THE SIXTH CHINA-JAPAN-KOREA INTERNATIONAL CONFERENCE ON RING AND MODULE THEORY

June 27- July 2, 2011

Kyung Hee University at Suwon

Korea

Schedule

First day: Monday, June 27   Registration

Second day: Tuesday, June 28

Opening Ceremony (09:00 – 09:15) **Jin Yong Kim**			
Time	Plenary Speakers		
09:20 – 09:50	Hideto Asashiba		
09:55 – 10:25	Jianlong Chen		
10:30 – 11:00	Yang Lee		
11:00 – 11:10	**Coffee Break**		
11:10 – 11:40	Mohammad Ashraf		
11:45 – 12:15	Toma Albu		
12:15 – 14:00	**Lunch**		
	Invited Speakers		
	Session I	Session II	Session III
14:00 – 14:20	Rekha Rani	Huiling Song	Frimpong Ebenezer Kwabena
14:25 – 14:45	John S. Kauta	Liang Shen	Radwan M. Alomary
14:50 – 15:10	Shakir Ali	Yasuhiko Takehana	Faiza Shujat
15:10 – 15:20	**Coffee Break**		
15:20 – 15:40	Mamoru Kutami	Larry Xue	Claus Haetinger
15:45 – 16:05	B. N. Waphare	Sang Cheol Lee	Almas Khan
16:05 – 16:15	**Coffee Break**		
16:15 – 16:35	Jian Cui	Fahad Sikander	Wang Yanhua
16:40 – 17:00	Juncheol Han	Ayazul Hasan	Malik Rashid Jamal

Third day: Wednesday, June 29

Time	Plenary Speakers		
09:00 – 09:30	Changchang Xi		
09:35 – 10:05	Izuru Mori		
10:10 – 10:40	W. Keith Nicholson		
10:40 – 10:50	**Coffee Break**		
10:50 – 11:20	Pjek-Hwee Lee		
11:25 – 11:55	S. Tariq Rizvi		
12:00 – 12:30	Pace P. Nielsen		
12:30 – 14:00	**Lunch**		
	Invited Speakers		
	Session I	Session II	Session III
14:00 – 14:20	Tsiu-Kwen Lee	Xian Wang	Nadeem ur Rehman
14:25 – 14:45	Lixin Mao	Yosuke Kuratomi	Yong Uk Cho
14:50 – 15:10	Nam Kyun Kim	Mohd. Yahya Abbasi	Abu Zaid Ansari
15:10 – 15:20	**Coffee Break**		
15:20 – 15:40	Chris Ryan	Nguyen Viet Dung	M. Salahuddin Khan
15:45 – 16:05	Hisaya Tsutsui	Fatemeh Dehghani-Zadeh	Norihiro Nakashima
16:05 – 16:15	**Coffee Break**		
16:15 – 16:35	Yasuyuki Hirano	Gangyong Lee	Kazunori Nakamoto
16:40 – 17:00	Jung Wook Lim	Cosmin Roman	Hirotaka Koga
18:00 – 20:00	**Banquet**		

Fourth day : Thursday, June 30 Sightseeing

Fifth day : Friday, July 1

Time	Plenary Speakers		
09:00 – 09:30	Kiyoichi Oshiro		
09:35 – 10:05	Chan Yong Hong		
10:10 – 10:40	Nanqing Ding		
10:40 – 10:50	**Coffee Break**		
10:50 – 11:20	Miguel Ferrero		
11:25 – 11:55	Mohamed Yousif		
12:00 – 13:30	**Lunch**		
	Invited Speakers		
	Session I	Session II	Session III
13:30 – 13:50	Yiqiang Zhou	Sarapee Chairat	Kenta Ueyama
13:55 – 14:15	Thomas Dorsey	Hong You	Takao Hayami
14:20 – 14:40	Nazer Halimi	Kazuho Ozeki	Fumiya Suenobu
14:40 – 14:50	**Coffee Break**		
14:50 – 15:10	Muzibur Rahman Mozumder	Asma Ali	Takahiko Furuya
15:15 – 15:35	Chang Ik Lee	Mohammad Javad Nematollahi	Ajda Fosner
15:40 – 16:00	Alexander Diesl	Yahya Talebi	Jia-Feng Lu
16:00 – 16:10	**Coffee Break**		
16:10 – 16:30	Da Woon Jung	Tugba Guroglu	Ebrahim Hashemi
16:35 – 16:55	WooYoung Chin		Mohammad Shadab Khan

