10th International Conference on Clustering Aspects of Nuclear Structure and Dynamics (CLUSTER'12)

Debrecen, Hungary
24-28 September 2012

Volume 436   2013

jpcs.iop.org

Digital Repository Universitas Jember

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy.   ✖

Table of contents

Volume 983

2018

‹ Previous issue   Next issue ›

International Conference on Mathematics, Science and Education 2017 (ICMSE2017)
18–19 September 2017, Semarang, Indonesia

View all abstracts

Accepted papers received: 23 February 2018
Published online: 6 April 2018

Preface

Papers

PAPER • OPEN ACCESS

International Conference on Mathematics, Science and Education 2017 (ICMSE2017)

To cite this article: 2018 *J. Phys.: Conf. Ser.* **983** 011001

View the article online for updates and enhancements.

Preface

It is a very great privilege for Faculty of Mathematics and Natural Science (FMIPA) Universitas Negeri Semarang to host the 4th International Conference on Mathematics, Science, and Education (ICMSE 2017) in Semarang, Central Java, Indonesia on 18-19 September 2017. We are honored to have the opportunity to work with Indonesian Chemical Society, Indonesian Physical Society, Indonesian Biology Society, Association of Computer Science Higher Education, Indonesian Mathematical Society, and Indonesian Educator Science in this forum. In 2017, our theme of "Roles of Mathematics and Science Research in Supporting Growth of Sustainable Natural Resources-based Industries" celebrates the annual conference to provide a platform to the researchers, experts and practitioners from academia, governments, NGOs, research institutes, and industries to meet and share cutting-edge progress in the field of mathematics, natural science, and science education. Also, this event provides an opportunity to enhance understanding of relationships between knowledge and research in the scope of Mathematics, Biology, Chemistry, Physics, and Science Education.

The committee of ICMSE 2017 would like to express the sincere gratitude to the keynote speakers and all authors of the contributed papers in the conference proceedings. Moreover, would like to thank the expert reviewers for reviewing the manuscripts. We also highly appreciate the assistance offered by many volunteers in the preparation of the conference and the proceedings, and of course, to the sponsors assisting in funding this conference.

The committee selected 205 papers from 253 papers and reports findings presented in this forum to be published in **Journal of Physics: Conference Series (Institute of Physics Publisher)** indexed in some databases, including the Conference citation index, Scopus, Inspec, Chemical Abstracts Service, and Astrophysics Data System. We hope that this program will expand the mutual understanding and respect in stimulating research in Mathematics, Science, and Education; share research interest and information, and create a form of collaboration and build a trust relationship. We are delighted to be able to show the world what recent developments in the field of Mathematics, Natural Science, and Science Education through this fruitful program.

Chairperson,

Prof. Dr. Sutikno, S.T., M.T.

COMMITTEE

International Scientific Advisory Board

Prof. Dr. Edy Cahyono, M.Si.	(*Chemistry Department, Universitas Negeri Semarang, Indonesia*)
Dr. Masturi, S.Pd., M.Si.	(*Physics Department, Universitas Negeri Semarang, Indonesia*)
Dr. Putut Marwoto M.S	(*Physics Department, Universitas Negeri Semarang, Indonesia*)
Prof. Dr. Ani Rusilowati, M.Pd.	(*Physics Department, Universitas Negeri Semarang, Indonesia*)
Dr. Mahardika Prasetya Aji M.Si.	(*Physics Department, Universitas Negeri Semarang, Indonesia*)
Prof. Dr. Supriyadi M.Si.	(*Physics Department, Universitas Negeri Semarang, Indonesia*)
Dr. Ir. Paristiyanti Nurwardani, M.P.	(*Director of Learning and Student Affairs; Ministry of Research, Technology and Higher Education, Indonesia*)
Prof. Dr. Young Jun CHANG	(*University of Seoul, South Korea*)
Prof. Dr. Francis Q. Brearley	(*Manchester Metropolitan University, United Kingdom*)
Prof. Dr. Uda Hashim	(*Universiti Malaysia Perlis, Malaysia*)
Prof. Dr. Ngurah Dewa Suprapta	(*Researcher & Enterpreneur, Udayana University, Indonesia*)
Prof. Dr. Duraisamy Sambasivam Sankar	(*Universiti Teknologi Brunei, Brunei Darussalam*)
Prof. Takeshi Sakurai	(*Kanazawa University, Japan*)
Dr. Arramel	(*National University of Singapore, Singapore*)
Prof. Dr. Yu-Cheng Hsu	(*National Dong Hwa University, Taiwan*)
Dr. Margareta Rahayuningsih S.Si, M.Si	(*Biology Department, Universitas Negeri Semarang, Indonesia*)
Prof. Dr. Ir. Amin Retnoningsih MSi.	(*Biology Department, Universitas Negeri Semarang, Indonesia*)
Prof. Dr. Enni Suwarsi Rahayu M.Si.	(*Biology Department, Universitas Negeri Semarang, Indonesia*)
Dr. Anuradha Mathrani	(*Massey University, New Zealand*)
Prof. Roberta Hunter	(*Massey University, New Zealand*)
Prof. Dr. Hans-Dieter Barke	(*Westfälische Wilhelms -Universität Münster, Institut für Didaktik der Chemie, Germany*)
Prof. Dr. Ibnu Maryanto	(*Zoology Division Research Centre for Biology, Indonesian Institute of Sciences*)
Prof. Md. Rahim Sahar	(*Department of Physics, Universiti Teknologi Malaysia, Malaysia*)
Dr. Uda Hashim	(*Universiti Malaysia Perlis, Malaysia*)
Prof. Dr. Zaenuri S.E, M.Si,Akt	(*Mathematics Department, Universitas Negeri Semarang, Indonesia*)
Prof. Dr. St. Budi Waluya M.Si	(*Mathematics Department, Universitas Negeri Semarang, Indonesia*)
Dr. Isnaini Rosyida S.Si, M.Si	(*Mathematics Department, Universitas Negeri Semarang, Indonesia*)
Dr. rer.nat. Adi Nur Cahyono S.Pd., M.Pd.	(*Mathematics Department, Universitas Negeri Semarang, Indonesia*)

