

**SOUTH EAST ASIAN MATHEMATICAL SOCIETY**

## **SEAMS SCHOOL PROPOSAL**

### **Algebras and their applications (Quantum physics, Cryptography and Statistics)**

Malaysia  
Nov 2-10, 2015

**Organized by**

Institute for Mathematical Research (INSPEM), Universiti Putra Malaysia

**2014**

## SEAMS SCHOOL PROPOSAL

1. The proposed title, place and dates of the SEAMS School

Title of the SEAMS School	: <b>Algebras and their applications (Quantum Physics, Cryptography and Statistics)</b>
Place	: Institute for Mathematical Research, Universiti Putra Malaysia, 43400, INSPEM, UPM, Serdang, Selangor D.E., Malaysia
Dates	: Nov 2-10, 2015

2. Organizers (write the names, place of work, and email address, if you have more than two then add the necessary lines)

1. Name	: Prof. Dato' Dr. Hj Kamel Ariffin Mohd Atan
Institution	: Director, Institute for Mathematical Research, Universiti Putra Malaysia
Email and Phone	: <a href="mailto:kamel@upm.edu.my">kamel@upm.edu.my</a> and +603 8946 6872
2. Name	: Prof. Dr. Isamiddin S.Rakhimov
Institution	: Department of Mathematics, Faculty of Science , Universiti Putra Malaysia, and Laboratory of Cryptography, Analysis and Structure, Institute for Mathematical Research, Universiti Putra Malaysia.
Email and Phone	: <a href="mailto:rakhimov@upm.edu.my">rakhimov@upm.edu.my</a> and +603 8946 6831
3. Name	: Associate Professor Dr. Hishamuddin Zainuddin
Institution	: Deputy Director, Institute for Mathematical Research, Universiti Putra Malaysia
Email and Phone	: <a href="mailto:hishamuddin@upm.edu.my">hishamuddin@upm.edu.my</a> and +603 8946 6873
4. Name	: Associate Professor Dr. Mohd Rushdan Mohd Said
Institution	: Laboratory of Cryptography, Analysis and Structure, Institute for Mathematical Research, Universiti Putra Malaysia
Email and Phone	: <a href="mailto:mrushdan@upm.edu.my">mrushdan@upm.edu.my</a> and +603 8946 6841
5. Name	: Associate Professor Dr. Mahendran A/L Shitan
Institution	: Laboratory of Computational Statistics and Operations Research, Institute for Mathematical Research, Universiti Putra Malaysia
Email and Phone	: <a href="mailto:mahen@upm.edu.my">mahen@upm.edu.my</a> and +603 8946 6876

3. Short Description of the Scientific Content (max 100 words)

**SEAMS Pre-School Programme (3 days)**

Prior to the main SEAMS School Programme, a 3-Day Pre-School Workshop will be held for the students to equip them with sufficient essential knowledge, so as to enable them to follow the contents of the Main Programme. The topics for discussion in the Pre-School Workshop are as follows:

1. Commutative Algebras (review)
2. Algebraic Geometry (review)
3. Lie algebras (review)

**Main Programme (7 days)**

- **Quantum Physics**  
Recent advances in quantum information has begun to explore deeper into the structure of complex projective space as space of quantum states. Among the tools employed are algebraic varieties, symplectic quotients and projective ring geometries.
- **Elliptic curve cryptography**  
Elliptical curve cryptography (ECC) is a public key encryption technique based on elliptic curve theory that can be used to create faster, smaller, and more efficient cryptographic keys.
- **Algebraic Statistics**  
Algebraic statistics advocates the use of algebraic geometry, commutative algebra, and geometric combinatorics as tools for making statistical inferences. The starting point for this connection is the observation that most statistical models for discrete random variables are, in fact, algebraic varieties.

4. The speakers of the school (names, address, emails)

1. Prof. Dr. M. Planat (CNRS, France) (Quantum Physics)  
michel.planat@femto-st.fr
2. Prof. Dr. S. Galbraith (University of Auckland, New Zealand)(Cryptography)  
s.galbraith@math.auckland.ac.nz.
3. Prof. Dr. Ezra Miller (Duke University, NC, USA)(Algebraic Statistics)

ezra@math.duke.edu

4. Ass. Prof. Dr.H. Zainuddin (Universiti Putra Malaysia)(Quantum Physics)  
hisham@upm.edu.my
5. Ass. Prof. Dr. Hailiza Kamarul Haili (Universiti Sains Malaysia, Malaysia)  
(Cryptography) hailiza@cs.usm.my
6. Prof. Dr. Isamiddin S.Rakhimov (Universiti Putra Malaysia)(Algebraic  
Statistics) rakhimov@upm.edu.my

5. Describe in a few lines the local institution related to this school, including the main academic program and its strength. Give also the Internet site of the local institutions.

1. **Universiti Putra Malaysia (UPM):** The university has a research institute (Institute for Mathematical Research) carrying out research problems related to the proposed SEAMS school. The institute has Master and PhD programs. There are two professors, six associate professors, more than twenty five researchers, graduated and post graduate students interested in participation in the proposed area of research discussions (Algebra, Cryptography, Quantum Physics, Algebraic Statistics). Website:  
<http://www.inspem.upm.edu.my/?LANG=en&uri=/>
2. **International Islamic University Malaysia:** The university has three different departments that have conducted research on various aspects algebraic structures and operator techniques namely Department of Computer & Theoretical Sciences in Kulliyah of Science, Department of Physics in Centre of Foundation Studies and Department of Science in Engineering in Kulliyah of Science. These departments have offered their M.Sc. and Ph.D. in respective fields. The relevant websites are  
<http://www.iium.edu.my/science/departments/about-cts>  
<http://www.iium.edu.my/cfs/departments/department-sciences-programmes-dosp/department-physics>  
<http://www.iium.edu.my/engineering/departments/department-science-engineering>
3. **University Science Malaysia:**  
The University offers MSc and PhD programs in Mathematics/Cryptography under the School of Mathematical Sciences and School of Computer Sciences. Several researchers under these two schools work in the area of cryptography with their MSc and PhD students.  
<http://www.usm.my>  
<http://math.usm.my>  
<http://www.cs.usm.my>

6. Provide information about the expected participants. The number and the distribution of expected participants.

It is expected the participation of 10 post graduate students from Indonesia, Thailand, Philippines and 30 Malaysians. Approximately, 50% of the participants are expected to

be females.

7. Describe the objectives and the program of the proposed school, including the courses, speakers, abstracts (8 lines each) and tentative schedules for each course.

**Objectives:**

**1. Applications of algebras in Quantum Physics and Quantum Information Theory.**

**Abstract:** In quantum mechanics and particularly quantum information theory, multi-particle quantum states can be constructed by using tensor products of complex Hilbert spaces. Quantum correlations and quantum contextuality have been extensively used in the development of quantum protocols for various purposes, such as quantum cryptography, super-dense coding, quantum teleportation etc. There exist two local operations that can be applied to a multi-partite state, namely the unitary and the invertible operations (matrices). The latter is known as the group of locally invertible matrices under which the quantum entanglement does not increase and is an algebraic group whose action on the space of quantum states is an algebraic action. Various tools from algebraic geometry and projective spaces relevant to quantum entanglement and quantum contextuality will be covered in this SEAMS school.

**2. Elliptic Curve cryptography, recent results and perspectives.**

**Abstract:** Introductory topics on elliptic curves and cryptographic applications will be covered, with an emphasis on providing a strong background in Elliptic Curve Cryptography. Participant will be introduced to elliptic and hyperelliptic curves and details efficient arithmetic in their ideal class group. Background in finite fields and elliptic curves implementation are helpful but not necessary. The various methods of the main operation, which is scalar multiplication, will be discussed. Pairings in ECC are important research area and their implementation in cryptographic protocols will be presented.

**3. Algebraic approaches to Statistical Problems.**

**Abstract:** This section of the proposed SEAMS 2015 is devoted to introduction to algebraic statistics, emphasizing both the interesting algebraic questions that arise and the statistical consequences of the algebraic analysis. Possible topics for discussions in this section are as follows:

1. Statistical models as algebraic varieties;
2. Log-linear models, toric varieties, and Markov bases;
3. The use of some computer systems for computations with toric ideals.

**Tentative Schedule of talks**

DAY 1	1. 09:00 – 10:00 Algebras in Quantum Physics (an over sea speaker)
	2. 10:10 – 11:10 Algebras in Quantum Physics (an over sea speaker)
	3. 11:30 – 12:30 Discussion Session: Lie algebras in Quantum Physics (a local speaker)
	4. 14:30 – 15:30 A Review on Elliptic Curves (a local speaker)
	5. 15:40 – 16:40 A Review on Elliptic Curves (a local speaker)
DAY 2	1. 09:00 – 10:00 EC Cryptography (an over sea speaker)
	2. 10:10 – 11:10 EC Cryptography (an over sea speaker)
	3. 11:30 – 12:30 Discussion Session: How to choose an Elliptic Curve in Cryptography

	4. 14:30 – 15:30 Introduction to Commutative algebras and Algebraic Geometry (a local speaker)
	5. 15:40 – 16:40 Introduction to Commutative algebras and Algebraic Geometry (a local speaker) (a local speaker)
DAY 3	1. 09:00 – 10:00 Algebraic Statistics (an over sea speaker)
	2. 10:10 – 11-10 Algebraic Statistics (an over sea speaker)
	3. 11:30 – 12:30 EC Cryptography (a local speaker)
	4. 14:30 – 15:30 Group Action and its applications (a local speaker)
	5. 15:40 – 16:40 Quantum Physics (a local speaker)
DAY 4	1. 09:00 – 10:00 Algebras in Quantum Physics (an over sea speaker)
	2. 10:10 – 11-10 Algebras in Quantum Physics (an over sea speaker)
	3. 11:30 – 12:30 Discussion Session: Group Actions in Quantum Physics (a local speaker)
	4. 14:30 – 15:30 EC Cryptography (a local speaker)
	5. 15:40 – 16:40 EC Cryptography (a local speaker)
DAY 5	1. 09:00 – 10:00 Cryptography (an over sea speaker)
	2. 10:10 – 11-10 Cryptography (an over sea speaker)
	3. 11:30 – 12:30 Quantum Physics (a local speaker)
	4. 14:30 – 15:30 Algebraic Statistics (an over sea speaker)
	5. 15:40 – 16:40 EC Cryptography (a local speaker)
DAY 6	1. 09:00 – 10:00 Algebras in Quantum Physics (an over sea speaker)
	2. 10:10 – 11-10 Quantum Physics (a local speaker)
	3. 11:30 – 12:30 Algebraic Statistics (an over sea speaker)
	4. 14:30 – 15:30 Discussion Session: Action of Symmetric group in Algebraic Statistics (a local speaker)
	5. 15:40 – 16:40 EC Cryptography (a local speaker)
DAY 7	1. 09:00 – 10:00 EC Cryptography (an over sea speaker)
	2. 10:10 – 11-10 Algebraic Statistics (an over sea speaker)
	3. 11:30 – 12:30 Discussion Session: Perspectives of Applications of Algebras in QPh (an over sea speaker)
	4. 14:30 – 15:30 Discussion Session: Perspectives of Applications of Algebras in Cryptography (an over sea speaker)
	5. 15:40 – 16:40 Discussion Session: Perspectives of Applications of Algebras in Statistics (an over sea speaker)
DAY 8	<h1>Tour</h1>

8. Provide information about provisional budget and the expected funding.

<b>1. <u>Return Air Fare</u></b>	
- Speakers (€1700/speaker x 3 speakers)	= €5,100
- Oversea students (€120per student x 10 students)	= €1,200
<b>2. <u>Accommodation</u></b>	
- Speakers (€80/day per speaker x 9 days x 3 speakers)	= €2,160
- Oversea students (€20/ day per student x 11 days x 10 students)	= €2,200
<b>3. <u>Food ( Lunch + 2 tea breaks per day)</u></b>	
- Speakers (€10/day per speaker x 8 days x 3 speakers)	= € 240
- Students (overseas and local) (€10/ day per student x 10 days x 40 students)	= €4,000
<b>4. <u>Local travelling expenses Speakers and Students</u></b>	= € 300
<b>5. <u>One day social visit (includes transport and light snacks)</u></b>	= € 100
<b>6. <u>Supplies and Printings (programme, lecture notes and kits)</u></b>	= € 250
<b>7. <u>Secretariat and local committee expenses</u></b>	= € 250
	<b>TOTAL: € 15,800</b>

<b><u>EXPECTED SPONSORS</u></b>	
SEAMS(CIMPA):	€ 5,000.00
INSPEM:	€ 10,800.00
<b>TOTAL:</b>	<b>€ 15,800.00</b>

9. Provide CVs for the organizers.

# CURRICULUM VITAE



## A. BUTIR-BUTIR PERIBADI *(Personal Details)*

Nama Penuh <i>(Full Name)</i>	Hishamuddin Zainuddin		Gelaran <i>(Title)</i> : Dr.
No. MyKad / No. Pasport <i>(Mykad No. / Passport No.)</i> 621222-08-6033	Warganegara <i>(Citizenship)</i> Malaysia	Bangsa <i>(Race)</i> Malay	Jantina <i>(Gender)</i> : Male
Jawatan <i>(Designation)</i>	Associate Professor	Tarikh Lahir <i>(Date of Birth)</i>	22 December 1962

Alamat Semasa <i>(Current Address)</i>	Jabatan/Fakulti <i>(Department/Faculty)</i>	E-mel dan URL <i>(E-mail Address and URL)</i>
1133, Jalan S2 A33, Central Park, Seremban 2 70300 Seremban Negeri Sembilan  Tel: 06-6014609 Faks: 06-6014610	Lab. of Computational Sciences & Mathematical Physics, Institute for Mathematical Research  and  Department of Physics, Faculty of Science, Universiti Putra Malaysia  Tel: 03-8946-6874 Fax: 03-8945-4454	E-mail: hisham@putra.upm.edu.my  <a href="http://www.qfizik.upm.edu.my/info/hisham/default..htm">http://www.qfizik.upm.edu.my/info/hisham/default..htm</a>

## B. KELAYAKAN AKADEMIK *(Academic Qualification)*

Nama Sijil / Kelayakan <i>(Certificate / Qualification obtained)</i>	Nama Sekolah Institusi <i>(Name of School / Institution)</i>	Tahun <i>(Year obtained)</i>	Bidang pengkhususan <i>(Area of Specialization)</i>
B.Sc. (Hons)	University of Adelaide	1984	Mathematical Physics
Part III of Math Tripos	Cambridge University	1986	Theoretical Physics
Ph.D.	University of Durham	1990	Mathematical Physics

## C. KEMAHIRAN BAHASA *(Language Proficiency)*

Bahasa / <i>Language</i>	Lemah <i>Poor (1)</i>	Sederhana <i>Moderate (2)</i>	Baik <i>Good (3)</i>	Amat Baik <i>Very good (4)</i>	Cemerlang <i>Excellent (5)</i>
English					<i>Excellent</i>
Bahasa Melayu					<i>Excellent</i>
Lain-lain <i>(other):</i>					