Program

Tuesday, June 28

09:00 - 09:15 **Opening Ceremony Room: 211-1**

Jin Yong Kim, Kyung Hee University, Korea

Plenary Session **Room: 211-1**

09:20 - 11:00 **Chair: Jin Yong Kim (Kyung Hee University)**

09:20 - 09:50 *Derived equivalences and Grothendieck constructions of lax functors*

Hideto Asashiba, Shizuoka University, Japan

09:55 - 10:25 *On quasipolar rings*

Jianlong Chen, Southeast University, China

10:30 - 11:00 *Radicals of skew polynomial rings and skew Laurent polynomial rings*

Yang Lee, Pusan National University, Korea

11:00 - 12:15 **Chair: Nanqing Ding (Nanjing University)**

11:10 - 11:40 *JORDAN TRIPLE ($\sigma;\tau$)-HIGHER DERIVATIONS IN RINGS*

Mohammad Ashraf, Aligarh Muslim University, India

11:45 - 12:15 *The Osofsky-Smith Theorem for modular lattices, and applications*

Toma Albu, Simion Stoilow Institute of Mathematics of the Romanian Academy, Romania

Branch Session I **Room: 211-1**

14:00 - 15:10 **Chair: Chan Yong Hong (Kyung Hee University)**

14:00 - 14:20 *Some decomposition theorems for rings*

Rekha Rani, N.R.E.C., College, India

14:25 - 14:45 *On a class of hereditary crossed-product orders*

John S. Kauta, Universiti Brunei Darussalam, Brunei

14:50 - 15:10 *On derivations in *-rings and H*-algebras*

Shakir Ali, Aligarh Muslim University, India

15:20 - 16:05 **Chair: Pace P. Nielsen (Brigham Young University)**

15:20 - 15:40 *Von Neumann regular rings with generalized almost comparability*

Mamoru Kutami, Yamaguchi University, Japan

15:45 - 16:05 *On unitification problem of weakly rickart *-rings*

B. N. Waphare, University of Pune, India

16:15 - 17:00 **Chair: Yiqiang Zhou (Memorial University of Newfoundland)**

16:15 - 16:35 *The McCoy condition on modules*

Jian Cui*, Southeast University, China

Jianlong Chen, Southeast University, China

16:40 - 17:00 *Generalized commuting idempotents in rings*

Juncheol Han*, Pusan National University, Korea

Sangwon Park, Dong-A University, Korea

Branch Session II **Room: 218**

14:00 - 15:10 **Chair: Quanshui Wu (Fudan University)**

14:00 - 14:20 *A new pseudorandom number generator using an Artin-Schreier tower*

Huiling Song*, Hiroshima University and Harbin Finance University, Japan

Hiroyuki Ito, Tokyo University of Science, Japan

14:25 - 14:45 *On countably* Σ*-C2 rings*

Liang Shen*, Southeast University, China

Jianlong Chen, Southeast University, China

14:50 - 15:10 *A generalization of hereditary torsion theory and their dualization*

