeO_2 nanocomposites could enhance photocatalytic activities in MB dye degradation compared to ZnO/CeO_2 nanocomposites. Our results show that addition of 10wt% NGP to ZnO/CeO_2 nanocomposites exhibits the highest photocatalytic activity. The enhancement of photocatalytic activities can be ascribed to the function of NGP as trap state for electron. The scavenger tests results indicated that the photo-generated hole would play an important role in the degradation of MB.

Sonocatalytic and Photosonocatalytic Activity of Ternary $Fe_3O_4/CeO_2/ZnO$ for Waste Water Removal

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ABSTRACT

In this study, CeO_2 nanoparticles were modified by Fe_3O_4 and ZnO to enhance their sono- and photosonocatalytic activity for degrading Methylene Blue dye pollutant. The molar ratio between Fe_3O_4, CeO_2, and ZnO was 0.05:1:1, 0.1:1:1, 0.3:1:1, 0.5:1:1. The ternary $Fe_3O_4/CeO_2/ZnO$ nanocomposites with various molar ratios were fabricated by the sol-gel method. The structure of ternary $Fe_3O_4/CeO_2/ZnO$ nanocomposites was investigated by XRD Diffraction, while the surface area was investigated by Brunauer-Emmett-Teller (BET). The conditions such as the molar ratio, catalyst dosage and scavengers were investigated to see the degradation of Methylene Blue under ultrasonic and combination of ultrasonic and ultraviolet irradiations, simultaneously.

Design of Human Controlled 1 DOF Right Hand Exoskeleton Using Electromyography Signal

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ABSTRACT

Exoskeleton in general is a structure that is anatomically designed to be able to accommodate the physical movement of its user and provide additional strength. One of the biggest challenge in designing an exoskeleton is to determine the method of control that will be implemented. There are various control methods that can be used and the use of EMG signal to control a 1 DOF right arm exoskeleton is evaluated in this research. This research aims to achieve optimum control using EMG signal. EMG signal is a variation of voltage that occurs when a muscle contracts hence its strong correlation with the user's intention of movement. The RMS values of each EMG signal that originates from bicep and tricep muscle are calculated and processed to determine the direction and speed of rotation of a DC motor that actuates the exoskeleton. The RMS calculation is conducted at various array length that will theoretically affect its accuracy. The difference between those two RMS values is then calculated and interpreted as the intention of flexion or extension movement that will control the DC motor rotation direction. The absolute value of the RMS difference multiplied with a gain factor is used to regulate the duty cycle of a PWM signal that is used to control the rotational speed of the DC motor. A good system control is characterized by its settling time, the smaller the better. To achieve the smallest settling time, array length and gain factor is varied. The test was conducted in two stages, static and dynamic test. The test result shows a trend where the settling time decreases when array length is shortened and gain is increased. It shows that optimum control can be achieved by selecting the right array length and gain.

Keywords: exoskeleton, EMG signal, settling time, DOF, RMS

Credit Rating Calculation of Micro, Small, and Medium Enterprises (MSMEs) using Fuzzy Logic System

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ABSTRACT

Micro, Small, and Medium Enterprises (MSMEs) play an important role in national economic growth. MSMEs can maintain the pace of the economy when the financial crisis occurred. However there are still some obstacles in the financing of MSMEs especially by banks. The existence of asymmetric information or the information gap between the debtor and the bank caused the number of loan applications were denied. Therefore it is important to have an external assessment to tackle these problems as an external support, one of which is through a credit rating. Credit rating will provide information as to the credibility of an enterprise. In this case the fuzzy logic system (FLS) can be applied in the calculation of credit rating to provide information about the credibility of MSMEs. FLS using assessment indicators of MSMEs as an input that is transformed into a membership function (trapezoidal and triangular). Based on the simulation, using a different membership function either trapezoidal or triangular do not give a great influence on the results given by FLS.

Identification of Maturase K (*mat*K) Gene In Trinitario Cocoa Plant (*Theobroma cocoa* L.) From Lampung And Central Java

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ABSTRACT

The research was conducted to know the genetic variation in the Trinitario cocoa plant (*Theobroma cocoa* L.) obtained from exploration and selection in Lampung Province, named HJ1, HJ2, HJ3 and HJ4 and the elder Trinitario cocoa crop, named DR2. The identification was performed by comparing the DNA sequence of the *mat*K region in chloroplasts DNA genome. Genomic isolation was carried out on samples of an old and fresh cocoa leaf. Furthermore, the amplification was conducted using two different primers, named Mac 02 (872 bp) and Mac 09 (1.153 bp). The sequencing results obtained indicate genetic variations in samples that amplified using Mac 09 primer. Dendrogram that was constructed using UPGMA method showed that the cocoa plant from the exploration and selection (HJ1, HJ2, HJ3 and HJ4) are grouped into one cluster, and the DR2 plant are the elder of that four cocoa plant.

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