<b>D. PENGALAMAN SAINTIFIK DAN PENGKHUSUSAN</b> ( <i>Scientific experience and Specialisation</i> )				
<i>Organization</i>	<i>Position</i>	<i>Start Date</i>	<i>End Date</i>	<i>Expertise</i>
Malaysian Institute of Physics	Fellow	1994	-	Theoretical Physics
Malaysian Society for Solid State Science & Technology	Life Member	1993	-	Theoretical Physics
Malaysian Mathematical Sciences Society	Life Member	2008	-	Mathematical Physics

<b>E. PEKERJAAN</b> ( <i>Employment</i> )				
<i>Majikan / Employer</i>	<i>Jawatan / Designation</i>	<i>Jabatan / Department</i>	<i>Tarikh lantikan / Start Date</i>	<i>Tarikh tamat / Date Ended</i>
Universiti Putra Malaysia	Lecturer	Physics	1990	2000
Universiti Putra Malaysia	Associate Professor	Physics	2000	-

<b>F. ANUGERAH DAN HADIAH</b> ( <i>Honours and Awards</i> )				
<i>Name of awards</i>	<i>Title</i>	<i>Award Authority</i>	<i>Award Type</i>	<i>Year</i>
<i>Academic Awards</i>	Akademi Sains Malaysia-Royal Society, UK Exchange Programme,	Akademi Sains Malaysia/Royal Society, UK	Exchange Programme Participant	17 March-30 April 2001, Imperial College, London
<i>Non-Academic Awards</i>	Sijil Perkhidmatan Cemerlang	Universiti Putra Malaysia	Excellence in services	Many years
<i>Awards of Merit</i>				

<b>G. SENARAI PENERBITAN</b> (Sila masukan nama pengarang, tajuk, nama jurnal, jilid, muka surat dan tahun diterbitkan) ( <i>List of publications – author (s), title, journal, volume, page and year published</i> )	
<i>Journal (selected with main contribution)</i>	<p>H. Zainuddin, “Group-Theoretic Quantization of a Particle on a Torus in a Constant Magnetic Field”, <i>Phys. Rev.</i> <b>D40</b> (1989) 636-641.</p> <p>H. Zainuddin, “Noether’s Theorem in Nonlinear Sigma Models with a Wess-Zumino Term”, <i>J. Math. Phys.</i> <b>31</b> (1990) 2225-2236.</p> <p>H. Zainuddin, “Contraction of the Canonical Group for a Particle Moving on a Two-Torus in a Constant Magnetic Field”, <i>Bul. S&amp;T Kead. Pepejal Mal.</i> <b>3</b> (1993) 89-93.</p> <p>H. Zainuddin, Z.A. Hassan &amp; Z.A. Talib, “Group-Theoretic Quantization, Topology and Integer Quantum Hall Effect on Two-Torus”, <i>J. Solid State Sci. Technol. Lett.</i> <b>5</b> (1998) 53-60.</p> <p>H. Zainuddin, Z.A. Hassan &amp; Z.A. Talib, “Group-Theoretic</p>

Quantization, Central Extensions & Integer Quantum Hall Effect” in *Frontiers in Quantum Physics*, (eds.) S.C. Lim, R. Abd. Shukor & K.H. Kwek, (Springer-Verlag, 1998) pp 277-284.

Ahmed Bouketir & H. Zainuddin, “Angular Momentum of Electromagnetic Field by Group-Theoretic Quantization of Hall System on a Sphere”, *Solid State Sci. & Technol.* **6** (1998) 74-83.

S.A. Halim, K.P. Lim, M. Hashim, S.P. Chow, H. Zainuddin & E.B. Saion, “Structural & Giant Magnetoresistive Properties in AgNiFe and AgFe Thin Granular Magnetic Films”, *J. Fiz. Mal.* **19** (1998) 93-97.

H. Zainuddin & A. Bouketir, “T(2), Non-Commuting Winding Numbers and Quantization on Triply Punctured Two-Sphere”, *J. Fiz. Mal.* **24** (2003) 101-106.

F.P. Zen, B.E. Gunara, Arianto & H. Zainuddin, “On Orbifold Compactification of N=2 Supergravity in Five Dimensions”, *JHEP* **8** (2005) 018.

K.T. Chan, I.V. Grozescu & H. Zainuddin, “Development of Single Photon Source”, *Solid State Sci. Technol. Lett.* **13** (2006) 174-180.

H. Zainuddin, A. Bouketir, A.A.M. Siddig, F.P. Zen & N.M. Shah, “Group-Theoretic Quantization on Triply-Punctured Two-Sphere”, *J. Fiz. Mal.* **27** (2006) 135-139.

H. Zainuddin, S.P. Toh, N.M. Shah, M. Zainy, Z.A. Zulkarnain, J. Hassan & Z.A. Hassan, “No-Go Theorems and Quantization”, *Fundamental Sci.* **3** (2007) 127-136.

B.A. Tay & H. Zainuddin, “Orbit Classification of Qutrit via the Gram Matrix”, *Chinese Phys. Lett.* **25** (2008) 1923.

Mohammad Reza Soltan Aghaei, Zuriati Ahmad Zukarnain, Ali Mamat & Hishamuddin Zainuddin, “A Hybrid Algorithm For Finding Shortest Path In Network Routing”, *Journal of Theoretical and Applied Information Technology.* **5**(3) (2009) 360-365

Mohammad Reza Soltan Aghaei, Zuriati Ahmad Zukarnain, Ali Mamat & Hishamuddin Zainuddin, “A Hybrid Architecture Approach for Quantum Algorithms”, *Journal of Computer Science* **5**(10) (2009) 725-731.

Nur Hanani Kamarul Aizan, Zuriati Ahmad Zukarnain, & Hishamuddin Zainuddin, “Implementation of BB84 Protocol on UDP 802.11i”, *Journal of Theoretical and Applied Information Technology.* **9**(1) (2009) 77-81.

Toh Sing Poh & Hishamuddin Zainuddin, “Kochen-Specker Theorem

Proof: Conversion of Product Rule to Sum Rule” *Chinese Physics Letters*, **26**(7) (2009) 070305

Abubaker Ahmed Mohamed Siddig & Hishamuddin Zainuddin, “Computation of Maass Cusp Form on Modular Group in Mathematica”, *International Journal of Applied Mathematics*, **54**(2) (2009) 279-295.

Hassan Amirhashchi, Hishamuddin Zainuddin & Hamid Nil Saz Dezfouli, “Geometrical Behaviours of LRS Bianchi Type-I Cosmological Model”, *Electronic Journal of Theoretical Physics*, **6**(22) (2009) 79-84.

Hassan Amirhashchi & Hishamuddin Zainuddin, “Some LRS Bianchi Type-II String-Dust Cosmological Models in General Relativity”, *Electronic Journal of Theoretical Physics*, **7**(23) (2010) 213-220.

Hassan Amirhashchi & Hishamuddin Zainuddin, “Bianchi Type III Massive String Cosmological Models for Stiff and Anti-Stiff Fluid in General Relativity”, *Fizika B*, **19**(2) (2010) 81-90.

N. Malekmohammadi & H. Zainuddin, “The Application of Data Envelopment Analysis and Queuing Models to Large Scale Computer Networks”, *Int. J. Industrial Mathematics* **2** (2010) 1-7.

Hassan Amirhashchi & Hishamuddin Zainuddin, “Magnetized Bianchi Type III Massive String Cosmological Models in General Relativity”, *International Journal of Theoretical Physics* **49** (2010) 2815-2828.

Toh Sing Poh & Hishamuddin Zainuddin, “Kochen-Specker Theorem for Three-Qubit System”, *Physics Letters A* **374** (2010) 4834-4837.

Anirudh Pradhan, Hassan Amirhashchi & Hishamuddin Zainuddin, “Exact Solution of Perfect Fluid Massive String Cosmology in Bianchi Type III Space-Time with Decaying Vacuum Energy Density  $\Lambda$ ”, *Astrophysics and Space Science* **331** (2011) 679-687

Anirudh Pradhan, Hassan Amirhashchi & Hishamuddin Zainuddin, “A New Class of Inhomogeneous Cosmological Models with Electromagnetic Field in Normal Gauge for Lyra Manifold”, *International Journal of Theoretical Physics* **50** (2011) 56-59.

Hassan Amirhashchi, Hishamuddin Zainuddin & Anirudh Pradhan, “Magnetized Bianchi Type III Massive String Universe with Time Decaying Energy Density  $\Lambda$ ”, *International Journal of Theoretical Physics* **50** (2011) 2531-2545.

Hassan Amirhashchi, Anirudh Pradhan & Hishamuddin Zainuddin, “An Interacting and Non-interacting Two-Fluid Dark Energy Models in FRW Universe with Time Dependent Deceleration Parameter”,

*International Journal of Theoretical Physics* **50** (2011) 3529-3543

Abdumalik Rakhimov, Anvarjon Akhmedov & Hishamuddin Zainuddin, "On the Spectral Expansions of Distributions Connected with Schrodinger Operators", *Applied Mathematics Letters* **25** (2012) 921-924

S.P. Toh, Hishamuddin Zainuddin & Kim Eng Foo, "Randomly Generating Four Mixed Bell-Diagonal States with a Concurrence Sum to Unity", *Chinese Physics Letters* **29** (2012) 010305 4pp

Hassan Amirhashchi, Hishamuddin Zainuddin & Anirudh Pradhan, "Bianchi Type-III Cosmological Model With Variable G and  $\Lambda$ -Term in General Relativity", *Romanian Journal of Physics* **57** (2012) 748-760

Saeid Molladavoudi, Hishamuddin Zainuddin & Chan Kar Tim, "Jensen-Shannon Divergence and Non-Linear Quantum Dynamics", *Physics Letters A* **376** (2012) 1955-1961

Lam Shi Xiang, Hishamuddin Zainuddin, Mahendran Shitan & Isthriyaygy Krishnarajah, "Malaysian Stock Correlation Networks: Up and Down Trends Market Behavior", *International Journal of Pure and Applied Mathematics* **78** (2012) 735-750

Anirudh Pradhan, Hassan Amirhashchi & Hishamuddin Zainuddin, "Accelerating Dark Energy Models in Bianchi Type-V Space-Time with Time Dependent Deceleration Parameter", *Electronic Journal of Theoretical Physics* **27** (2012) 159-176

Lam Shi Xiang, Hishamuddin Zainuddin, Mahendran Shitan & Isthriyaygy Krishnarajah, "The Market Effect on Malaysian Stock Correlation Network", *Applied Mathematical Sciences* **6** (2012) 5161-5178

Wong Wen Wei, Hishamuddin Zainuddin & Isamidin Rakhimov, "Linking Base Spaces of Hopf Fibration for Two-Qubit State Space Description", *Advanced Studies in Theoretical Physics* **6** (2012) 1371-1387

Hassan Amirhashchi, Anirudh Pradhan & Hishamuddin Zainuddin, "n Interacting Two-Fluid Viscous Dark Energy Models in Non-Flat Universe", *Research in Astronomy and Astrophysics* **13** (2013) 129-138

Chan Kar Tim, Hishamuddin Zainuddin & Saeid Molladavoudi, "Computation of Quantum Bound States on a Singly Punctured Two-Torus", *Chinese Physics Letters* **30** (2013) 010304

Aslam Abdullah & Hishamuddin Zainuddin, "Extension of Type-V and Type-IX Homogeneous Cosmologies", *Procedia Engineering* **53** (2013) 696-700

	<p>Chan Kar Tim, Hishamuddin Zainuddin &amp; Saeid Molladavoudi, “Computation and Visualization of Cuspidal Waveforms for Modular Group using GridMathematica”, <i>Sains Malaysiana</i> <b>42</b> (2013) 655-660</p> <p>Mojtaba Aliakbarzadeh and Hishamuddin Zainuddin, “Generating Mutually Unbiased Bases and Discrete Wigner Functions for Three-Qubit System”, <i>Malaysian Journal of Mathematical Sciences</i> <b>8</b> (2014) 1-18</p> <p>R. Muhida, M.M. Rahman, M.S.H. Chowdhury, H. Setiyanto, H. Zainuddin, B.Z. Azmi and H. Kasai, “Density Functional Study of Spin Polarization on a Carbon Material with Hexagonal Structure Induced by Iron Atoms”, <i>Journal of Computational and Theoretical Nanoscience</i> <b>11</b> (2014) 58-61</p> <p>Yusuf Zuntu Abdullahi, Md Mahmudur Rahman, Alhassan Shuaibu, Shamsu Abubakar, Hishamuddin Zainuddin, Rifki Muhida and Henry Setiyanto, “Density Functional Study of Manganese Atom Adsorption on Hydrogen-Terminated Armchair Boron Nitride Nanoribbons”, <i>Physica B</i> <b>447</b> (2014) 65-69</p> <p>Hassan Amirhashchi, Syed Nasrullah Ali Qazi and Hishamuddin Zainuddin, “An Interacting Scenario for Dark Energy in a Bianchi Type-I Universe”, <i>Research in Astronomy and Astrophysics</i> <b>14</b> (2014) 1383-1392</p>
<i>Books/Monographs</i>	<p><i>21<sup>st</sup> Century Physics – Vision 2020</i>, (eds.) Y.M. Hassan, M.Y. Sulaiman, Z.A. Talib, H. Zainuddin, S.A. Aziz &amp; M. Hashim (eds.) (Dept. of Physics, Universiti Pertanian Malaysia, 1994)</p> <p><i>Kecemerlangan Fizik, Kejayaan Negara – Prosiding Fizik Kebangsaan '95</i>, Z.A. Sulaiman, H. Zainuddin, Z.A. Talib, A.H. Shaari, H.A.A. Sidek &amp; M.A. Wahab, (eds.) (Department of Physics, Universiti Pertanian Malaysia, 1996)</p> <p><i>Lecture Notes on Computational Physical Sciences – Proceedings of TSL Expository Lecture Series 5</i>, Hishamuddin Zainuddin, Mohd Basyaruddin Abdul Rahman, Tay Buang Ann and Zurita Ismail, (UPM Press, 2009)</p> <p><i>Sedasawarsa Kisah INSPEM</i>, Hishamuddin Zainuddin et al. (eds.), (INSPEM, 2012)</p>
<i>Chapter in book</i>	-
<i>Proceedings</i>	
<i>Other publications</i>	Not listed
<i>Computer software</i>	

### H. PROJEK PENYELIDIKAN TERDAHULU (Past Research Project - Selected)

<i>Project No.</i>	<i>Project Title</i>	<i>Role</i>	<i>Year</i>	<i>Source of fund</i>	<i>Status</i>
ERGS/1-2013/5527178	Discrete Groups, Hyperbolic & Complex	Head of Project	2013	ERGS	Active

	Projective Geometry and Quantum States				
05-02-12-1865RU	Geometrical and Group-Theoretical Aspects of Quantum Entanglement	Head of Project	2012	RUGS	Ended
02-10-10-969FR	A Study of String Cosmological Models with Time Decaying Vacuum Energy Density and Related Problems	Head of Project	2010	FRGS	Ended
01-04-10-887FR	Quantum Chaos Theory in Terms of Causal Interpretation of Bohmian Quantum Mechanics	Head of Project	2010	FRGS	Ended

\*Listed the latest two.