Yasuhiko Takehana, Hakodate national college, Japan

15:20 - 16:05 **Chair: Sangwon Park (Dong-A University)**

15:20 - 15:40 *The Galoie Map and its Induced Maps*

Larry Xue*, Bradley University, United States

George Szeto, Bradley University, United States

15:45 - 16:05 *The Quillen splitting lemma*

Sang Cheol Lee*, Chonbuk National University, Korea

Yeong Moo Song, Suncheon National University, Korea

16:15 - 17:00 **Chair: Hiroshi Yoshimura (Yamaguchi University)**

16:15 - 16:35 *Generalization of basic and large submodules of QTAG-modules*

Fahad Sikander*, Aligarh Muslim University, India

Sabah A R K Naji, Aligarh Muslim University, India

16:40 - 17:00 *Elongations of QTAG-modules*

Ayazul Hasan*, Aligarh Muslim University, India

Sabah A R K Naji, Aligarh Muslim University, India

Branch Session III **Room: 219**

14:00 - 15:10	**Chair: Nam Kyun Kim (Hanbat National University)**
14:00 - 14:20	*High pass rate of ring and module theory by students*
	Frimpong Ebenezer Kwabena, Ternopil State Medical University/ Pharmacology, Ukraine
14:25 - 14:45	**-Lie ideals and generalized derivations on prime rings*
	Radwan Mohammed Alomary*, Aligarh Muslim University, India
	Nadeem ur Rehman, Aligarh Muslim University, India
14:50 - 15:10	*On Lie ideals and centralizing derivations in semiprime rings*
	Faiza Shujat*, Aligarh Muslim University, India
	Asma Ali, Aligarh Muslim University, India

15:20 - 16:05	**Chair: Mohammad Ashraf (Aligarh Muslim University)**
15:20 - 15:40	*On Lie structure of prime rings with generalized (α,β)-derivations*
	Claus Haetinger*, Univates University Center, Brazil
	Nadeem ur Rehman, Aligarh Muslim University, India
	Radwan Alomary, Aligarh Muslim University, India
15:45 - 16:05	*Identities with generalized derivations of semiprime rings*
	Almas Khan, Aligarh Muslim University, India

16:15 - 17:00	**Chair: Ebrahim Hashemi (Shahrood University)**
16:15 - 16:35	*A class of non-Hopf bi-Frobenius algebras*
	Wang Yanhua, Shanghai University of Finance and Economics, China
16:40 - 17:00	*Some differential identities in prime gamma-rings*
	Malik Rashid Jamal*, Aligarh Muslim University, India
	Mohammad Ashraf, Aligarh Muslim University, India

Wednesday, June 29

Plenary Session **Room: 211-1**

09:00 - 10:40	**Chair: Hideto Asashiba (Shizuoka University)**
09:00 - 09:30	*Tilting modules and stratification of derived module categories* Changchang Xi*, Beijing Normal University, China Hongxing Chen, Beijing Normal University, China
09:35 - 10:05	*McKay Type Correspondence for AS-regular Algebras* Izuru Mori, Shizuoka University, Japan
10:10 - 10:40	*Strong Lifting Splits* W. Keith Nicholson*, University of Calgary, Canada M. Alkan, Akdeniz University, Turkey A. Cigdem Ozcan, Hacettepe University, Turkey
10:50 - 12:30	**Chair: Yang Lee (Pusan National University)**
10:50 - 11:20	*Herstein's Questions on Simple Rings revisited* Pjek-Hwee Lee, National Taiwan University, Taiwan
11:25 - 11:55	*Direct Sum Problem for Baer and Rickart Modules* S. Tariq Rizvi, The Ohio State University, United States
12:00 - 12:30	*Dedekind-finite strongly clean rings* Pace P. Nielsen, Brigham Young University, United States

Branch Session I **Room: 211-1**

14:00 - 15:10	**Chair: Chan Huh (Pusan National University)**
14:00 - 14:20	*Derivations modulo elementary operators*
	Tsiu-Kwen Lee*, National Taiwan University, Taiwan
	Chen-Lian Chuang, National Taiwan University, Taiwan
14:25 - 14:45	*Simple-Baer rings and minannihilator modules*
	Lixin Mao, Nanjing Institute of Technology, China
14:50 - 15:10	*The McCoy theorem on non-commutative rings*
	Nam Kyun Kim*, Hanbat National University, Korea
	C.Y. Hong, Kyung Hee University, Korea
	Y. Lee, Pusan National University, Korea