Organizing Committee

Chairperson:
Prof. Dr. Sutikno, S.T., M.T.

Members:
Dr. Isti Hidayah M.Pd
Cepi Kurniawan, S.Si., M.Si., Ph.D.
Aji Purwinarko, S.Si., M.Cs.
Dante Alighiri S.Si., M.Sc.
Stephani Diah Pamelasari, S.S., M.Hum.
Nila Prasetya Aryani, S.Si.,M.Si.
Fidia Fibriana, S.Si., M.Sc.
Willy Tirza Eden, S.Farm., M.Sc.
Muhammad Zuhair Zahid, S.Pd.Si., M.Pd.
Muhammad Abdullah, S.Si., M.Sc.

Optimization of C4.5 algorithm-based particle swarm optimization for breast cancer diagnosis

M A Muslim, S H Rukmana, E Sugiharti, B Prasetiyo and S Alimah

+ View abstract 📄 View article 📄 PDF

OPEN ACCESS 012064

Lamp control using the principles of mathematical logic

E Yudianto, F F Firmansyah, P S B S Akbar, R Nisyak, F A Maudi and A N Saputri

+ View abstract 📄 View article 📄 PDF

OPEN ACCESS 012065

Economic order quantity (EOQ) by game theory approach in probabilistic supply chain system under service level constraint for items with imperfect quality

R Setiawan

+ View abstract 📄 View article 📄 PDF

OPEN ACCESS 012066

Measuring economic value for tourism destination using contingent valuation method: The Sangiran Sites, Central Java Province, Indonesia

S Subanti, E Zukhronah, S S Handajani, BRM B Irawan and A R Hakim

+ View abstract 📄 View article 📄 PDF

OPEN ACCESS 012067

Critical thinking analysis based on Facione (2015) – Angelo (1995) logical mathematics material of vocational high school (VHS)

S Y Seventika, Y L Sukestiyarno and Scolastika Mariani

+ View abstract 📄 View article 📄 PDF

OPEN ACCESS 012068

On computing: the inverse of centrosymmetric matrix

N Khasanah, Farikhin and B Surarso

+ View abstract 📄 View article 📄 PDF

OPEN ACCESS 012069

Existence and characterization of optimal control in mathematics model of diabetics population

A H Permatasari, R H Tjahjana and T Udjiani

+ View abstract 📄 View article 📄 PDF

OPEN ACCESS 012070

Communication and transportation as quality of life determinants based on cities in Central Java Province and Special Region of Yogyakarta

S Subanti, Hartatik, A R Hakim, A Daerobi and R R Setiawan

+ View abstract 📄 View article 📄 PDF

PAPER • OPEN ACCESS

Lamp control using the principles of mathematical logic

View the article online for updates and enhancements.

Lamp control using the principles of mathematical logic

E Yudianto[1,*], F F Firmansyah[1], P S B S Akbar[2], R Nisyak[1], F A Maudi`[1] and A N Saputri[1]

[1] Department of Mathematics Education, University of Jember, Indonesia
[2] Department Electrical Engineering, University of Jember, Indonesia

[*]Corresponding author: erfanyudi@unej.ac.id

Abstract Along with the rapid development of technology, there are so many innovations on tools that can facilitate human's work, one of which is a remote lamp controller. This light controller can provide convenience and comfort for people in turning on or off lights, especially they are traveling. The way remote light controller is used applies the principle of mathematical logic, particularly biimplication. The principle of mathematical logic (biimplication) on this light controller is applied to GSM module (gprs) and SMS.