<b>I. SENARAI PELAJAR SISWAZAH</b> ( <i>List of Postgraduate Students</i> )				
<i>Name</i>	<i>ThesisTitle</i>	<i>Degree</i>	<i>Year</i>	<i>Status</i>
Ahmed Bouketir	Group Theoretic Quantisation on Spheres and Quantum Hall Effect	PhD	2000	Graduated
Toh Sing Poh	Cosmic Crystallography: CCP-Index of Thurston Manifold	MSc	2002	Graduated
Abubaker Ahmed Mohamed Siddig	Mathematica Packages for Solving Schrodinger Equation with One Dimensional Rectangular Potentials	MSc	2003	Graduated
Aslam Abdullah	Extending Bianchi's Classification of Homogeneous Three-Manifolds	MSc	2006	Graduated
Ch'ng Han Siong	Accelerating Cosmologies with Extended Product Spaces	MSc	2006	Graduated
Nurisya Mohd Shah	Energy Eigenequation Expansion for a Particle on Singly Punctured Two-Torus and Triply-Punctured Two- Sphere Systems	MSc	2008	Graduated
Toh Sing Poh	Proving Kochen-Specker Theorem Using Projection Measurement and Positive Operator Valued Measure	PhD	2008	Graduated
Mazlinda Zainy	The Discrete Phase Space for 3-Qubit and 2-Qutrit Systems Based on Galois Fields	MSc	2009	Graduated
Abubaker Ahmed Mohamed Siddig	Computation of Maass Cusp Forms on Singly Puncture Two-Torus and Triply-Punctured Two-Sphere Using Mathematica	PhD	2009	Graduated
Siti Nurul 'Ain binti Zaiton	Qutrits and Lie Algebra Structure on Tensor Product of SU(3)	MSc	2010	Graduated
Hassan Amirhashchi	New Anisotropic Cosmological Models and Two-Fluid Dark Energy Models	PhD	2011	Graduated
Mojtaba	Generating Mutually Unbiased Bases	MSc	2011	Graduated

Aliakbarzadeh	and Discrete Wigner Function for Three-Qubit System			
Lam Shi Xiang	A Network Structural Analysis of Malaysian Stock Market with Edge Density Constraint	MSc	2012	Graduated
Wong Wen Wei	Geometry of Two-Qubit System	MSc	2012	Graduated
Saeid Molladavoudi	Symplectic Techniques in Geometric Quantum Mechanics and Nonlinear Quantum Mechanics	PhD	2013	Graduated

**CURRICULUM VITAE**  
**Mohamad Rushdan Md Said**  
**Universiti Putra Malaysia**  
**Malaysia**



<b>A. Personal Details</b>			
<i>(Full Name)</i>	Mohamad Rushdan Bin Md Said		<i>(Title):</i> Assoc Prof. Dr
<i>(Citizenship)</i>	Malaysian	<i>(Date of Birth)</i>	22 June 1959

<i>(Current Address)</i>	<i>(Department/Faculty)</i>	<i>(E-mail Address and URL)</i>
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<b>B. (Academic Qualification)</b>			
<i>(Certificate / Qualification obtained)</i>	<i>(Name of School / Institution)</i>	<i>(Year obtained)</i>	<i>(Area of Specialization)</i>
PhD	Macquarie University, Sydney, Australia	1997	Number Theory/Cryptography
MS	University of Louisiana, Lafayette, USA	1984	Math (Number Theory)
BS	Louisiana State University, USA	1981	Math

<b>C. (Employment)</b>				
<i>Employer</i>	<i>Designation</i>	<i>Department</i>	<i>Start Date</i>	<i>Date Ended</i>
UPM	Head, Laboratory of Cryptography, Analysis and Structures	Institute for Mathematical Research	2002	Present
UPM	Associate Professor	Mathematics	2003	Present
UPM	Lecturer	Mathematics	1985	2003



**D. (List of publication-last 5 years)***Journal*

1. Perfect Secret Sharing Scheme Based on Vertex Domination set, International Journal of Computer Mathematics, DOI:10.1080/00207160.2014.941360, (2014)
2. A Reduced  $\tau$ -adic Naf (RTNAF) Representation For Scalar Multiplication on Anomalous Binary Curves (ABC), Pertanika JST, Vol. 22 (2) Jul. 2014
3. Biometric Identification based local Iterated Function Systems, EPJ ST: Special Issue on "Chaos, Cryptography and Communications, DOI:10.1140/epjst/e2014-02120-4, (2014)
4. Key Exchange for New Cryptosystem Analogous to Luceig and Cramer-Shoup, International Journal for Cryptology Research, 4(1): 68 - 72 (2013).
5. On the Mathematical Complexity and the Time Implementation of Proposed Variants of Elliptic Curves Cryptosystems, International Journal for Cryptology Research, 4(1): 42 - 54 (2013)
6. A Method to Decrease Computation Time for fourth Order Lucas Sequence, AIP Conference Proceedings, Volume 1557, pp. 55-58 (2013)
7. Parallelizing GF (p) Montgomery Elliptic Curve Cryptosystem Operations to Improve Security and Performance. Advanced Materials Research. Vols. 622-623, pp 1906-1911 (2013).
8. On the Hastad's Attack to LUC4 Cryptosystem and Compared with other RSA-type Cryptosystem. Malaysian Journal of Mathematical Sciences. 7(S): 1-17 (2013)
9. Password Authentication Based on Fractal coding Scheme, Journal of Applied Mathematics, Volume 2012 (2012), Article ID 340861, 16 pages, doi:10.1155/2012/340861
10. On the Security of Golden Cryptosystems, Int. J. Contemp. Math. Sciences, Vol. 7, no. 7, 327 - 335, 2012.
11. Shorter Addition Chain for Smooth Integers Using Decomposition Method, International Journal of Computer Mathematics, Vol.88, Issue 11, pp.2222-2232 (2011).
12. On the Security of Digital Signature Protocol Based on Iterated Function Systems, International Journal of Mathematical Analysis, v. 5, no. 29, 1399 – 1410. 2011.
13. About Fuzzy Fixed Point Theorem in the Generalized Fuzzy Fractal Space, Far East Journal of Mathematical Sciences, Volume 53(1), pp. 53-64. 2011.
14. Trade-off between Area and Speed for Projective Edwards Elliptic Curves Cryptosystem over  $Gf(p)$  Using Parallel Hardware Designs and Architectures, International Review on Computers and Software, Vol. 6, No. 4, pp. 615-625, 2011.
15. Improved Digital Signature Protocol Using Iterated Function Systems, International Journal of Computer Mathematics, Vol. 88, No. 17, November 2011, pp.3613–3625, 2011.
16. A New Idea in Zero Knowledge Protocols Based on Iterated Function Systems, World Applied Sciences Journal, Vol. 13. No. 3, 364-371, 2011
17. Efficiency Analysis for Public Key Systems Based on Fractal Functions. Journal of Computer Science. 7 (4): 526-532, (2011)
18. On the Design of Projective Binary Edwards Elliptic Curves over  $GF(p)$  Benefiting from Mapping Elliptic Curves Computations to Variable Degree of Parallel Design. International Journal on Computer Science and Engineering. S Vol. 3 Issue 4, pp: 1697-1712, (2011).
19. The Block Cipher Algorithm-Properties, encryption efficiency Analysis and Security Evaluation, The Advances and Applications in Mathematical Sciences, Vol. 4 No. 2, 129-138 (2010).

	<ol style="list-style-type: none"> <li>20. The vulnerability analysis and the security evaluation of block ciphers, International Mathematical Forum, Vol.5, no. 42, 2071 - 2075, (2010).</li> <li>21. Bilinear Pairing Computation Using the Extended Double-Base Chains Algorithm, Int. Journal of Math. Analysis, Vol. 4, no. 19, 929 – 941, (2010).</li> <li>22. Algorithm to Enhance Elliptic Curves Scalar Multiplication Combining MBNR with Point Halving, Applied Mathematical Sciences, Vol. 4, no. 26, 1259 – 1272, (2010).</li> <li>23. An Improved Binary Method for Scalar Multiplication in Elliptic Curve Cryptography, Journal of Mathematics and Statistics, 6(1): 28-33, 2010.</li> <li>24. A New Public Key Cryptosystem Based on IFS, International Journal of Cryptology Research. 2(1): 1-13 (2010)</li> </ol>
<i>Books/Monographs</i>	<ol style="list-style-type: none"> <li>1. Mohamad Rushdan Md Said, (1984), On Euler's <math>\phi</math>-function and a Unitary Function, MS Thesis, University of Louisiana at Lafayette, USA.</li> <li>2. Mohamad Rushdan Md Said, (1997), Applications of Recurrence Relations to Cryptography, Ph.D Thesis, Macquarie University, Australia.</li> <li>3. Module For Distance Learning: Mohamad Rushdan Md Said (2001), Aljabar Permulaan , IDEAL, Universiti Putra Malaysia.</li> <li>4. Module for Distance Learning: Mohamad Rushdan Md Said, Kamel Ariffin Mohd Atan (2003), Teori Nombor, IDEAL, Universiti Putra Malaysia.</li> </ol>
<i>Chapter in book</i>	<ol style="list-style-type: none"> <li>1. A New Direction in Utilization of Chaotic Fractal Functions for Cryptosystems. M.R.K. Ariffin, N.M.G. Al-Saidi, M.R.M. Said, Z. Mahad &amp; M.A. Da Applications of Nonlinear Dynamics and Chaos in Engineering Volume 2. Springer, Germany. 2012. Publisher: Springer-Verlag, Germany</li> </ol>
<i>Proceedings</i>	<ol style="list-style-type: none"> <li>1. Finite and Infinite Field Cryptography Analysis and Applications. International Conference on Applied Mathematics and Pharmaceutical Sciences (ICAMPS'2012) Jan. 7-8, 2012 Dubai.</li> <li>2. Parallelizing GF (p) Montgomery Elliptic Curve Crypto-system Operations to Improve Security and Performance. 2012 3rd International Conference on Mechanical and Aerospace Engineering (ICMAE 2012) , July 7-8, 2012, Paris, France.</li> <li>3. The Cryptanalysis and Extension of the Generalized Golden Cryptography. 2011 IEEE Conference on Open Systems (ICOS2011). IEEE Xplore, Digital Object Identifier: 10.1109/ICOS.2011.6079298</li> <li>4. AN EFFICIENT BROADCASTING SCHEMES FOR MODIFIED CHORDAL RINGS DEGREE SIX NETWORKS. 2011 International Conference on Information and Industrial Electronics (ICIIE 2011).</li> <li>5. On the Security of the Generalized Golden Cryptography. IPCSIT vol.13 (2011) © (2011) IACSIT Press, Singapore, pp.5-9.</li> <li>6. Signed decomposition method for scalar multiplication in elliptic curve cryptography. AIP Conf. Proc. 1309, pp. 805-813; doi:http://dx.doi.org/10.1063/1.3525209. 2010.</li> <li>7. Computation of cryptosystem based on lucas functions using addition chain. Proceedings 2010 International Symposium on Information Technology - System Development and Application and Knowledge Society, ITSIM'10, 3, art. no. 5561514.</li> <li>8. Fractal attractor based digital signature, Proceeding - 6th International Conference on Networked Computing and Advanced Information Management, NCM 2010, art. no. 5572077, pp. 446-449.</li> <li>9. Using fractal as an Encryption Method for Private Key Systems. Proceeding of the International Conference on Education, Technology and</li> </ol>

	Computer, ICETC 2009, 17-20 April 2009.
<i>Computer software</i>	1. Copyright (2009): (New Evaluation Tool for Block Ciphers Symmetric Cryptosystems (NET-BC))

<b>E. (Current Research Project)</b>					
<i>Project No.</i>	<i>Project Title</i>	<i>Role</i>	<i>Year</i>	<i>Source of fund</i>	<i>Status</i>
ERGS/1/2013/STG06/UPM/02/2	Secure Biometric Authentication Based on Fractal Image Coding Scheme	Project Leader	2013	MOHE (RM104K)	In Progress

<b>F. (Past Research Project)</b>					
<i>Project No.</i>	<i>Project Title</i>	<i>Role</i>	<i>Year</i>	<i>Source of fund</i>	<i>Status</i>
01-11-09-732FR	A public key cryptosystem using iterated function system (IFS) Fractals Theory	Project Leader	2009	MOHE (RM 31K)	Completed
01-01-04-SF0945	Efficient Arithmetic and Pairing Evaluation in Elliptic Curve Cryptography	Project leader	2008	MOSTI (RM 116K)	Completed
01-01-07-156FR	An Application of Lucas Function in the Cramer-Shoup Cryptosystem	Project Leader	2006	MOHE (RM 51K)	Completed
01-19-03-097J	On The RSA-type Cryptosystem	Project Leader	2004	MOHE (RM 50K)	Completed

<b>G. (Number of Postgraduate Students Supervised)</b>			
<i>Program</i>	<i>Status</i>	<i>As Chairman</i>	<i>As Members</i>
PhD	Graduated	5	10
	Ongoing	6	5
Master	Graduated	5	12
	Ongoing	1	2

## RESUME

### IDENTIFICATION DATA

**Name : ISAMIDDIN S. RAKHIMOV,**

**Professor, Dr.**

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Gender	Male
Date and place of birth	10/10/1956, Bukhara, Uzbekistan
Nationality	Uzbek
Citizenship	Uzbekistan
Family status	Married, two children
Home address (Tashkent, Uzbekistan):	Massiv 2-Ibn-Sino, 11/40. 100068, Tashkent, Uzbekistan. Tel (998-371) 218-14-01
Contacts:	(00998-71) 218-14-01 (home) (Uzbekistan), 603-8946-6831 (office), fax: 89437958 (Malaysia) <a href="mailto:risamiddin@gmail.com">risamiddin@gmail.com</a> <a href="http://isamiddin@isamiddin.com">isamiddin@isamiddin.com</a>
Mailing Address: (Malaysia)	43400, Dept. of Mathematics, FS, UPM, Serdang, Selangor Darul Ehsan, Malaysia .
Languages	Uzbek, Russian – native speaker; English – fluent, Bahasa Malayu – conversational level.

## I. ACADEMIC DEGREES

1.	Doctor of Sciences	Doctor of Sciences in Physics and Mathematics, Institute of Mathematics, Academy of Sciences Republic of Uzbekistan, Tashkent, 2011
2.	PhD degree	Ph.D. in Physics and Mathematics from the University of Leningrad (now Saint Petersburg) in December 27, 1985, ФМ No: 026121 May 7, 1986, Leningrad, Russia.
3.	MSc. Degree	Faculty of Mathematics and Mechanics of Leningrad State University (now Saint Petersburg State University) in 1979 qualified as Mathematician, Teacher. Г-1 No 780679, July 5, 1979, Leningrad, Russia.
4.	Certificate	Republican Special Physics and Mathematics High School, June, 1973. Tashkent, Uzbekistan.

## II. EDUCATION

<b>N</b>	<b>Academic institutions</b>	<b>Type of position</b>	<b>Commencement date</b>	<b>Date of end</b>
1.	Leningrad State University, Leningrad (now Sankt Petersburg ) city, Russia.	PhD student	December 1982	December 1985
2.	Leningrad State University, Leningrad (now Sankt Petersburg) city, Russia .	Scientific researcher	December 1980	December 1982
3.	Leningrad State University, Leningrad (now Sankt Petersburg)city, Russia.	Student	September 1976	July 1979.