15:20 - 16:05	**Chair: Miguel Ferrero (Universidade Federal do Rio Grande de Sul)**
15:20 - 15:40	*Decomposition theory of modules and applications to quasi-Baer rings*
	Chris Ryan*, University of Louisiana at Lafayette, United States
	Gary Birkenmeier, University of Louisiana at Lafayette, United States
15:45 - 16:05	*On fully prime rings*
	Hisaya Tsutsui, Embry-Riddle University, United States

16:15 - 17:00	**Chair: Tsiu-Kwen Lee (National Taiwan University)**
16:15 - 16:35	*Homogeneous functions on rings*
	Yasuyuki Hirano, Naruto University of Education, Japan
16:40 - 17:00	*A characterization of some integral domains of the form $A+B[\Gamma^*]$*
	Jung Wook Lim*, POSTECH, Korea
	Byung Gyun Kang, POSTECH, Korea

Branch Session II	**Room: 218**

14:00 - 15:10	**Chair: Yoshitomo Baba (Osaka Kyoiku University)**
14:00 - 14:20	*Local derivations of a matrix algebra over a commutative ring*
	Xian Wang,, China University of Mining and Technology, China
14:25 - 14:45	*Relative mono-injective modules and relative mono-ojective modules*
	Yosuke Kuratomi*, Kitakyushu National College of Technology, Japan
	Derya Keskin Tütüncü, University of Hacettepe, Turkey
14:50 - 15:10	*HF-modules and isomorphic high submodules of QTAG-modules*
	Mohd. Yahya Abbasi, Jamia Millia Islamia, India

15:20 - 16:05	**Chair: S. Tariq Rizvi (The Ohio State University)**
15:20 - 15:40	*Rings whose left modules are direct sums of finitely generated modules*
	Nguyen Viet Dung, Ohio University, United States
15:45 - 16:05	*Finiteness properties Generalized local cohomology with respect to an ideal containing the irrelevant ideal*
	Fatemeh Dehghani-Zadeh, Islamic Azad University, Iran

16:15 - 17:00	**Chair: Toma Albu (Simion Stoilow Institute of Math. of the Romanian Academy)**
16:15 - 16:35	*On Endoregular Modules*
	Gangyong Lee*, The Ohio State University, United States
	S. Tariq Rizvi, The Ohio State University, United States
	Cosmin Roman, The Ohio State University, United States
16:40 - 17:00	*Modules whose endomorphism rings are von Neumann regular*
	Cosmin Roman*, The Ohio State University, United States
	Gangyong Lee, The Ohio State University, United States
	S. Tariq Rizvi, The Ohio State University, United States

Branch Session III **Room: 219**

14:00 - 15:10	**Chair: Yasuyuki Hirano (Naruto University of Education)**
14:00 - 14:20	*On n-commuting and n-skew-commuting maps with generalized derivations in rings*
	Nadeem ur Rehman, Aligarh Muslim University, India
14:25 - 14:45	*Some results on s.g. near-rings and <R,S>-groups*
	Yong Uk Cho, Silla University, Korea
14:50 - 15:10	*Lie ideals and generalized derivations in semiprime rings*
	Abu Zaid Ansari, Aligarh Muslim University, India

15:20 - 16:05	**Chair: Izuru Mori (Shizuoka University)**
15:20 - 15:40	*On Orthogonal (σ, τ)-Derivations in Γ-Rings*
	M. Salahuddin Khan*, Aligarh Muslim University, India
	Shakir Ali, Aligarh Muslim University, India
15:45 - 16:05	*Modules of Differential Operators of a Generic Hyperplane Arrangement*
	Norihiro Nakashima*, Hokkaido University, Japan
	Go Okuyama, Hokkaido Institute of Technology, Japan
	Mutsumi Saito, Hokkaido University, Japan

