2016

UTM – ITB

ALGEBRA SEMINAR

15 May 2016

Applied Algebra and Analysis Group (AAAG)
Frontier Materials Research Alliance
Universiti Teknologi Malaysia, Johor Bahru

2016

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Foreword by Research Group Leader – AAAG, UTM

Welcome to UTM-ITB Algebra Seminar 2016!

This is the second UTM-ITB Algebra Seminar after our joint seminar in 2011 at ITB, Indonesia. The main purpose of the seminar is to collaborate and exchange research ideas amongst the algebraists especially from the countries of Malaysia and Indonesia.

Selected seven researchers from Applied Algebra and Analysis Group, Universiti Teknologi Malaysia, one from Universiti Putra Malaysia, and five from ITB will be presenting their latest research work in this seminar. We also have participants from universities all around Malaysia.

For researchers from Algebra Research Group, ITB, I welcome all of you to UTM Johor Bahru, Malaysia. I hope our collaboration will continue to flourish in the future.

To other participants from Malaysia, may this be the start of our future collaboration too.

Thank you all for coming!!

PROF. DR. NOR HANIZA SARMIN

Foreword by Research Group Leader - Algebra Research Group, ITB

I am happy to watch that the second UTM-ITB Algebra Seminar 15 May 2016 being held. It is a sign that the seminar which was initiated three years ago is maintained its continuity.

From ITB, we present six presenters from various topics of study that are expected to fairly represent the field of interest of our group. Beside to disseminate our new research results, in this seminar we hope to get comments and inputs on the topics we present for future development. We also hope that in this seminar we can learn a lot from the presentations of the UTM.

Finally we hope that the cooperation between Applied Algebra and Analysis Group UTM and Algebra Research Group ITB is maintained and strengthened.

PROF. DR. PUDJI ASTUTI

Committee Members

1. Prof. Dr. Nor Haniza Sarmin (UTM) (Advisor)
2. Dr. Nor Muhainiah Mohd Ali (UTM) (Chair)
3. Assoc. Prof. Dr. Intan Muchtadi (ITB)
4. Dr. Fong Wan Heng (UTM)
5. Dr. Gantina Rachmaputri (ITB)

Name of Presenters

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Institut Teknologi Bandung (ITB), Indonesia

1. Aditya Purwa Santika, Dr.
2. Defita, S.Si.
3. Gantina Rachmaputri, Dr.
4. Khaerudin Saleh
5. Samsul Arifin, S.Si., M.Sc.
6. Sri Rosdiana, S.Si., M.Si.

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1. Adnin Afifi Nawi
2. Ibrahim Gambo
3. Muhanizah Abdul Hamid
4. Norarida Md Rhani
5. Rabiha Birka
6. Sharifah Kartini Said Husain, Dr (UPM)
7. Siti Norziahidayu Amzee Zamri
8. Siti Afiqah Mohammad

Name of Participants

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2. Afif Humam
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1. Amira Fadina Ahmad Fadzil
2. Aqilah Farhana Abdul Rahman
3. Fadhilah Abu Bakar
4. Fong Wan Heng, Dr.
5. Mustafa Anis El-Sanfaz
6. Nor Haniza Sarmin, Prof. Dr.
7. Nor Muhainiah Mohd Ali, Dr.
8. Nurhidaya Mohd Jan
9. Nurhidayah Zaid

Others Institutions

1. Athirah Nawawi, Dr. (UPM)
2. Ayu Ameliatul Shahilah binti Ahmad Jamri (UPM)
3. Azrul Azim Mohd Yunus (USIM)
4. Hanita binti Hashim (UNISEL)

5. Hemilda Owen Anak Welfred (UPM)
6. Kavikumar Jacob, Assoc. Prof. Dr. (UTHM)
7. Khuenissa Grace Bt Lawrence (UPM)
8. Mohd Sham Mohamad, Dr. (UMP)
9. Muhammad Yaakob bin Ali Tam (UPM)
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11. Norhezan bt Umar (UNISEL)
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16. Yati Ashikin Abd Wahab (UNISEL)
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SCHEDULE OF UTM-ITB ALGEBRA SEMINAR & ACADEMIC VISIT
(14 MAY 2016 TO 15 MAY 2016)

DATE	ACTIVITY
14 May 2016 (Saturday)	Departure from Bandung to Senai Airport Check in Scholars Inn, UTM JB
15 May 2016 (Sunday)	Algebra Seminar 2016:
8.00 am – 8.30 am	Registration
8.30 am – 9.30 am	Opening Speech Foreword by Research Group Leader A3G, UTM Foreword by Group Leader Algebra Research Group, ITB
9.30 am – 10.00 am	Refreshment
10.00 am – 12.20 pm	Session 1 Presentation by 1 Speaker from UPM, 3 speakers from UTM and 3 Speakers from ITB
12.20 pm – 2.00 pm	Lunch Break
2.00 pm – 4.20 pm	Session 2 Presentation by 4 Speakers from UTM and 3 Speakers from ITB
4.20 pm – 4.45 pm	Closing Speech
4.45 pm – 5.00 pm	Afternoon Tea
16 May 2015 (Monday)	Departure to Bandung from Senai Airport

ABSTRACT

GENERALIZED DERIVATIONS OF LEIBNIZ ALGEBRAS

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Abstract

This talk introduces the concept of generalized derivations of Leibniz algebras and studied their properties. The definition of the generalized derivation depends on some parameters and in particular values of the parameters, we obtain classical concept of derivation and its generalizations. We give classifications of the generalized derivations of low dimensional Leibniz algebras. Subspaces of generalized derivations of the Leibniz algebras and their structures are studied.