1. Introduction

In daily life we are often unaware that Mathematics are not only applied at schools. Almost all societies apply Mathematics, such as the application of the mathematical logic used in controlling electrical appliances. The process of controlling information, information systems, information storage, and austerity operates in the symbolic language of mathematical logic [1]. Mathematical logic makes its contributions from other fields such as the introduction of new logic [2–4].

The principle of mathematical logic on the control of electrical appliances (lamps) is an important thing at home. This is because the current human life cannot be separated from a variety of electrical equipments is increasingly sophisticated and automated. Various tools used by human in daily life serve various purposes, such as lighting, kitchen utensils, and the security system automated.

However, there are some problems arising from the use of electrical equipment commonly encountered, one of which is the wastage of electricity when one forgets to turn off electrical equipment at home, leading to the wastage of energy and costs to be incurred [5].

Understanding energy savings as a practical measure is not developed yet in community and is still scarcely disseminating information on energy-saving techniques. The control of an electronic or electrical component (lamp) becomes very important. This requires the awareness of the community to save energy [6].

In addition to the right way to save energy, we make an electrical controller (lamp) using the priciple of mathematical logic, which can facilitate the community in use. The problem of logic in electrical control (lamp) is applied in the circuit, which is in Global System for Mobile Communication (GSM) and HP (mobile phone) using SMS facility, also on motion sensor (PIR), camera and alarm, using AC voltage facility.

2. Methods

SMS (Short Message Service) is a facility owned by GSM network that allows subscribers to send and receive short messages of 160 characters. SMS is handled by the network through a service center that serves to store and forward messages from the sender to the recipient. The SMS format used by the MS (mobile station) manufacturer is the Protocol Description Unit (PDU). The PDU format changes the

septet of ASCII code (7 bits) into a PDU byte (8 bits) byte when transmitted, and it will be converted back into ASCII code upon received SMS [5,7].

Lamp is a tool that provides lighting, both inside the house and outside [8,9]. Lights have different shapes and functions, by type and place. Especially for home lighting, lamps are needed and adapted to the layout.

Logic comes from the Greek word "logos" which means word, speech, or reason. Logic is a method or technique created to examine the accuracy of reasoning and examine the principles of logical reasoning and reasoning valid conclusions. Mathematical logic is a branch of Mathematics that is a combination of the science of logic and the science of Mathematics.

3. Result and Discussion

Mathematical logic is a translation of symbolic logic on what can be interpreted as a way of thinking or mathematical thinking. Mathematical logic provides a foundation on how to draw conclusions. The thing gained by studying mathematical logic is the ability to take and determined which conclusions are right or wrong. The science of mathematical logic includes statements, negations, disjunctions, conjunctions, implications, biographies, tautologies, contradictions, two equivalent statements, office sentences, and conclusions [4,10].

The statement in mathematical logic is a sentence in which there are values that can be declared 'true' or 'false'. The conclusion of a mathematical logic sentence cannot have both (false and true). A sentence can't be declared as a statement if we can't determine whether the sentence is true or false and relative. In Mathematical logic, there are several statements, one of which is biimplication. In biimplication, the statement will be considered true when both of them have equally true or false values. Addition statement will be considered wrong. The biography is indicated by the meaning $"p\cdots$ if and only if $q\cdots"$ or can be written with $"p \leftrightarrow q"$ [9].

Mathematical logic can be applied in the science of programming. Logic is the mathematical foundation of a software, which is used to formalize the semantics of programming languages and program specifications, and to test the accuracy of a program [11,12]. This shows how important mathematical logic is in the field of computer science [2,6,13,14]. Logic used as a basis in learning programming languages, data structures, artificial intelligence, database, computational theory, software engineering, expert systems, neural networks, techniques / digital systems, and others that use logic intensively.

A digital system can be modeled into a logical sequence. This logic circuit has one or more input and output. The logic sequence represents the logic function of the system. The function of logic can be expressed mathematically in the form of logic equations, concerned with what shows the input-external relationship of the system. The logic sequence is composed of logical statements that are interconnected. Each logic circuit is represented by a symbol that represents the output function of the input of a system. In application of the distance lamp controller, the principle of mathematical logic biimplication is operative [15,16].

The biimplication is a combination of two statements with the conditional form (cause-effect) [17]. The cause and effect are interchangeable, which we call biimplication. The statements of cause result in a statement of effect and vice versa, denoted by $"\leftrightarrow"$. The bias of the statement and written $"p \leftrightarrow q"$ is read "if and only if" and is often also read "equivalent" where it is necessary and sufficient (Table 1).