16:15 - 17:00	**Chair: Nguyen Viet Dung (Ohio University)**
16:15 - 16:35	*Topics on the moduli of representations of degree 2*
	Kazunori Nakamoto, University of Yamanashi, Japan
16:40 - 17:00	*On mutation of tilting modules over noetherian algebras*
	Hirotaka Koga, University of Tsukuba, Japan

Friday, July 1

Plenary Session **Room: 211-1**

09:00 - 10:40 **Chair: Masahisa Sato (University of Yamanashi)**

09:00 - 09:30 *On the Faith conjecture*

Kiyoichi Oshiro, Yamaguchi University, Japan

09:35 - 10:05 *The Minimal Prime Spectrum of Rings with Annihilator Conditions and Property (A)*

Chan Yong Hong, Kyung Hee University, Korea

10:10 - 10:40 *On Gorenstein modules*

Nanqing Ding, Nanjing University, China

10:50 - 11:55 **Chair: Jianlong Chen (Southeast University)**

10:50 - 11:20 *Partial Actions of Groups on Semiprime Rings*

Miguel Ferrero, Universidade Federal do Rio Grande de Sul, Brazil

11:25 - 11:55 *Recent developments on projective and injective modules*

Mohamed Yousif, The Ohio State University, United States

Branch Session I **Room: 211-1**

13:30 - 14:40	**Chair: Juncheol Han (Pusan National University)**
13:30 - 13:50	*A class of clean rings*
	Yiqiang Zhou, Memorial University of Newfoundland, Canada
13:55 - 14:15	*Strongly Clean Matrix Rings*
	Thomas Dorsey*, CCR-La Jolla, United States
	Alexander Diesl, Wellesley College, United States
14:20 - 14:40	*Star operation on Orders in Simple Artinian Rings*
	Nazer Halimi, The University of Queensl, Australia
14:50 - 16:00	**Chair: Mamoru Kutami (Yamaguchi University)**
14:50 - 15:10	*Generalized Derivations on prime rings*
	Muzibur Rahman Mozumder*, National Taiwan University, Taiwan
	Tsiu-Kwen Lee, National Taiwan University, Taiwan
15:15 - 15:35	*Some Generalization of IFP Rings and McCoy Rings*
	Chang Ik Lee*, Pusan National University, Korea
	Yang Lee, Pusan National university, Korea
15:40 - 16:00	*Some results and new questions about clean rings*
	Alexander Diesl, Wellesley College, United States
16:10 - 16:55	**Chair: Hong Kee Kim (Gyeongsang National University)**
16:10 - 16:30	*Nil-Armendariz rings and upper nilradicals*
	Da Woon Jung*, Pusan National University, Korea
	Yang Lee, Pusan National University, Korea
	Sung Pil Yang, Pusan National University, Korea
	Nam Kyun Kim, Hanbat National University, Korea
16:35 - 16:55	*Insertion-of-factors-property on nilpotent elements*
	Wooyoung Chin*, Korea Science Academy of KAIST, Korea
	Jineon Baek, Korea Science Academy of KAIST, Korea
	Jiwoong Choi, Korea Science Academy of KAIST, Korea
	Taehyun Eom, Korea Science Academy of KAIST, Korea
	Young Cheol Jeon, Korea Science Academy of KAIST, Korea

Branch Session II **Room: 218**

13:30 - 14:40 **Chair: Yingbo Zhang (Beijing Normal University)**

13:30 - 13:50 *On rings over which the injective hull of each cyclic module is Sigma-extending*