### **III. PROFESSIONAL EXPERIENCES AND APPOINTMENTS**

<b>N</b>	<b>Employer</b>	<b>Type of position</b>	<b>Commencement date of service</b>	<b>Date of end of services</b>
1.	Dept. of Mathematics, Faculty of Science, Universiti Putra Malaysia, Malaysia.	Professor	June 2013	
2.	Dept. of Mathematics, Faculty of Science, Universiti Putra Malaysia, Malaysia.	Associate professor	August 2008	May 2013
3.	Dept. of Mathematics, Faculty of Science, Universiti Putra Malaysia, Malaysia.	Senior Lecturer	August 2004	August 2008
4.	Dept. of Algebra and Number theory, Faculty of Mech. and Math., National University of Uzbekistan, Tashkent, Uzbekistan	Associate professor	May 27 1993	August 2004
5.	Dept. of Algebra and Number theory Faculty of Mech. and Math., Tashkent State University, Tashkent, Uzbekistan .	Senior Lecturer	December 1985	May 27 1993

### **IV. TEACHING ACTIVITIES**

<b>N</b>	<b>Name of subject</b>	<b>Level</b>	
<b>1.</b>	Algebraic Structures	Master and PhD students	Dept. of Mathematics, FS, UPM
<b>2.</b>	Topology	Master and PhD students	Dept. of Mathematics, FS, UPM
<b>3.</b>	Analysis 1	Master and PhD students	Dept. of Mathematics, FS, UPM

<b>4.</b>	Advanced Calculus	Bachelor students	Dept. of Mathematics, FS, UPM
<b>5.</b>	Calculus	Bachelor students	Dept. of Mathematics, FS, UPM
<b>6.</b>	Introduction to mathematics of finance and economics	Bachelor students	Dept. of Mathematics, FS, UPM
<b>7.</b>	Algebra	Bachelor students	Dept. of Mathematics, FS, UPM
<b>8.</b>	Modern algebra	Bachelor students	Dept. of Mathematics, FS, UPM
<b>9.</b>	Differential Equations	Bachelor students	Dept. of Mathematics, FS, UPM
<b>10.</b>	Abstract Algebra	Bachelor, Master and Ph.D students	Dept. of Mathematics, FS, UPM
<b>11.</b>	Field theory	Master and PhD students	Dept. of Algebra and Number theory, Mech.-Math. Faculty, National University of Uzbekistan, Tashkent, Uzbekistan.
<b>12.</b>	Number Theory	Bachelor and Master students	Dept. of Algebra and Number theory, Mech.-Math. Faculty, National University of Uzbekistan, Tashkent, Uzbekistan.
<b>13.</b>	Linear Algebra	Bachelor and Master students	Dept. of Algebra and Number theory, Mech.-Math. Faculty, National University of Uzbekistan, Tashkent, Uzbekistan.
<b>14.</b>	Algebraic Geometry	Master and PhD students	Dept. of Algebra and Number theory, Mech.-Math. Faculty, National University of Uzbekistan, Tashkent, Uzbekistan.
<b>15.</b>	Commutative Algebras	Master and PhD students	Dept. of Algebra and Number theory, Mech.-Math. Faculty, National University of Uzbekistan, Tashkent, Uzbekistan.

## **V. MAIN RESEARCH INTERESTS :**

- 1) Structural theory of finite-dimensional algebras.
- 2) Commutative Algebras.
- 3) Algebraic geometry.
- 4) Invariant theory
- 5) Number theory and Cryptography

## **VI. RESEARCH INTERESTS AND RELEVANT PUBLICATIONS**

### **a) Impact Factor and ISI publications**

1. U.D. Bekbaev, **I.S.Rakhimov**, Q.Muminov, On differential rational invariants of classical motion groups, *Journal of Algebra and its Applications*, 14(2), 2015, 14 pages.
2. N.S.Mohamed, S.K.Said Husain, **I.S.Rakhimov**, On isomorphism classes of a subclass of filiform Leibniz algebras in dimension 10, *AIP Conf. Proc.*, 1602, 736-743, 2014.
3. M.Abubakar, **I.S.Rakhimov**, I.M.Rikhsiboev, On derivations of low-dimensional associative dialgebras, *Proceedings of 3<sup>rd</sup> International Conference on Mathematical Sciences, AIP Conf. Proc.*, 1602, 730-735, 2014.
4. **I.S.Rakhimov**, A.Kh.Khudoyberdiyev, S.K.Said Husain, On classification of five-dimensional solvable Leibniz algebras, *Linear algebra and its Appl.*, 457, 2014, 428-454.
5. U.D. Bekbaev, **I.S.Rakhimov**, On differential invariants of some classical groups, *Proceedings ICMSS 2013*, 255-264, Springer, 2014.
6. **I.S. Rakhimov**, S. K. Said Husain, F. Deraman, The description of orbits under an action of  $GL_9$  on  $SL_9$ , *Proceedings ICMSS 2013*, 139-154, Springer, 2014.
7. A. O. Abdulkareem, **I. S. Rakhimov** and S. K. Said Husain, On seven-dimensional filiform Leibniz algebras, *Proceedings ICMSS 2013, Springer* 2014, 1-11.
8. S. Mohd Kasim, **I.S.Rakhimov**, S.K.Said Husain, *Isomorphism Classes of 10-dimensional filiform Leibniz algebras*, *AIP Conf. Proc.*, 1602, 708-715, 2014.
9. A.O. Abdulkareem, **I.S.Rakhimov**, S.K.Said Husain, Isomorphism Classes and Invariants of low-dimensional filiform Leibniz algebras, *Linear and Multilinear Algebra* (accepted)



10. A.O. Abdulkareem, **I.S.Rakhimov**, S.K.Said Husain, *Rigidity of Some Classes of Algebra*, *AIP Conf. Proc.*, 1605, 702-707, 2014.
11. Pourtaherian, H., **Rakhimov, I.S.** , On quasi-Armendariz properties on skew polynomial rings , (2013) *AIP Conference Proceedings* 1557, 8 - 11
12. B.A. Omirov, **I.S. Rakhimov**, R.Turdibaev, *On description of Leibniz algebras corresponding to  $sl_2$* , *Algebras and Representation Theory*, 16(5), 2013, 1507-1519. IF=0.554
13. **Isamiddin S. Rakhimov**, Kalyan Kumar Dey and Akhil Chandra Paul, Prime gamma Near-Rings with Derivations, *International Journal of Pure and Applied Mathematics*, 2013, 83(2), 221-231. (SCOPUS)
14. **I. S. Rakhimov**, Kalyan Kumar Dey and Akhil Chandra Paul, On Commutativity of Completely Prime Gamma-Rings, *Malaysian Journal of Mathematical Sciences*, 7(2), 2013, 283-295 (SCOPUS)
15. Farmani, M., **Rakhimov, I.** On geometric classification of 3-dimensional complex Leibniz algebras, *AIP Conference Proceedings*, 1522, 2013, 926-929 (SCOPUS)
16. Kalyan Kumar Dey and Akhil Chandra Paul, **Isamiddin S. Rakhimov**, Simiprime gamma rings with orthogonal Reverse Derivations, *International Journal of Pure and Applied Mathematics*, 2013, 83(2), 233-245. (SCOPUS)
17. **Isamiddin S. Rakhimov**, Kalyan Kumar Dey, Akhil Chandra Paul, *Prime gamma-rings with (sigma,tau)-derivations*, *International Journal of Pure and Applied Mathematics*, 2013, 82(5), 669-681. (SCOPUS)
18. **Isamiddin S.Rakhimov**, Al-Nashri Al-Hossain, *On Derivations of some classes of Leibniz algebras*, *Journal of Generalized Lie Theory and Applications*, 2012, 6, Article ID G120501, 12 pages. (SCOPUS)
19. Wong Wen Wei, Hishamuddin Zainudin, **Isamiddin Rakhimov**, Linking Base Spaces of Hopf Fibration for Two-Qubit State Space Description, *Adv. Studies Theor. Phys.*, 2012, 6(28), 1371-1387. (SCOPUS)
20. **Isamiddin S. Rakhimov**, Kalyan Kumar Dey and Akhil Chandra Paul, Orthogonal Generalized Derivations in Semiprime Gamma Near-Rings, *International Journal of Algebra*, 6(23), 2012, 1127 - 1134 (SCOPUS)
21. **Isamiddin S. Rakhimov**, Kalyan Kumar Dey, Akhil Chandra Paul and Kamel A. Mohd Atan, Permutting tri-(sigma,tau)-derivations in prime gamma near rings, *JP Journal of Algebra, Number Theory and Applications*, 2012, 26(1), 11-31. (SCOPUS)
22. Kalyan Kumar Dey, Akhil Chandra Paul, **Isamiddin S. Rakhimov**, *On Commutativity in prime gamma-near-rings with symmetric bi-derivations*, *International Journal of Pure and Applied Mathematics*, (accepted), 2012. (SCOPUS)
23. **Rakhimov I.S.**, Rikhsiboev I.M., Khudoyberdiyev A.Kh., Karimjonov I.A.,

- Description of some classes of Leibniz algebras*, Linear Algebra and its Applications, **437** (2012) pp. 2209-2227. **IF=1.04**
24. **Isamiddin S. Rakhimov**, Kamel Ariffin Mohd Atan, *Contractions and Invariants of Leibniz algebras*, Bulletin of the Malaysian Mathematical Science Society, (2), 35(2A), 2012, 557-565. **IF=0.6**
25. F. Deraman, **I.S. Rakhimov**, S.K.Said Husain, Isomorphism classes and invariants for a subclass of nine-dimensional filiform Leibniz algebras, *International Journal of Modern Physics: Conference Proceedings*, 1450, 326 – 331, 2012, doi: 10.1063/1.4724162. **(SCOPUS)**
26. **Isamiddin S. Rakhimov**, Kamel A. Mohd Atan, On some new properties of Catalan Numbers, *International Journal of Modern Physics: Conference Proceedings*, 9, 2012, 537- 542, **(SCOPUS)**
27. Kalyan Kumar Dey, Akhil Chandra Paul, **Isamiddin S. Rakhimov**, *On Commutativity in Gamma-near-ring with Symmetric Bi-( $\sigma, \tau$ )-derivations*, Far East Journal of Mathematical Science, 2012, 65( 2), 211-225. **(SCOPUS)**
28. Kalyan Kumar Dey, Akhil Chandra Paul, **Isamiddin S. Rakhimov**, *Tri-additive maps and Permutting Tri-derivations of Gamma-rings*, JP Journal of Algebra, Number Theory and Applications, 2012, 25(1), 29-44. **(SCOPUS)**
29. Ikrom M. Rikhsiboev, **Isamiddin S. Rakhimov**, Classification of three dimensional complex Leibniz algebras, *International Journal of Modern Physics: Conference Proceedings*, 1450, 358 – 362, 2012, doi: 10.1063/1.4724168 **(SCOPUS)**
30. Kalyan Kumar Dey, Akhil Chandra Paul, **Isamiddin S. Rakhimov**, *Generalized Derivations in Semiprime Gamma Rings*, International Journal of Mathematics and Mathematical Sciences, 2012, ID 270132, DOI: 10.1155/2012/270132. **(SCOPUS)**
31. H. Pourtaherian, **I.S. Rakhimov**, *On Skew version of reversible rings*, International Journal of Pure and Applied Mathematics, 73(3), 2011, 267-280. **(SCOPUS)**
32. Massoud Amini, **Isamiddin Rakhimov**, Seyed Jalal Langari, *Enveloping Lie Algebras of Low Dimensional Leibniz Algebras*, Applied Mathematics, 2(8), 2011, 1027-1030. **(SCOPUS)**
33. **I.S. Rakhimov**, M.A. Hassan. *On low-dimensional Lie-like filiform Leibniz algebras and their invariants*, Bulletin of the Malaysian Mathematical Science Society, (2), 34(3), (2011), 475-485. **IF=0.6**

34. H.Pourtaherian, **I.S.Rakhimov**, Siti Hasana Sapar, *On Hilbert Property of Rings*, International Journal of Algebra, 5(7), 2011, 301-308. **IF=0.195**
35. **I. S. Rakhimov**, Al-Nashri Al-Hossain, *On Derivations of low-dimensional complex Leibniz algebras*, JP Journal of Algebra, Number Theory and Applications, 21(1), (2011), 69-81. (**SCOPUS**)
36. **I.S. Rakhimov**, M.A.Hassan. *On one-dimensional central extension of a filiform Lie algebra*. Bulletin of the Australian Math. Soc., 84 (2011), 205-224. **IF= 0.353**
37. **I.S. Rakhimov**, M.A.Hassan. On isomorphism criteria for Leibniz central extensions of a linear deformation of  $\mu_n$ , International Journal of Algebra and Computations, 21(5), (2011), 715-729. **IF= 0.457**
38. **I.S. Rakhimov**, Sh.K.Said Husain. *On isomorphism classes and invariants of low dimensional complex filiform Leibniz algebras*, Linear and Multilinear Algebra, 59(2), (2011), 205-220. **IF 0.740**.
39. **I.S. Rakhimov**, S.K.Said Husain. *Classification of a subclass of nilpotent Leibniz algebras*, Linear and Multilinear algebra, 2011, 59 (3), 339-354. **IF 0.740**.
40. S.K.Said Husain, M.A.Hassan, **I.S. Rakhimov**, *On isomorphisms and invariants of 5<sup>th</sup> dimensional complex filiform Leibniz algebras*, AIP Conference Proceedings, 1309, 2010, 430-438.(**SCOPUS**)
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## **VII. BOOKS AND BOOK CHAPTERS**

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2. **Isamiddin S. Rakhimov**, Al-Nashri Al-Hossain, Kamel A.M. Atan, *On Derivations of some classes of Leibniz algebras*, Lampert Academic Publishing, 2012, 186 pages. (**Monograph**)
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12. **Isamiddin S.Rakhimov, (INVITED SPEAKER)**, On structural properties, links and generalizations of some algebraic systems: achievements and perspectives, *Day of Algebra (DOA 2)*, December 8, 2009, Al-Khawarazmi Seminar Room, Math. Building, UPM, Malaysia.
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- Resedarch and Education in Mathematics (ICREM 3), 10-12 April 2007 The Legend Hotel, Kuala Lumpur (Malaysia)
18. **Isamiddin S. Rakhimov**, Sharifah Kartini. *On classification of Low dimensional complex filiform Leibniz algebras*. The third International Conference on Resedarch and Education in Mathematics (ICREM 3), 10-12 April 2007 The Legend Hotel, Kuala Lumpur, (Malaysia).
  19. U. D. Bekbaev, **I. S. Rakhimov**. *On classification of finite dimensional complex filiform Leibniz algebras* (First class) The third Saudi Science Conference “New Horizons in Science and Their Applications” College of Science King Saud University P.O. Box 2455 Riyadh 11451 (Kingdom of Saudi Arabia). March 10<sup>th</sup>-13<sup>th</sup> March/2007.
  20. **Isamiddin S. Rakhimov**. *On isomorphisms of finite dimensional Complex Filiform Leibniz Algebras*. “3rd International Conference on 21st Century Mathematics 2007” School of Mathematical Sciences, National Center for Mathematics, GC University, Lahore, (Pakistan).
  21. **Isamiddin S. Rakhimov**, Witriany Basri. *On low dimensional diassociative algebras*, Prosiding Konferensi Kebangsaan Pemodelan Matematik dan Statistik, 5-6 September 2006, UPM (Malaysia).
  22. **Isamiddin S. Rakhimov**. *Varieties of low dimensional Complex Leibniz Algebras*. International Conference “Operator Algebras and Quantum Probability”, 7-10 Sept., 2005. Tashkent. (Uzbekistan).
  23. **I.S. Rakhimov**. *On Leibniz Algebras and their degenerations*. The Second International Conference on Research and Education in Mathematics, (ICREM 2), 25<sup>th</sup> – 27<sup>th</sup> May 2005, (Malaysia).
  24. **I.S. Rakhimov**, S. Kartini, F. Yunus. *On Degenerations of 3-dimensional Complex Leibniz Algebras*. The Second International Conference on Research and Education in Mathematics, (ICREM 2), 25<sup>th</sup> – 27<sup>th</sup> May 2005, (Malaysia).
  25. **I.S. Rakhimov**, B.A. Omirov. *The Classification of four dimensional Complex Nilpotent Leibniz Algebras*, International Conference on Research and Education in Mathematics, 2nd-4th April 2003, Kuala Lumpur, Malaysia.
  26. B.A. Omirov, **I.S. Rakhimov**. *Variety of four Dimensional Nilpotent Complex Leibniz Algebras*, Scientific Seminar of the Institute fur Angewandte Matematik, Universitat Bonn. (Germany). 18 Nov 2003.
  27. B. Omirov, **I.S. Rakhimov**. *Classification of four-dimensional nilpotent complex Leibniz algebras*. Scientific Seminar of the Institute fur Angewandte Matematik, Universitat Bonn. (Germany). 10 Dec 2003.