Table 1. Value of Biimplication Truth

p	q	$p \leftrightarrow q$
B	B	B
B	S	S
S	B	S
S	S	B

The application of mathematical logic (biimplication) on light controller applies to camera with alarm and handphone with GSM module [18,19] (Table 2). When we send SMS "lamp on", then the light is on. When we send SMS "lamp off", then the light is off. So we do not need to control the light switches manually, but we can control the switch from a distance (Figure 1).
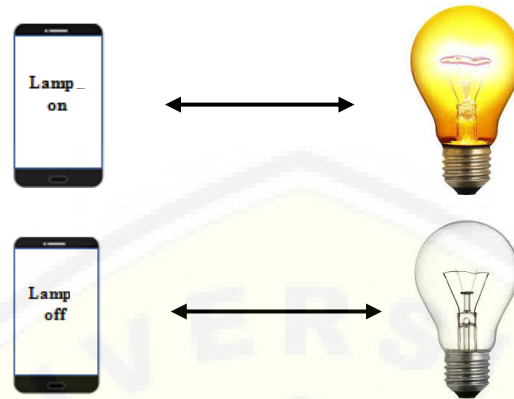

Figure. 1 Work system biimplication model

Table 2. The value of truth biimplication SMS with GSM module

SMS	System	Conclusion
on	on	B
off	on	S
on	off	S
off	off	B

4. Conclusion

The principle of mathematical logic (biimplication) is modified in the control of electrical appliances (lamps). The principle of mathematical logic (biimplication) on light controller on GSM module (gprs) with SMS. This is important for energy management in a place, for example at home. The control of these lights is important in the present, where society needs high efficiency.

The controller of this lamp when look at from the table value of abduction SMS with GSM module (needs revising), get a conclusion "B-S-S-B" in accordance with the conclusion in the biimplication table. This has concluded this light controller applies the principle of mathematical logic (biimplication).

References

[1]   Pryadko I and Ishkov A 2016 The problem of using logic in structural mechanics and electrical engineering as viewed by the Russian researcher boris biryukov *Procedia Eng.* **165** 1162
[2]   Blass A 2016 Symbioses between mathematical logic and computer science *Ann. Pure Appl. Log.* **167** 868
[3]   Kovalev A A, Dumer I and Pryadko L P 2011 Design of additive quantum codes via the code-word-stabilized framework *Phys. Rev. A - At. Mol. Opt. Phys.* **84**
[4]   Chu-Carroll M C 2013 *Good Math*
[5]   Sharma H K, Tomar R and Patni J C 2015 HRJ-encryption: An ASCII code based encryption algorithm and its implementation *2015 International Conference on Computing for Sustainable Global Development, INDIACom 2015*
[6]   Baez J and Stay M 2011 Physics, topology, logic and computation: A Rosetta Stone *Lect. Notes Phys.* **813** 95
[7]   O'Neill B 2013 Mirror, Mirror on the Screen, What Does All this ASCII Mean?: A Pilot Study of Spontaneous Facial Mirroring of Emotions *Arbutus Rev.* **4** 19

[8]   van Casteren D H J, Hendrix M A M and Duarte J L 2007 Controlled HID lamp-ballast interaction for low-frequency square-wave drivers *IEEE Trans. Power Electron.* **22** 780

[9]   Laksono P W, Jauhari W A, Iftadi I, Christina Ayu K, Ibnu Pandu B P, Jamaluddin A, Saputro D E and Haijunowibowo D 2016 A system based on fuzzy logic approach to control humidity and temperature in fungus cultivation *Proc. - Jt. Int. Conf. Electr. Veh. Technol. Ind. Mech. Electr. Chem. Eng. ICEVT 2015 IMECE 2015* 344

[10]   Gabbay D M and Guenthner F 2014 *Handbook of philosophical logic* vol 17

[11]   Connectives L and Constraints I P 2009 *Logic and Integer Programming* vol 130

[12]   Lindström S and Segerberg K 2007 *Handbook of Modal Logic* vol 3

[13]   Williams H P 2013 *Model building in mathematical programming*

[14]   Harper R 2010 *Practical foundations for programming languages* vol 9781107029

[15]   Berry D M 2013 The essential similarity and differences between mathematical modeling and programming *Sci. Comput. Program.* **78** 1208

[16]   Chhun L, Maussion P and Zissis G 2010 HPS lamp control with adjacent frequency signal injection for acoustic resonance avoidance *IECON Proceedings (Industrial Electronics Conference)* p 2571

[17]   Harel D, Marron A and Weiss G 2012 Behavioral programming *Commun. ACM* **55** 90

[18]   Hassan A M A 2015 Enhancement of a GSM based control system *Int. J. Appl. Eng. Res.* **10** 21991

[19]   Zhang Q, Wang B and Yin A 2010 Design and Implementation of Temperature Monitoring System Based on GSM Short Message Service *ASIA-PACIFIC YOUTH CONFERENCE ON COMMUNICATION TECHNOLOGY 2010 (APYCCT 2010)* p 625