Sarapee Chairat*, Thaksin University, Thailand

Chitlada Somsup, Thaksin University, Thailand

Maliwan Tunapan, Thaksin University, Thailand

Dinh Van Huynh, Ohio University, United States

13:55 - 14:15 *Structure of augmentation quotions for integral group rings*

Hong You*, Soochow University, China

Qingxia Zhou, Harbin Institute of Technology, China

14:20 - 14:40 *Hilbert coefficients of parameter ideals*

Kazuho Ozeki, Meiji University, Japan

14:50 - 16:00 **Chair: Changchang Xi (Beijing Normal University)**

14:50 - 15:10 *Differentiability of torsion theories*

Asma Ali, Aligarh Muslim University, India

15:15 - 15:35 *H_δ-supplemented modules*

Mohammad Javad Nematollahi, Islamic Azad University, Iran

15:40 - 16:00 *Modules Whose Non-cosingular Submodules are Direct Summand*

Yahya Talebi*, University of Mazandaran, Iran

M. Hosseinpour, University of Mazandaran, Iran

A. R. Moniri Hamzekolaei, University of Mazandaran, Iran

16:10 - 16:55 **Chair: Kazuho Ozeki (Meiji University)**

16:10 - 16:30 *A Note On Variation Of Supplemented Modules*

Tugba Guroglu*, Celal Bayar University, Turkey

Gokhan Bilhan, Dokuz Eylül University, Turkey

Branch Session III **Room: 219**

13:30 - 14:40	**Chair: Kiyoichi Oshiro (Yamaguchi University)**
13:30 - 13:50	*Some results on AS-Gorenstein algebras*
	Kenta Ueyama, Shizuoka University, Japan
13:55 - 14:15	*Hochschild cohomology ring of the integral group ring of the semi-dihedral group*
	Takao Hayami, Hokkai-Gakuen University, Japan
14:20 - 14:40	*Study on the algebraic structures in terms of geometry and deformation theory*
	Fumiya Suenobu*, Hiroshima University, Japan
	Fujio Kubo, Hiroshima University, Japan

14:50 - 16:00	**Chair: Pjek-Hwee Lee (National Taiwan University)**
14:50 - 15:10	*Support varieties for modules over stacked monomial algebras*
	Takahiko Furuya*, Tokyo University of Science, Japan
	Nicole Snashall, University of Leicester, United Kingdom
15:15 - 15:35	*Maps preserving matrix pairs with zero Lie or Jordan product*
	Ajda Fosner, University of Primorska, Slovenia
15:40 - 16:00	*Introduction to piecewise-Koszul algebras*
	Jia-Feng Lu, Zhejiang Normal University, China

16:10 - 16:55	**Chair: Takahiko Furuya (Tokyo University of Science)**
16:10 - 16:30	*On near modules over skew polynomials*
	Ebrahim Hashemi, Shahrood University of Technology, Iran
16:35 - 16:55	*On Decomposition Theorems for Near Rings*
	Mohammad Shadab Khan, Aligarh Muslim University, India

THE SIXTH CHINA-JAPAN-KOREA
INTERNATIONAL CONFERENCE ON RING AND MODULE THEORY
June 27- July 2, 2011

- June 27 (Monday), 10:00 - 17:00 Registration at the Dormitory of Kyung Hee University
- June 28 (Tuesday), 09:00 - 09:15 Opening Ceremony (Room 211-1)
  Jin Yong Kim (Kyung Hee University)

• Plenary Session

• Branch Session I

• Branch Session II

Plenary Session

PS-1 June 28(Tuesday), 09:20-09:50 / 211-1 : Hideto Asashiba (Shizuoka University)