28. **I.S.Rakhimov.** *On group of rational points of Elliptic curves with CM.*  
The Singapore International Symposium on Topology and Geometry.  
SISTAG Singapore (Singapore), 2001, (July, 02-06, 2001).

**IX. Post Doc., PhD and MS Programs (since year 2000)**

**(i) Post Doc.:**

**Rikhsiboev Ikrom Mirzakarimovich** – Post. Doc. Fellow Researcher,  
INSPEM, 02/2009 – 01/2010.(**Supervisor**).

**(ii) PhD PROGRAM (IN UPM):**

No	Name	Title	Matric No & year	Status	Leadership
1	Hamideh Poortaherian	Armandariz rings and their relations	GS22154	Completed	<b>Supervisor</b>
2	Al-Nashri Al-Hossain	Invariants of Leibniz algebras	GS22747	Completed	<b>Supervisor</b>
3	Sharifah Kartini Said Husain	On Structural Properties of Leibniz Algebras	GS16535 2006-2010	Completed	<b>Supervisor</b>
4	Witriany Basri	Classification of Low dimensional Loday Algebras	GS16465 2006-2010	Submitting Thesis	<b>Supervisor</b>
5	Syed Jalal Langari	Classification of Low dimensiona Nilpotent Leibniz Algebras	GS17757 2007-2010	Completed	<b>Supervisor</b>
6	Munther Al-Hassan	Invariants of finite dimensional Leibniz Algebras	GS20621	Completed	<b>Supervisor</b>

<b>7</b>	Zabiddin Bin Salleh	Investigation of Bitopologies In Generalizations of Lindelof Spaces	GS14368 2003-2007	Completed	<b>Supervisor Committee</b>
<b>8</b>	Abdulwahed Mohammad Ismail	Elliptic Curves Arithmetic and Pairing Computation	GS14691 2004-2008	Completed	<b>Supervisor Committee</b>
<b>9</b>	Toh Sing Poh	Kochen-Specker Theorem Proof Using Positive OperatorValued Measure	GS16069	Completed	<b>Supervisor Committee</b>
<b>10</b>	Foo Kim Eng	The Geometry of Quantum Entangled Mixed States	GS20316	On going	<b>Supervisor Committee</b>
<b>11</b>	Tan Thian Khoon	Screening of Solid Microorganisms for Bioremediation of Selected Presticides	GS19240	On going	<b>Supervisor Committee</b>
<b>12</b>	Aniza Abd Ghani	Elliptic curve Cryptology	GS 22352	On going	<b>Supervisor Committee</b>
<b>13</b>	Mohamad Aidil Johari	A general relation between sums of cubes and pyramidal numbers	GS23513	Completed	<b>Supervisor Committee</b>



<b>14</b>	Liaw Hock Sang	Efficiencies of Optimal Elements for Quantum Logical Operations	GS18780	On going	<b>Supervisor Committee</b>
<b>15</b>	Chan Kar Tim Sains dan Teknologi Kuantum	Spectral Studies of Eigenvalues in Maass Cusp Form Using Grid Mathematica	GS24465	Completed	<b>Supervisor Committee</b>
<b>16</b>	Najlai F.Hameed Al-Saffar  Mathematical Cryptography	Efficient Scalar Multiplication of Elliptic Curve	GS31477	on going	<b>Supervisor Committee</b>
<b>17</b>	Mateen Naser Ridha	Speed Gradient Quantum Algorithm for Quantum Networks	GS36642 UPM/SPS/G S36642/JK Penyeliaan 25 Feb 2014	on going	<b>Supervisor Committee</b>
<b>18</b>	Mohamed Ardo Mahamed	Computational Structures on Leibniz algebras			
<b>19</b>	Mojtaba Aliakbarzadeh	Epidemic Toy Model	GS 33488	on going	<b>Supervisor Committee</b>
<b>20</b>	Anvar Nooraldeen	Bornological Structurs	GS 40911	on going	<b>Supervisor</b>
<b>21</b>	Wasan Ajeel Ahmood	The Multi-dimensional Fractional Laplace Transform	GS38497	on going	<b>Supervisor Committee</b>

<b>22</b>	Maysaa Jalil Mohammed 2013.14(2)	Algebraic Statistics	GS38692	Sem 2 2014 on going	<b>Supervisor</b>
<b>23</b>	Muhamed Abubakar Hagi Mohamed	Diassociative algebras and their derivations	GS35195	on going	<b>Supervisor</b>

**(iii) MSc PROGRAMS (IN UPM).**

<b>No</b>	<b>Name</b>	<b>Title</b>	<b>Matric No &amp; Study year</b>	<b>Status</b>	<b>Leadership</b>
1.	Abdulkareem Abdulafeez Olalekan	Classification of Lie-like Leibniz algebras	GS33400 2012	Completed	<b>Supervisor</b>
2.	Suzila binti Mohd Kasim	Isomorphism Classes of filiform Leibniz algebras	GS31081 2011	Completed	<b>Supervisor</b>
<b>3.</b>	Nurul Shazwani	Classification of 10-dim filiform Leibniz algebras	GS31070 2011	Completed	<b>Supervisor Committee</b>
<b>4.</b>	Mehrnoosh Farmani	Leibniz algebra contractions	GS31882 2011	On going	<b>Supervisor</b>
<b>5.</b>	Fatanah Deraman	Isomorphism classes and Invariants of Filiform Leibniz Algebras	GS29357 & 2010	Completed	<b>Supervisor</b>

<b>6.</b>	Wong Wen Wei Fizik Matematik dan Berkomputasi	Geometry of Four-Qubits Entanglement	GS27350	Completed	<b>Supervisor Committee</b>
<b>7.</b>	Mouna Bibi Langari	Skejelbred-Sund method for classification of nilpotent Lie Algebras	GS203211	Viva 21/06/10	<b>Supervisor</b>
<b>8.</b>	Sozan J.Obaiys	Classification of nine dimensional filiform Leibniz Algebras	GS20399	25 Aug., 2009 (Viva)	<b>Supervisor</b>
<b>9.</b>	Siti Syaheera binti Aminudin	On the Cardinality of the set of Solutions to Congruence Equations	GS30635	Completed	<b>Supervisor Committee</b>
<b>10.</b>	Choong Pak Shen	Geometry of local orbits for three qubits	GS35357	on going	<b>Supervisor Committee</b>

## **X. INTERNAL EXAMINER**

### **MASTER OF SCIENCE.**

1.	Name : Matric No. : Faculty : Date : Thesis Title :	Hasmiah Binti Bahari GS 13874 Dept. of Math., FS. 5/10/2006 ONE GENERALIZATION OF BERNULLI NUMBERS
2.	Name : Matric No. : Faculty : Date : Thesis Title :	Siti Nurul' Ain Zaiton GS 16466 INSPEM 17/05/2010 QUTRITS AND TENSOR PRODUCT SU(3)
3.	Name : Matric No. : Faculty : Date : Thesis Title :	Yap Hong Keat GS18468 INSPEM 02/12/ 2010 AN ESTIMATION OF MULTIPLE EXPONENTIAL SUMS IN TWO VARIABLES
4.	Name : Matric No. : Faculty : Date : Thesis Title :	Mojtaba Aliakbarzadeh GS23814 INSPEM 12/05/ 2011 GENERATING MUTUALLY UNBIASED BASES AND DISCRETE WIGNER FUNCTION FOR THREE-QUBIT SYSTEM

**PhD.**

1.	Name :	Zeyad Abdel Aziz Mah'd Al Zhou
	Matric No. :	GS 13282
	Faculty :	Dept. of Math. FS.
	Date :	27/11/2006
	Thesis Title :	Generalization of Kronecker and Hadamard products of matrices and some applications

## **XI. EXTERNAL EXAMINER**

### **PhD.**

1.	Name :	Nurulla Azamov
	Institute:	Institute of Mathematics, Uzbekistan Academy of Sciences
	Date :	2001
	Thesis Title:	Representation of Skew-Hermitian Elements in von Neumann Algebras by Skew Commutators
2.	Name :	Mansoor Saburov
	Matric No. :	GS 0839707
	Faculty :	Dept. of Computational and Theoretical Sciences, KS, Intern. Islamic Univ. Malaysia.
	Date :	12/07/2011
	Thesis Title :	Quantum Markov Chains and Related Nonlinear Dynamical Systems

3.	Name :	Izzat Salem Suleiman
	Matric No. :	G1121989
	Faculty :	Dept. of Computational and Theoretical Sciences, KS, Intern. Islamic Univ. Malaysia.
	Date :	19/03/2014
	Thesis Title :	On Ksi-Quadratic Stochastic operators and related algebras.

### **XI. RESEARCH ACTIVITIES.**

No	Project code	Designation	Project Title	Source of Fund/Amount	Result	Year
1.	06-01-04-SF0122	Project Leader	Classification Problems of Finite Dimensional Loday Algebras	SF RM 125,997	2006	2006-2008
2	05-03-08445FR	Project Leader	Algebraic and Geometric Properties of Some Class of Finite dimensional non Associative Algebras	FRGS RM 45,000	2008	2008-2010
3	05-01-09-0733RU	Project Leader	Cohomological approach to the classification problem of Leibniz algebras	RUGS RM 58,000	27/08/09	24 months
4.	5450435	Associate researcher	Efficient Algorithm and Pairing Evaluation in Elliptic Curve Cryptography	SF RM 116, 200	01/04/08	18 months

5	01-12-10-978FR	Project Leader	Isomorphism Classes and Invariants of low-dimensional complex filiform Leibniz algebras	FRGS RM 60,000	March 2011	2011-2013
6	01-12-10-988FR	Associate researcher	Structural Properties of some classes of Dialgebras over Complex Numbers	FRGS RM 58,000	March 2011	2011-2013
7	FRGS 01-04-10-895FR	Associate researcher	On Classification of complex filiform Leibniz algebras in dimensions 9 until 11.	FRGS RM40,640	2010	2010/11
8	FRGS 01-04-10-895FR	Associate researcher	On Degenerations of Low Dimensional Complex Leibniz Algebras	FRGS RM40,000		2012 – 2014
9	05-02-12-2188RU	Project Leader	STRUCTURAL PROPERTIES AND GENERALIZATIONS OF SOME ALGEBRAIC SYSTEMS.	RUGS RM 34,000.00		2012-2014

## **XII. AWARDS AND APPRICIATIONS**

1. Doctor of Sciences in Physics and Mathematics, Institute of Mathematics, Academy of Sciences Republic of Uzbekistan, Tashkent, 2011
2. More than 120 research paper in different reputable International mathematical Journals
3. More than 50 International and national conference participation with invited talks
4. Three monographs and one book published
5. Ten research grants holder with amount RM 576000.00
6. Sijil Perkhidmatan Cemerlang (Tahun 2004 Signed by Naib Canselor UPM)
7. Sijil Penghargaan (Tahun 2004 Signed by Dean Fakulti Sains UPM)
8. Sijil Perkhidmatan Cemerlang (Tahun 2005 Signed by Naib Canselor UPM)

9. Anugerah Saintis Cemerlang Fakulti 2005 (Tahun 2005 Signed by Dean of Faculty of Sciences, UPM)
10. Certificate of Appreciation (Tahun 2005 signed by Director Institute for Mathematical Research of University Putra Malaysia).
11. Sijil Penyertaan (Tahun 2006 signed by Ketua Jabatan Matematik, Fakulti Sains UPM)
12. Sijil Penghargaan (Tahun 2006 Signed by Dekan Fakulti Sains UPM)
13. Certificate of Appreciation (Tahun 2007 signed by Director Institute for Mathematical Research of University Putra Malaysia).
14. Anugerah Saintis Cemerlang 2008 (Signed by Dean of Faculty of Science, UPM)
15. Anugerah Pengajar Cemerlang 2008 (Signed by Dean of Faculty of Science, UPM)
16. Sijil Penyertaan (Tahun 2009) (Pengerusi Sesi) (Signed by Pengerusi SKSM Ke-17).
17. Anugerah Penyelidik Cemerlang (Tahun 2009) (Signed by Director INSPERM).
18. Sijil Penghargaan Pengajaran (Sesi I 2009/2010 Course MTH 3004) (Signed by Dean of Faculty of Science, UPM)
19. Sijil Penghargaan Pengajaran (Sesi II 2009/2010 Course MTH 3202) (Signed by Dean of Faculty of Science, UPM)
20. Sijil Penghargaan Pengajaran (Sesi I 2010/2011 Course MTH 3200) (Signed by Dean of Faculty of Science, UPM)
21. Sijil Penghargaan Pengajaran (Sesi I 2010/2011 Course MTH 3103) (Signed by Dean of Faculty of Science, UPM)
22. Sijil Penghargaan Pengajaran (Sesi II 2010/2011 Course MTH 3103) (Signed by Dean of Faculty of Science, UPM)
23. Sijil Perkhidmatan Cemerlang (Tahun 2010 Signed by Naib Canselor UPM)
24. Sijil Pengajar Cemerlang (Sesi II 2010/11 Course MTH5201) (Signed by Dean of Faculty of Science, UPM)
25. Anugerah Perkhidmatan Cemerlang (Tahun 2010 Signed by Dean of Faculty of Sciences, UPM)
26. The isomorphism classes and invariants of low-dimensional complex filiform Leibniz algebras, Bronze Medal , PRPi 08, PEMERAN REKA CIPTA PENYELIDIKAN DAN INOVASI, UPM 2008.
27. Contractions of 3-dimensional complex nilpotent Leibniz algebras. Bronze Medal , PRPi 08, PEMERAN REKA CIPTA PENYELIDIKAN DAN INOVASI, UPM 2008.
28. On low-dimensional Lie-like filiform Leibniz algebras and Their Invariants, Bronze Medal , PRPi 09, PEMERAN REKA CIPTA PENYELIDIKAN DAN INOVASI, UPM 2009 .