Keywords : Leibniz algebra; derivation; endomorphism; generalized derivation; isomorphism

NOTES ON BEHAVIOR AROUND INFINITE POLES

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Abstract

We shall study the structure of truncated Laurent series spaces that associated with a behavior of a linear system around infinite poles. We will show that the truncated Laurent series module over a formal series ring have an important role as a state space of a linear system around infinite poles. This study deduced by identifying properties and structures of a bilinear on the truncated Laurent series space. Furthermore, we also study some properties of the behavior around infinite poles.

Keywords : Behavior; Bilinear; Dynamical system; Pole; Truncated Laurent series

THE SCHUR MULTIPLIER OF PAIRS OF GROUPS OF ORDER p^3q

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Assist Prof Dr Samad Rashid
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Abstract

Let (G,N) be a pair of groups in which N is a normal subgroup of G. Then, the Schur multiplier of pairs of groups (G,N), denoted by $M(G,N)$, is an extension of the Schur multiplier of a group G, which is a functorial abelian group. In this research, the Schur multiplier of pairs of all groups of order p^3q where p is an odd prime and $p < q$ is determined.

Keywords: Schur multiplier; pairs of groups; groups of order p^3q

THE *p*-REGULAR SUBSPACE AND ITS INVARIANCE UNDER DERIVED EQUIVALENCE

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Abstract

Substructure of centre of a group algebra called *p*-regular subspace is related to conjugacy class of group elements whose order is not divisible by a prime *p*. This subspace is spanned by class sums of *p*-regular conjugacy classes, i.e. conjugacy classes of elements which orders are not divisible by *p*. The dimension of this subspace is related to the number of isomorphism classes of simple modules over the group algebra.

This research identifies *p*-regular subspace as the dual of the intersection of the images of p^n-power maps in commutator quotient space, for every positive integer *n*. We use this identification to study the invariance of *p*-regular subspace under derived equivalence. As this identification does not depend on the order of elements in group, we can extend this definition to any symmetric algebra. As examples, we determine *p*-regular subspaces of Nakayama algebra, algebra of dihedral type and algebra of semidihedral type. Furthermore, we also study the invariance of *p*-regular subspace of symmetric path algebras under derived equivalence.

Keywords: Derived category; Derived equivalence; Group algebra; p-regular subspace; Symmetric algebra

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THE CUBED COMMUTATIVITY DEGREE OF SOME DIHEDRAL GROUPS

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Abstract

Let *G* be a finite group. The commutativity degree of a group is the probability that a random pair of elements in the group commute. Furthermore, the *n*-th power commutativity degree of a group is a generalization of the commutativity degree of a group which is defined as the probability that the *n*-th power of a random pair of elements in the group commute. In this research, the *n*-th power commutativity degree for some dihedral groups is computed for the case *n* equal to 3, called the cubed commutativity degree.

Keywords: Commutativity degree; Dihedral groups; Finite Groups

VALUATION DIMENSION OF THE RING OF INTEGERS

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Abstract

A valuation ring is a commutative ring whose ideals are totally ordered by inclusion. Recently Ghorbani and Nazemian (2015) introduced the notion of valuation dimension of a commutative ring which measures how far of the ring deviates from being valuation. In this talk we will introduce the valuation dimension's notion and show a method to determine the valuation dimension of the ring of integers. Further, we will indicate how this method can be extended to examine the valuation dimensions of principal ideal domains.

Keywords : uniserial dimension; valuation dimension; valuation ring, principa ideal domain

THE CENTRAL SUBGROUP OF A BIEBERBACH GROUP WITH QUATERNION POINT GROUP OF ORDER EIGHT

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Abstract

A Bieberbach group is a torsion free crystallographic group, which is an extension of a free abelian group *L* of finite rank by a finite group *P*. Bieberbach groups of a crystal expounds its symmetrical properties. One of the symmetrical properties is the central subgroup of the nonabelian tensor square of a group. The nonabelian tensor square of a group is requisite on finding the other homological functors. One of the methods to explicate the nonabelian tensor square is to ensure the presentation of the group is polycyclic and to prove its consistency. In this research, the polycyclic presentation of a Bieberbach group with quaternion point group of order eight is shown to be consistent. Then, the computation of the central subgroup of this group will be shown.

Keywords: Central Subgroup; Bieberbach groups; Quaternion point group

THE SUBSET RELATIVE DEGREE OF A FINITE GROUP

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Abstract

Let G be a group, H any subgroup of G and X any subset of G. The commutativity degree of a finite group G is the probability that a random pair of elements in a group commute. The concept of commutativity degree has been extended to the relative commutativity degree of a group which is defined as the probability for a random element of subgroup H and a random element of a group G to commute with one another. In this research, the concept of relative commutativity degree is further extended to the subset relative degree of a group G, which is defined as the probability of a subset X to be a subgroup of a group G. Furthermore, the upper and lower bounds for the subset relative degree of a finite group are determined.

Keywords: Commutativity degree; relative commutativity degree; finite group.

LINEAR CODES OVER $\mathbb{Z}_8 + v\mathbb{Z}_8$

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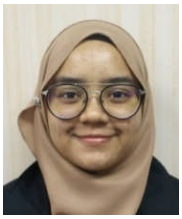
Abstract

In this paper we present linear codes over the ring $\mathbb{Z}_8 + v\mathbb{Z}_8$, where $v^2 = v$. We define Gray weight, Gray maps for linear codes, and we investigate MacWilliams identity for the complete weight enumerator and symmetric weight enumerator. Beside that, we construct self-dual codes, MDS codes, and cyclic codes.

Keywords : Cyclic codes; MacWilliams identity; Self-dual codes

ON THE PROBABILITY THAT AN ELEMENT OF A METACYCLIC 3-GROUP FIXES A SET BY CONJUGATE ACTION



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Abstract

Research on commutativity degree has been done by many authors since 1944. The commutativity degree is defined as the probability that a pair of elements in a group G commute. In this research, an extension of the commutativity degree known as the probability that an element of a group fixes a set Ω is explored. The group G in our scope is metacyclic 3-group and the set Ω is the subset of all commuting elements in the group, while the group action is conjugation. The probability that an element of G fixes a set Ω is computed using the number of conjugacy classes. The result turns out to depend on the order of Ω.

Keywords: commutativity degree, metacyclic 3-group, conjugate action

ON THE STRUCTURE OF FINITELY GENERATED PRIMARY MODULE

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Abstract

We will present the structure of a finitely generated primary module over a principle ideal domain. Especially the structure of endomorphism ring and the fully invariant submodule can be identified in term of a cyclic decomposition of the module. Furthermore, we will present its application in S-prime submodule.

Keywords : Endomorphism ring; Fully invariant submodules; Primary modules; Principal ideal domain

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ON THE ENERGY OF CONJUGACY CLASS GRAPH OF DIHEDRAL GROUPS

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Abstract

The energy of a graph Γ, which is denoted by $\varepsilon(\Gamma)$, is defined to be the sum of the absolute values of the eigenvalues of its adjacency matrix. In this talk the concepts of conjugacy class graph of dihedral groups are presented and the general formula for the energy of this graph found. All graphs considered in this paper are finite, simple and undirected.

Keywords: Energy of graph, conjugacy class graph, eigenvalues, dihedral groups.

EQUIVALENCE THEOREM FOR THE LEE WEIGHT ON CERTAIN FIELDS AND RINGS

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Abstract

Two linear codes can have same error correcting capability if they are isometric. Every monomial map is isometry but the converse is not always true. Mac Williams Equivalence Theorem states that every Hamming weight isometry between codes over fields is a monomial map. Wood generalized the equivalence theorem by considering weights other than Hamming weight. Wood claimed and proved that the Lee weight and Euclidean weight satisfy the equivalence theorem for the resiude ring $\mathbb{Z}_N$ for N is on the form 2^k or 3^k, N is a prime number of the form $N = 2p + 1$, where p is prime. For $N = 4p + 1$, Aleams Barra proved that the equivalence theorem is fulfilled, and here we will try to prove for $N = 4p + 1$ and $N = 2^k$ in different way from before.

Keywords : Distance preserving; Hamming Weights; Isometric; Lee Weights; Monomial map

A NEW FORM OF FUZZY GENERALIZED BI Γ –IDEALS IN ORDERED Γ –SEMIGROUP

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Abstract

The formation of ordered gamma semigroup by the complete chains of semigroups play an important role in the broad study of ordered semigroups whereas the ordered gamma semigroups serves as the generalization of ordered semigroups. In this talk, a new concept of fuzzy generalized bi- gamma ideals of ordered gamma semigroup is introduced. We studied that the level subset $\mathbf{U}(\lambda; t)(\neq \emptyset)$ and the fuzzy subset λ of an ordered gamma semigroup G coincide in ordered gamma semigroup G. Likewise, we show that A being a non-empty subset of generalized bi gamma ideal of G is also generalized bi gamma ideal of G if and only if the characteristic function of χ_A is the new form of fuzzy generalized bi gamma ideal of G.

Keywords: New form of fuzzy generalized bi gamma ideals, Ordered gamma semigroup,

Fuzzy point, Generalized bi gamma ideals.

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