29. Classification Theorem of low-dimensional Diassociative algebras, Bronze Medal , PRPi 09, PEMERAN REKA CIPTA PENYELIDIKAN DAN INOVASI, UPM 2009.
29. Isomorphism Classes of low-dimensional Diassociative algebras, Bronze Medal , PRPi 10, PEMERAN REKA CIPTA PENYELIDIKAN DAN INOVASI, UPM 2010.
30. On low-dimensional filiform Leibniz algebras and Their Invariants, Bronze Medal , PRPi 10, PEMERAN REKA CIPTA PENYELIDIKAN DAN INOVASI, UPM 2010 .
31. An Invariant approach to the Classification Problem of Finite-dimensional filiform Leibniz algebras, Silver Medal , PRPi 32. PEMERAN REKA CIPTA PENYELIDIKAN DAN INOVASI, UPM 2010 .
33. Sijil Penghargaan, ANUGERAH PERKHIDMATAN CEMERLANG, Tahun 2011.
34. Sijil Pengajaran Cemirlang, 2011/2012 MTH3201, Tahun 2012.
35. Sijil Pengajaran Cemirlang, 2011/2012 MTH3103, Tahun 2012.
36. Sijil Pengajaran Cemirlang, 2011/2012 MTH3100, Tahun 2012.
37. Sijil Penyertan, Tahun 2012.
38. Certificate of Appreciation, ISPC 2012, Tahun 2012.
39. Sijil Pengajaran Cemirlang, 2012/2013 MTH4201, Tahun 2013.
40. Sijil Pengajaran Cemirlang, 2012/2013 MTH3202, Tahun 2013.
41. Sijil Penghargaan Perkhidmatan Cemirlang, 2012, Tahun 2013.
42. Sijil Penghargaan, Tahun 2013.
43. Certificate of Appreciation SORIC 2013, Tahun 2013.
44. Sijil Penyertaan SKSM 21, Tahun 2013.
45. Cambridge Certificate for Outstanding Educational Achievement, 2013.
46. Sijil Penghargaan, Tahun 2014.

### **XIII. OTHER ACTIVITIES**

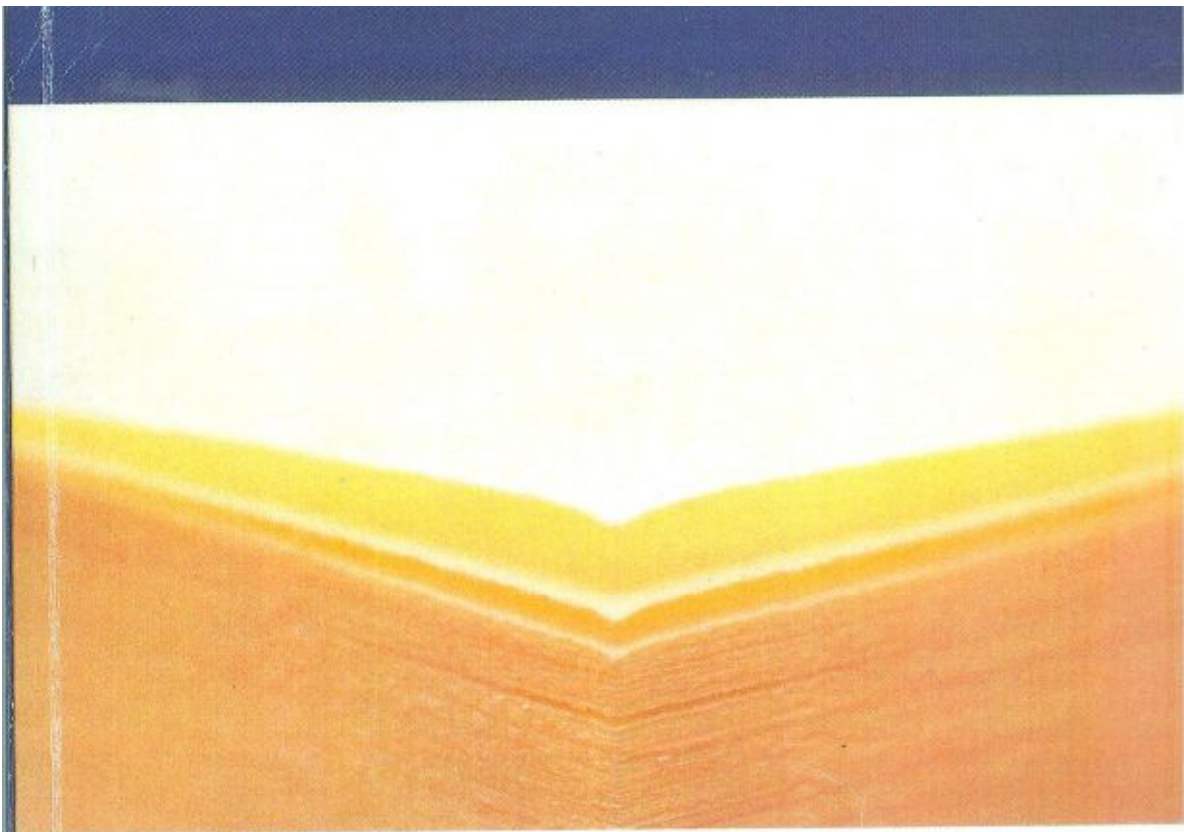
1. Member of Uzbekistan Mathematical Society.
2. Board of editors Research Bulletin INSPERM Math. Digest.
3. Coordinator of INSPERM research program: STRUCTURAL THEORY OF FINITE DIMENSIONAL ALGEBRAS.
4. Member of the INSPERM management committee (2007-2009)
5. Member of Jabatan Matematik seminar committee (2008)
6. Member of Jabatan Matematik Keselamatan dan Kesihatan committee (2009)
7. Coordinator of Weekly Scientific seminar for Researchers and Graduate Students (Laboratory of Theoretical Studies, INSPERM).
8. Mathematical Review (American Mathematical Society)– reviewer.
9. Zentralblatt MATH (European Mathematical Society) – reviewer.

10. Member of the Malaysian Mathematical Science Society.
11. Referee – Local and International journals.

#### **XIV. HOBBY**

1. Volleyball
2. Tennis
3. Swimming

#### **XV. MY BOOKS**

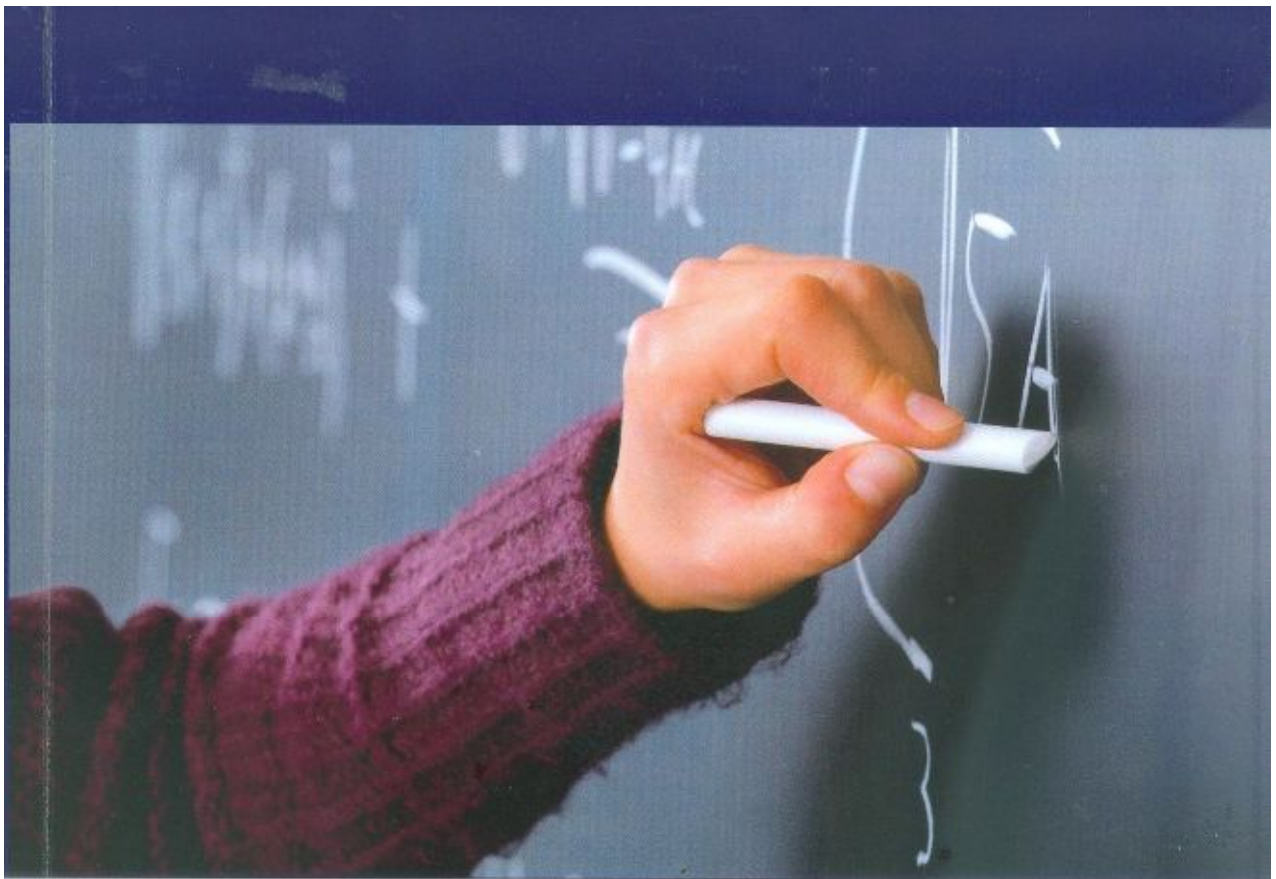


SOZAN J. OBAIYS  
ISAMIDDIN S. R.  
KAMEL A. M. ATAN

# **CLASSIFICATION OF FIRST CLASS OF COMPLEX FILIFORM LEIBNIZ ALGEBRAS**

CLASSIFICATION OF FIRST CLASS 9-DIMENSIONAL  
COMPLEX FILIFORM LEIBNIZ ALGEBRAS

 **LAMBERT**  
Academic Publishing



Isamiddin S. Rakhimov  
Al Hossain Al Nashri  
Kamel A. Mohd Atan

# Derivations of low-dimensional Leibniz Algebras

Characteristically Nilpotent Leibniz algebras

 **LAMBERT**  
Academic Publishing

**INVARIANTS OF THE VARIETIES OF FILIFORM LEIBNIZ  
ALGEBRAS AND ELLIPTIC CURVES**

**ISAMIDDIN S.RAKHIMOV**

**DOCTOR OF SCIENCES IN PHYSICS AND MATHEMATICS**

2011

**KAHFI**



**INTRODUCTION  
TO  
ALGEBRA**

# CURRICULUM VITAE

Date: 24 September, 2014



## ASSOC. PROF. DR. MAHENDRAN SHITAN

Head of Laboratory,  
Laboratory of Computational Statistics and Operations Research,  
Institute for Mathematical Research,  
Universiti Putra Malaysia

### Email

1. sarasmahen@gmail.com
2. mahen@upm.edu.my

### CURRENT POSITION

1. **Head of Laboratory,**  
Laboratory of Computational Statistics and Operations Research,  
Institute for Mathematical Research,  
Universiti Putra Malaysia
2. **Assoc. Prof.,**  
Department of Mathematics,  
Faculty of Science,  
Universiti Putra Malaysia.

## ACADEMIC QUALIFICATION

1. **B. Sc. (Hons)** - Mathematics (First Class Honours),  
Universiti Sains Malaysia
2. **M. App. Sc.** – Mathematical Modelling and Data Analysis,  
Royal Melbourne Institute of Technology (RMIT University).
3. **Ph. D.** – Spatial Models,  
Royal Melbourne Institute of Technology (RMIT University).

## SCHOLARSHIPS

1. Jabatan Perkhidmatan Awam (JPA), Malaysia
2. Australian Merit Scholarship
3. Universiti Putra Malaysia

## MEMBERSHIP

1. Life Member of Institute of Statistics, Malaysia (ISM)
2. Management Science/Operations Research Society of Malaysia (MSORSM)
3. The Malaysian Mathematical Society
4. Academic Officers Association, Universiti Putra Malaysia

## LECTURING EXPERIENCE

1. MTH 5901 - **Research Methods in Mathematics** - PhD/Masters
2. MTH 5416 - **Time Series Analysis** - Masters
3. MTH 5418 - **Spatial Statistical Techniques** - Masters
4. MTH 5415 - **Multivariate Analysis** - Masters
5. MTH 5407 - **Exploratory Data Analysis** - Masters



6. MTH 5409 - **Econometrics** - Masters
7. MTH 4405 - **Introduction to Multivariate Analysis** - Bachelors
8. MTH 4406 - **Time Series** - Bachelors
9. SJES 4457 - **Statistical Time Series** - Bachelors at Universiti Malaya
10. MTK 3601 - **Mechanics** - Bachelors
11. MTH 3401 - **Probability and Statistics I** - Bachelors
12. MTH 3407 - **Intermediate Probability** - Bachelors
13. MTH 3100 - **Calculus** - Bachelors
14. MTH 3003 - **Statistics for Applied Sciences** - Bachelors
15. MTH 3004 - **Mathematics for Business and Finance** - Bachelors
16. MTH 1001 - **Mathematics I** - Diploma
17. MTK 1002 - **Mathematics II** - Diploma
18. MTH 1201 - **Basic Algebra** - Diploma
19. MTH 1401 - **Elementary Statistics** - Diploma

#### **RESEARCH SUPERVISORY EXPERIENCE (THESIS)**

1. Provash Kumar Karmokar - Post Doctoral Studies
2. Norhashidah Awang - Ph. D. - Completed in 2005 - Some Aspect of the Spatial Unilateral Autoregressive Moving Average Model for Regular Grid Data.
3. Alireza Ghodsi (GS20116) - Ph. D. - Completed in 2011 - Properties and Estimation for Fractionally Integrated Spatial Models and Non-Negative Integer-Valued Autoregressive Spatial Models.
4. Thulasyammal Ramiah Pillai - Ph. D. - Completed in 2013 - Generalised Autoregressive Moving Average (GARMA) models.

5. Saidatulnissa Abdullah - Ph. D. - Completed in 2013 - Spatial Models for Regular Grid Data
6. Pauline Mah Jin Wee (GS30043) - Ph. D. - Current - Modelling of Standard Precipitation Index.

#### **RESEARCH CO-SUPERVISORY EXPERIENCE (THESIS)**

1. Maiyastri (Indonesia) - Ph. D. - Completed in 2004 - Modelling and Forecasting the KLCI's Rate of Returns using Generalised Autoregressive Conditional Heteroscedasticity Models.
2. Rafidah Mohamed (Sudan)- Completed in 2009 - Ph. D.- Hierarchical Bayesian Spatial Models for Disease Mortality Rates.
3. Anwar Fitrianto (Indonesia) - Ph. D. - Completed in 2010 - Mediation Analysis in Hierarchical Linear Model with an Extension of Robust Approaches.
4. Ng Soo Thor (GS15824)(Gerentologi) - Ph. D. - Completed in 2010 - Productive Ageing and Quality of Life of Older Persons
5. Akram Hasanov (Uzbekistan) - Completed in 2011 - Ph. D. - Current - Econometric Analysis of Exchange Rate Volatility Effect on Trade.
6. Norhashila Binti Hashim (GS23553) - Ph. D. - Completed in 2012 - Evaluation of Chilling Injury Symptoms in Bananas using Optical Imaging Methods.
7. Fadhilah Abd Razak (UNITEN) - Ph. D. - Completed in 2013 - A Novel Electricity Load Forecasting Technique using Dynamic Regression Intervention Model.
8. Faridah Basaruddin (GS17418) - Ph. D. - Current - Application of Computer Statistical Methods and Neural Network on Multivariate Modelling of Power Load.
9. Maulidiani (GS21751) - Ph. D. - Current - Standardization of *Cantella Asiatica* Extracts using Metabolomic Approach.
10. Mundher Abdullah Khaleel (GS38387) - Ph. D. - Current - The Beta-Weighted Blurr X Distribution Properties and Application.

11. Lim Hock Ann (GS26978) - Ph. D. - Current - Robust Autocorrelation Testing.
12. Pantea Hafezian (UTM) - Ph. D. - Current - Value of Risk Assesment in Sukuk Markets using GARCH models.
13. Faridah Mohamad - Masters - Completed 2002 - Impacts of Exposure to Ambient PM<sub>10</sub> on Hospital Outpatient Visits for Haze-Related Diseases and School Children Lung Function.
14. Prabath K. Jayasinghe (Sri Lanka) - Masters - Completed 2005 - Tidal Influence on the Physico-Chemical Parameters, Temporal and Spatial Distribution of Zooplankton in Langat River Estuarine Area, Malaysia.
15. Chee Thiam Ming - Masters - Completed in 2006 - Multiple Regression Models relating Household Municipal Solid Waste Composition (RDF) and Energy Content of Refuse Derived Fuel.
16. Diana Emang (GS21903) - Masters - Completed in 2011 - Forecasting Major Timber Product Exports from Peninsular Malaysia using ARIMA models.
17. Zahra Memariani (GS28090) - Masters - Completed in 2013 - Examining Malaysian Secondary School Teachers' Perception of Mathematics Education using A Q-Methodology Study.
18. Lam Shi Xiang (GS27333) - Masters - Completed in 2013 - A Network Analysis on Malaysian Stock Market.
19. Nor Farhana Nordin (GS27999) - Masters - Current - Factors Influencing Secondary Students Mathematics Achievement in Selangor: An Application of Structural Equation Modelling Approach.
20. Siti Nur'azhiimah binti Abd Halim (GS34225) - Masters - Current - Determining the Passengers' Show-up Rate in a Selected Airline Industry in Malaysia.

### **PROJECT SUPERVISION**

1. Lua Ek Chuan - Masters - Completed in 2000 - The EWMAST Control Chart for Negatively Correlated Data.

2. Chuah Suan Cheng - Masters - Completed in 2001 - Forecasting Tourist Arrivals to Malaysia.
3. Saidatulnissa Abdullah - Masters - Completed in 2001 - Time Series Modelling of The Malaysian Automobile Sales.
4. Lee Ming Ha - Masters - Completed - The EWMAST Chart for the Second Order Negatively Correlated ARMA Process.
5. Isthriyagy Krishnarajah - Masters - Completed in 2001 - Trend Surface Analysis of Annual Rainfall in Peninsular Malaysia.
6. Foo Chee Farn - Masters - Completed in 2001 - An Alternative EDA Technique for Identifying Uniformly Distributed Data.
7. Fong Wai Sham - Masters - Completed in 2001 - The Spatial Distribution of Linear Alkylbenzenes(LABs) in the Straits of Malacca.
8. Pauline Mah Jin Wee - Masters - Completed in 2002 - ARAR and Long Memory Modelling of Tourist Arrivals to Malaysia.
9. Rofizah Mohammad - Masters - Completed in 2002 - Evolution of the Spatial Distribution of GDP of Asian Countries.
10. Murugason K. Gounder - Masters - Completed in 2002 - The Spatial Distribution of Intentional Oil Spills in the Straits of Malacca.
11. Chin Hong Yee - Masters - Completed in 2004 - Evaluation of the Performance of Bootstrap Estimates for AR(4) and MA(4) processes.
12. Tan Yiing Fei - Masters - Completed in 2004 - A Comparative Study between ARFIMA Models and Intervened Time Series Model for Tourist Arrivals to Malaysia.
13. Chong Kim Yew - Masters - Completed in 2006 - Detection of Outliers for Tourist Arrivals to Malaysia using REGARIMA Model.
14. Peh Koa Peng - Masters - Completed in 2007 - Performance of Estimation Methods for Generalised Moving Average (GMA) Model and Its Applications.

15. Kok Wei Ling - Masters - Completed in 2007 - Spatial Regression of Relative Humidity in Peninsular Malaysia.
16. Teng Mei Tuan - Masters - Completed in 2008 - FISSAR(1,1) model and some of its properties.
17. Turaj Vazifedan - Masters - Completed in 2011 - Modelling Polio Data using the First Order Non-negative Integer-valued Autoregressive, INAR (1) Model.
18. Kabir Bello (GS28448) - Masters - Completed in 2012 - The Performance of Optimal Max-EWMA and Optimal Max-GWMA Charts for Skewed Distributions: A Simulation Study.
19. Ng Yung Lerd (GS31985) - Masters - Completed in 2013 - Econometric Time Series on Rice Production, Malaysia.
20. Liew Khim Seng - Bachelor - Completed in 2000 - The Performance of AICC as Order Determination Criterion in the Selection of ARMA Time Series Models.
21. Lim Thian Nam - Bachelor - Completed in 2002 - Temporal and Spatial Patterns of  $PM_{10}$  at Klang Valley.
22. Chang Siau Kee - Bachelor - Completed in 2010 - A Simulation Study of the Autocorrelation properties of the Generalised Separable Spatial Autoregressive (GENSSAR) Process.
23. Geethampari a/p Subamaniam - Bachelor Completed in 2010 - Investigation Study of ARCH(1) Model driven by First Order Moving Average Errors.
24. Lee Hong Ying - Bachelor -Completed in 2010 - A Simulation Study of the Whittle's Estimation for the Restricted Second Order Generalised Autoregressive GAR(2) Model.
25. Lim Shu Fang - Bachelor - Completed in 2010 - A Simulation Study to obtain the Empirical Level of the Adaptive Test for Paired Data.
26. Lim Kah Weng - Bachelor - Completed in 2011 - A Simulation Study relating to the GAR(1) Model.

27. Ching Yee Guek - Bachelor - Completed in 2011 - Exploratory Data Analysis of Timber Product in Malaysia.
28. Nurul Hidayah bt. Abdul Latiff - Bachelor - Completed in 2011 - Forecasting a case of Export Demand for Sawntimber value in Peninsular Malaysia by using Time Series Analysis.
29. Gan Suet Sze - Bachelor - Completed in 2011 - A study of Mia Gastwirth Test.

## **RESEARCH GRANTS OBTAINED**

### **Project Leader**

1. Short Term Research Grant 1997 for project entitled “Estimation and Hypothesis Testing for Spatial Processes” amounting RM 5,500.
2. Fundamental Research Grant 2002 for project entitled “Regression Models with Second Order Spatially Correlated Errors” amounting RM 10,000.
3. Fundamental Research Grant 2004 for project entitled “Modelling Spatial Phenomena and Time Series Data of Selected Variables” amounting RM 10,600.
4. Fundamental Research Grant 2006 for project entitled “Assessing the influence of Multiple Outliers in Smooth Transition Autoregressive (STAR) Models” and “Properties, Estimation and Hypothesis Testing of FIS-SAR Model” amounting to RM 60,000.
5. Fundamental Research Grant 2009 for project entitled “Properties of Generalized Autoregressive Moving Average (GARMA) Model and Its Applications” amounting to RM 25,000.
6. Fundamental Research Grant 2010 for project entitled “Properties, Estimation and Hypothesis Testing for parameters of the Fractionally Integrated Separable and Non-Separable Spatial Autoregressive Process” amounting to RM 40,000.
7. Research University Grant 2012 for project entitled “Econometric Time Series Modelling of Rice Production in Malaysia and Bangladesh” amounting to RM 44,000.

8. Fundamental Research Grant 2013 for project entitled "A New Copula-based System for Physical Random Phenomena" amounting to RM 61,000.

#### **Co-researcher**

1. IRPA 2004 for project entitled "Robust Regression with both continuous and categorical variables with heteroscedastic non-normal errors" amounting to RM 169,000.
2. Fundamental Research Grant 2011 for project entitled "Robust Diagnostics and Robust Estimation of Garch Model in the presence of outliers" amounting to RM 68,000.
3. Research University Grant 2012 for project entitled "A Novel Water Quality Index for Langat River" amounting to RM 39,000.

#### **REVIEWER/EDITORIAL MEMBER**

1. Associate Editor of Sri Lankan Journal of Applied Statistics
2. Technical/Managing Editor for Malaysian Journal of Mathematical Sciences.
3. Guest Editor of Special Issue of PERTANIKA Journal of Science and Technology - Universiti Putra Malaysia
4. Communications in Statistics: Theory and Methods
5. PERTANIKA Journal of Science and Technology - Universiti Putra Malaysia
6. Jurnal Sains - Universiti Kebangsaan Malaysia
7. Journal Technology C - Universiti Teknologi Malaysia
8. Referee to the Proceedings of *The International Statistics Conference: Statistical Concepts and Methods for the Modern World*, 28-30 December, 2011, Colombo (Jointly organised by Institute of Applied Statistics Sri Lanka, School of Mathematics and Statistics, University of Sydney and Department of Statistics, University of Colombo, Sri Lanka).

9. Referee for the AIP Conference Proceedings Paper presented at ICMSS2013.

## INTELLECTUAL PROPERTY

1. Copyright obtained for the product " *A Statistical Software for Predicting Copepod NAUPLII Densities in the Straits of Malacca* ", 2006

## ACADEMIC PUBLICATIONS

### Books

1. **Mahendran Shitan** and Turaj Vazifedan (2011), *Exploratory Data Analysis for Almost Anyone*, UPM Press, Serdang, ISBN No.978-967-344-259-1.
2. **Mahendran Shitan** and Mohd Bakri Adam (2014), *Analisis Data Terokaan untuk hampir kesemua*, UPM Press, Serdang, ISBN No.978-967-344-381-9.

### Books (Editorial Works)

1. **Mahendran Shitan**, Lai Soon Lee and Zainidin K. Eshkuvatov (2014), *Statistics and Operational Research International Conference AIP Conference Proceedings*, AIP Publishing, Melville, New York, ISBN No. 978-0-7354-1249-1.

### Book Chapters

1. Zalina Mohd Ali, Noor Akma Ibrahim, Kerrie Mengersen, **Mahendran Shitan**, Hafizan Juahir and Faridatul Azna Ahmad Shahabuddin (2012), Temporal Water Quality Assessment of Langat River from 1995-2006, In Kostas Voudoris and Dimitra Voutsas, *Water Quality Monitoring and Assessment*, Page 321-346 InTech, ISBN No.978-953-51-0485-5.
2. Zalina Mohd Ali, Noor Akma Ibrahim, Kerrie Mengersen, **Mahendran Shitan** and Hafizan Juahir, (2014), Discriminant Analysis of Water Quality Data in Langat River, *From Sources to Solution*, Page 597-601, ISBN No. 978-981-4560-69-6.



## Journals

1. **Mahendran Shitan** and Peter J. Brockwell (1995), An Asymptotic Test for Separability of a Spatial Autoregressive Model, *Commun. Statist.- Theory Meth.*, 24(8), 2027-2040.
2. Liew Khim Seng and **Mahendran Shitan** (2002), The Performance of AICC as an Order Selection Criterion in ARMA Time Series Models, *PERTANIKA - Journal of Science & Technology*, Vol. 10 No. 1, 25-33, January 2002.
3. Liew Khim Seng, **Mahendran Shitan** and Huzaimi Hussain, (2003), Time Series Modelling and Forecasting of Sarawak Black Pepper Price, *Jurnal Akademik UiTM Sarawak*, June 2003, 39-55.
4. Saidatulnisa Binti Abdullah and **Mahendran Shitan**, (2003), Time Series Modelling of Malaysian Automobile Sales, *Science Putra Research Bulletin*, Vol. 11 No. 1, 13-18, Jan 2003.
5. Norhashidah Awang and **Mahendran Shitan**, (2006), Estimating the Parameters of the Second Order Spatial Unilateral Autoregressive Model, *International Journal of Statistical Sciences*, Vol. 5, 2006, pp 37-58.
6. **Mahendran Shitan**, Pauline Mah Jin Wee, Lim Ying Siew and Lim Ying Chin (2006), Air Pollution Index Determination using ARIMA and ARFIMA Time Series Models. *Journal of Engineering Science*, Vol. 2, 53-60, 2006.
7. **Mahendran Shitan**, (2008), Fractionally Integrated Separable Spatial Autoregressive (FISSAR) Model and Some of its Properties , *Commun. Statist.- Theory Meth.*, 37(8), 1266-1273.
8. **Mahendran Shitan** and Shelton Peiris (2008), Generalised Autoregressive GAR (1) Model: A Comparison of Maximum Likelihood and Whittle Estimation Procedures using A Simulation Study, *Commun. Statist.- Simulation and Computation*, 37(3), 560-570.
9. Kamel Ariffin Mohd Atan, Rustem Suncheleev, **Mahendran Shitan** and Mohd. Shafie bin Mustafa (2008), Animated Introductory Calculus: Development and Perception, *Journal of US-China Education Review*, March, 2008, Vol. 5, No. 3 (Serial No. 40)

10. Liew Khim Seng, **Mahendran Shitan**, Choong Chee Keong and Hooy Chee Woi (2008), Performance of Autoregressive Order Selection Criteria: A Simulation Study. *PERTANIKA - Journal of Science & Technology*, Vol 16(2), 171-176.
11. **Mahendran Shitan**, Pauline Mah Jin Wee, Lim Ying Chin and Lim Ying Siew (2008), ARIMA and Integrated ARFIMA Models for Forecasting Annual Demersal and Pelagic Marine Fish Production in Malaysia, *Malaysian Journal of Mathematical Sciences (Special Edition)*, Vol 2, No. 2, 41-54.
12. **Mahendran Shitan** (2008), A Note on the Variance of Generalized First Order Autoregressive Processes with Moving Average Errors, *InterStat* No.2, August, 2008.
13. **Mahendran Shitan** (2008), Time Series Modelling of Tourist Arrivals to Malaysia, *InterStat* No. 5, October, 2008.
14. **Mahendran Shitan**, Hernando Ombao and Kok Wei Ling (2009), Spatial Modelling of Peak Frequencies of Brain Signals, *Malaysian Journal of Mathematical Sciences*, Vol 3, No.1, 13-26.
15. Saidatulnisa Abdullah and **Mahendran Shitan**, (2009), Some Explicit Conditions for a Stationary Representation of the Unilateral Second-Order Spatial ARMA Model, *PERTANIKA - Journal of Science & Technology*, Vol 17(1), 163-171.
16. Alireza Ghodsi and **Mahendran Shitan**(2009), Estimation of the Memory Parameters of the Fractionally Integrated Separable Spatial Autoregressive (FISSAR(1,1)) Model: A Simulation Study. *Commun. Statist.- Simulation and Computation*, 38(6), 1256-1268.
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18. Rafida M. Elobaid, **Mahendran Shitan**, Noor Akma Ibrahim, Awang N.A. Ghani and Isa Daud (2009), Evolution of Spatial Correlation of Mean Diameter of Trees in Natural Dipterocarp Forest, *Journal of Mathematics and Statistics*, 5(4):267-269.

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21. **Mahendran Shitan**, Shelton Peiris and Peh Koa Peng (2009), The Forecasting Performance of the Moving Average (MA) Model and the Generalized Moving Average (GMA) Model, *Journal of Applied Statistical Science*, Vol. 17, Issue 3, 351-362.
22. **Mahendran Shitan** and Shelton Peiris (2009), A Note on the Properties of Generalised Separable Spatial Autoregressive (GENSSAR) Process, *Journal of Probability and Statistics*, Volume 2009, Article ID 847830.
23. Thulasayammal Ramiah Pillai, **Mahendran Shitan** and Shelton Peiris (2009), Time Series Properties of the Class of First Order Autoregressive Processes with Generalised Moving Average Errors, *Journal of Statistics: Advances in Theory and Application*, Vol 2, No. 1, September Issue, 71-92.
24. **Mahendran Shitan** and Teng Mei Tuan (2009), A Simulation Study of the Covariance and Correlation Properties of the Fractionally Integrated Separable Spatial Autoregressive (FISSAR) Model, *Journal of Statistics: Advances in Theory and Application*, Vol 2, No. 1, September Issue, 93-111.
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26. **Mahendran Shitan** and Shelton Peiris (2011), Time Series Properties of the Class of Generalized First Order Autoregressive Processes with Moving Average Errors, *Commun. Statist.-Theory Meth.*, 40(13), 2259-2275.

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30. Provash Kumar Karmokar, **Mahendran Shitan** and A. B. M. Rabiul Alam Beg (2011), Multicointegration Analysis on the High Yielding Boro Rice of Six Selected Districts in Bangladesh, *African Journal of Agricultural Research*, Vol. 6(19), 4654-4660.
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32. Thulasyammal R. Pillai, **Mahendran Shitan** and Shelton Peiris (2012), Some Properties of the Generalised Autoregressive Moving Average (GARMA(1,1, $\delta_1, \delta_2$ )) Model, *Commun. Statist.-Theory Meth.*, 41(4), 699-716.
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34. Provash Kumar Karmokar and **Mahendran Shitan** (2012), Investigating Impact of Outliers in both Independent and Dependent Variables on Agricultural Production Data, *Journal of Food, Agriculture & Environment*, Vol. 10(1), 573-577.

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36. Turaj Vazifedan and **Mahendran Shitan** (2012), Modelling Polio Data using The First-Order Non-Negative Integer Valued Autoregressive, INAR(1) Model, *International Conference on Mathematical and Computational Biology 2011, International Journal of Modern Physics: Conference Series*, Vol. 9 (2012), 232-239.
37. Hazel Monica Matias-Peralta, Alireza Ghodsi, **Mahendran Shitan** and Fatimah Md. Yusoff (2012), Probability Models for the Distribution of Copepods in Different Coastal Ecosystems along the Straits of Malacca, *International Conference on Mathematical and Computational Biology 2011, International Journal of Modern Physics: Conference Series*, Vol. 9, 316-325.
38. Thulasiammal Ramiah Pillai and **Mahendran Shitan**(2012), An Illustration of Generalised ARMA (GARMA) Time Series Modelling of Forest Area in Malaysia, *International Conference on Mathematical and Computational Biology 2011, International Journal of Modern Physics: Conference Series*, Vol. 9, 390-397.
39. Provash Kumar Karmokar and **Mahendran Shitan** (2012), Computation of Extreme-Value Parameters and Inference by Approximation Covariance Technique, *Pakistan Journal of Statistics*, Vol. 28(2), 259-269.
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- Stock Correlation Network, *Applied Mathematical Sciences*, Vol. 6, No. 104, 5161-5178.
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  44. Provash Kumar Karmokar, **Mahendran Shitan** and Ranjan Kumar Kundu (2012), Factors Affecting the Yield of High Yielding Variety Boro Rice: An Evidence from Rajshahi District of Bangladesh, *Journal of Food, Agriculture and Environment*, Vol. 10 (3 & 4), 492-495.
  45. Akram Shavkatovich Hasanov and **Mahendran Shitan**(2012), Modelling Inflation Volatility form Two Post-Soviet Economies, *International Journal of Statistical Sciences*, Vol. 12, pp 9-27.
  46. **Mahendran Shitan**, Mina Mahbub Hossain and Mehdi Rajeb (2012), A Re-Analysis of Time Series Modelling of Bangladesh Export Values, *International Journal of Statistical Sciences*, Vol. 12, pp 79-88.
  47. **Mahendran Shitan** and Shelton Peiris (2013), Approximate Asymptotic Variance-Covariance Matrix for the Whittle Estimators of GAR(1) Parameters, *Commun. Statist - Theory Meth.*, 42(5):756-770.
  48. Norhashila Hashim, Rimfiel B. Janius, Russly Abdul Rahman, Azizah Osman, **Mahendran Shitan** and Manuela Zude (2013), Application of Coumputer Vision in the Detection of Chilling Injury in Bananas, *Pertanika Journal of Science and Technology*, Vol. 21(1), 111-118.
  49. Provash Kumar Karmokar, **Mahendran Shitan** and A. B. M. Rabiul Alam Beg (2013), Long-run Relationship of the HYV Boro Rice Yields in the Northern Region of Bangladesh, *Journal of Food, Agriculture and Environment*, Vol. 11(1), 441-444.
  50. Alireza Ghodsi and **Mahendran Shitan**(2013), Some Properties of the Normalised Periodogram of Fractionally Integrated Separable Spatial ARMA (FISSARMA) Models, *Commun. Statist - Theory Meth.*, 42(8), 1515-1530.

51. Zalina Mohd Ali, Noor Akma Ibrahim, Kerrie Mengersen, **Mahendran Shitan** and Hafizan Juahir (2013), New Relative Importance of Water Quality Variables in Langat River, *International Journal of Chemical and Environmental Engineering*, Vol. 4, No. 1, 25-31.
52. Alireza Ghodsi and **Mahendran Shitan**(2013), First-Order Fractionally Integrated Non-Separable Spatial Autoregressive (FINSSAR(1,1)) Model and Some of its Properties, *Pakistan Journal of Statistics and Operation Research*, Vol. 9, No.1, pp 1- 16.
53. Sarkhosh Seddighi Chaharborj, Fudziah Ismail1, Fakhreddin Abedi and **Mahendran Shitan** (2013), Quadrupole mass filter with fuzzy initial conditions, *Advances in Difference Equations*, 1-12.
54. Nazrul Islam Mondal and **Mahendran Shitan**(2013), Factors affecting the HIV/AIDS Epidemic: An Ecological Analysis of Global Data, *African Health Sciences*, Vol. 13 Issue 2, 294-303.
55. Pauline Mah Jin Wee and **Mahendran Shitan**(2013), Modelling Rainfall Duration and Severity using Copula, *Sri Lankan Journal of Applied Statistics*, Vol. 14 No. 1, 13-26.
56. Nazrul Islam Mondal and **Mahendran Shitan**(2013), Projection of Human Immunodeficiency Virus among High Risk Groups in Malaysia, *Japanese Journal of Infectious Diseases*, Vol 66 No 5, 421-424.
57. Norhashila Hashim, Michael Pflanz, Christian Regen, Rimfiel B. Janius, Russly Abdul Rahman, Azizah Osman, **Mahendran Shitan** and Manuela Zude (2013), An Approach for Monitoring the Chilling Injury Appearance in Bananas by Means of Backscattering Imaging, *Journal of Food Engineering*, Vol. 116, Issue 1, 28-36.
58. Maulidiani, Faridah Abas, Alfi Khatib,**Mahendran Shitan**, Khozirah Shaari, Nordin H. Lajis (2013), Comparison of partial least squares and artificial neural network for the prediction of antioxidant activity in extract of Pegaga (Centella) varieties from  $^1H$  nuclear magnetic resonance spectroscopy, *Food Research International*, Vol. 54, Issue 1, 852-860.

59. Md. Nazrul Islam Mondal and **Mahendran Shitan**(2013), HIV/AIDS Epidemic in Malaysia: Vulnerability and Risk of Women, *Asian Journal of Humanities and Social Studies*, Vol. 01, Issue 05, 274-283.
60. Md. Nazrul Islam Mondal and **Mahendran Shitan**(2013), Impact of Socio-Health Factors on Life Expectancy in the Low and Lower Middle Income Countries, *Iranian J. Publ. Health*, Vol. 42, No. 12, 1354-1362.
61. Pauline Mah Jin Wee and **Mahendran Shitan**(2013), Modelling Rain-fall Duration and Severity using Copulas in Sik, Kedah, *Malaysia Water Research Journal*, Vol. 4 No. 2, 15-27.
62. Zalina Mohd Ali, Noor Akma Ibrahim, Kerrie Mengersen, **Mahendran Shitan** and Hafizan Juahir, (2013), Statistical Perspective of River Surface Water Quality, *Malaysia Water Research Journal*, Vol. 4 No.2 Page 50-63.
63. Zalina Mohd Ali, Noor Akma Ibrahim, Kerrie Mengersen, **Mahendran Shitan** and Hafizan Juahir, (2013), Comparison Analysis of Classical PCA and Robust PCA in WQI Development, *Malaysia Water Research Journal*, Vol. 4 No.2 Page 64-78.
64. Akram Hasanov and **Mahendran Shitan**(2014), Volatility Model Estimations of Palm Oil Price Returns via Long Memory, Asymmetric and Heavy-Tailed GARCH Parameterization, *Malaysian Journal of Mathematical Sciences*, 8(1), 15-34.
65. Md. Nazrul Islam Mondal and **Mahendran Shitan**(2014), Relative Importance of Demographic, Socioeconomic and Health Factors on Life Expectancy in Low and Lower-Middle Income Countries, *J. Epidemiol.*, 24(2), 117-124.
66. Fadhilah Abd. Razak, **Mahendran Shitan**, Amir H. Hashim, Izhan Z. Abidin (2014), Dynamic Regression Intervention Modelling for the Malaysian Daily Load, *Pakistan Journal of Statistics and Operation Research*, Vol. 10, No.1, pp 41-55.
67. Noraishah Mohammad Sham, Isthriyaygy Krishnarajah, **Mahendran Shitan**, Munn-Sann Lye (2014), Time Series Model on Hand, Foot and Mouth Disease, *Asian Pacific Journal of Tropical Disease*, Vol. 4, Issue 6, 469-472.



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70. Thulasymmam Ramiah Pillai and **Mahendran Shitan**(2014), Some Properties of the Generalised Autoregressive Moving Average (GARMA(1, 2;  $\delta$ , 1)) Model, *Commun. Statist - Theory Meth.*, Paper has been accepted for publication.
71. Ng Yung Lerd, **Mahendran Shitan**, Provash Kumar Karmokar (2014), Long-run Relationship between Yield of Rice in Perak and Selangor, Malaysia, Submitted to *Pakistan Journal of Statistics*.

### Proceedings

1. **Mahendran Shitan** (1997), A Graphical Method to determine the Stability of Spatial Models, *Proceedings of International Conference on Computational Mathematics*, 116-129, 8-10 Dec 1997, Bangkok.
2. **Mahendran Shitan** (1998), Parameter Constraints for the Stability of the Spatial AR(2,1) Model, *Paper presented at the Malaysian Science and Technology Congress*, Nov 1998, Universiti Sains Malaysia.
3. **Mahendran Shitan** and P. Krishnan (1999), An Investigative Study of the Test for Separability of Spatial Models for Moderate Sample Sizes, *Proceedings of Seminar of the Faculty of Economics, UKM*, 157-169, 2-3 Oct, 1999, Port Dickson.
4. Lau Ek Chuan and **Mahendran Shitan** (2000), The Performance of EWMAST Chart for Negatively Correlated Data, *Proceedings of International Conference on Mathematics and Its Applications in the New Millenium*, 348-356, UPM, 18-19 July, 2000.
5. Norhashidah Awang, Muhammad Idress Ahmad and **Mahendran Shitan**, (2001), A Comparative Study of Forecasting Models for Daily

- Maximum Values of Selected Air Pollutants in Klang, Malaysia, *Proceedings of the National Symposium of Mathematical Sciences*, 198-201, UKM, , 18-20 July, 2001, Bangi.
6. Fong Wai Sham and **Mahendran Shitan**, (2001), The Spatial Distribution of Linear Alkylbenzenes (LABs) in the Straits of Malacca, (Paper presented at the 2<sup>nd</sup> *International Conference on the Straits of Malacca*, 15-18 Oct, 2001, Penang).
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  8. Rofizah bt. Mohammad and **Mahendran Shitan**, (2002), Evolution of the Spatial Distribution of GDP of Asian Countries, *Proceedings of Asia Pacific Economics and Business Conference*, 700-703, UPM, UNIMAS and PETA, Vol. 1, 2-4 Oct, 2002, Kuching.
  9. **Mahendran Shitan** and Murugeson Kalliana (2003), A Resistant Line Fit between Zn and Co found in Estuary and Coastal Sediment Samples from Tanjung Karang and Pulau Langkawi., *Proceedings of UPM-JICA Project Workshop*, 377-381, 14-16 Jan, 2003, Putrajaya.
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  12. Norhashidah Awang, **Mahendran Shitan**, Isa Daud and Mohd Rizam Abu Bakar, (2003), The Explicit Correlation Structure for the Second Order Spatial Unilateral ARMA Model over the Fourth Quadrant, *Proceedings of Hawaii International Conference on Statistics and Related Fields*, 5-8 June, 2003, Honolulu.

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15. F. M. Yusoff, R. P. P. K. Jayasinghe, P. Kuppan, **Mahendran Shitan** and A. Arshad, (2003), Zooplankton Distribution along a Tropical River-Estuarine System, *Proceedings of the First Joint Seminar on Coastal Oceanography*, 44-58, 14-16 December, 2003, Chiang Mai, Thailand.
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3. Member of the Consulting Team for Malaysian Examination Council.
4. Consultancy project entitled " *Development of Post-Hardening Index (PHI) for Palm-based Blends*" for Malaysia Palm Oil Board (2011).
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