Derived equivalences and Grothendieck constructions of lax functors

We fix a commutative ring $\Bbbk$ and a small category I, and denote by $\Bbbk$-**Cat** the 2-category of $\Bbbk$-categories. As a generalization of a group action on a $\Bbbk$-category, we consider a functor $X : I \to \Bbbk\text{-}\mathbf{Cat}$ (when I is a group regared as a category with a single object $*$, this is just a group action on $X(*)$). We first consider how to define its "module category" Mod$X$ and "derived category" $\mathcal{D}(\text{Mod}X)$ to investigate derived equivalences of those X. If I is not a groupoid, then an expected candidate of the definition does not work within the limits of functors, and it needs to define them as (op)lax functors, even for which Grothendieck [2, Exposé VI §8] constructed a category Gr(X) (it coincides with the orbit category $X(*)/I$ when I is a group). Therefore we work over oplax functors $I \to \Bbbk\text{-}\mathbf{Cat}$, the class of which forms a 2-category $\overleftarrow{\text{Oplax}}(I, \Bbbk\text{-}\mathbf{Cat})$ as explained in [3], and for each oplax functor X in it, we will define Mod$X$, $\mathcal{D}(\text{Mod}X)$ as oplax functors in it. For X, X' in $\overleftarrow{\text{Oplax}}(I, \Bbbk\text{-}\mathbf{Cat})$ they are defined to be *derived equivalent* if $\mathcal{D}(\text{Mod}X)$ and $\mathcal{D}(\text{Mod}X')$ are equivalent in the 2-category $\overleftarrow{\text{Oplax}}(I, \Bbbk\text{-}\mathbf{Tri})$, where $\Bbbk$-**Tri** is the 2-category of $\Bbbk$-linear triangulated categories. An oplax functor X is called $\Bbbk$-*flat* if $X(i)(x, y)$ is a flat $\Bbbk$-module for each $i \in I$ and $x, y \in X(i)$. Note that all oplax functors are $\Bbbk$-flat when $\Bbbk$ is a field. Our main result is the following:

Theorem. *Let X and X' be oplax functors $I \to \Bbbk\text{-}\mathbf{Cat}$ and consider the following conditions.*

(1) *X and X' are derived equivalent;*
(2) *There exists a "tilting oplax subfunctor" T for X such that T and X' are equivalent in $\overleftarrow{\text{Oplax}}(I, \Bbbk\text{-}\mathbf{Cat})$;*
(3) Gr(X) *and* Gr(X') *are derived equivalent.*

Then

(a) (1) $\Rightarrow$ (2)*;*
(b) (2) $\Rightarrow$ (3)*; and*
(c) *If X' is $\Bbbk$-flat, then* (2) $\Rightarrow$ (1).

Remark. (i) The statements (a) and (c) give a generalization of the Morita type theorem characterizing derived equivalences of categories by Rickard and Keller in our setting.

(ii) The statement (b) gives a generalization of [1, Theorem 4.11].

(iii) By (a) and (b), we have (1) $\Rightarrow$ (3). As an easy application, this gives a unified proof of the fact that if A and A' are derived equivalent $\Bbbk$-algebras, then so are their quiver algebras AQ, $A'Q$, incidence algebras AS, $A'S$ and semigroup algebras AG, $A'G$ for all quivers Q, posets S and semigroups G.

References

[1] Asashiba, H.: A generalization of Gabriel's Galois covering functors and derived equivalences, arXiv:0807.4706, to appear in J. Alg.

[2] Grothendieck, A.: SGA 1.

[3] Tamaki, D.: *Grothendieck constructions for enriched categories*, preprint, arXiv:0907,0061.

PS-2 June 28(Tuesday), 09:55-10:25 / 211-1 : Jianlong Chen (Southeast University)

On quasipolar rings

It is well known that the generalized inverse is closely related to the regularity, e.g., an element of a ring is strongly regular iff it has a group inverse; an element of a ring is strongly π-regular iff it has a Drazin inverse. In 1996, Koliha defined the notion of a generalized Drazin inverse, and the concept of quasipolar elements in rings is introduced by the same author in 2002, it was shown that an element in a ring R has a generalized Drazin inverse iff it is quasipolar in R. Recall that an element a of a ring R is called quasipolar if there exists $p^2 = p \in R$ such that $p \in \mathrm{comm}_R^2(a)$, $a + p \in U(R)$ and $ap \in R^{qnil}$; the idempotent p is said to be a spectral idempotent of a. In this talk, we call a ring R quasipolar if each element in R is quasipolar. Local rings, strongly π-regular rings and abelian semiregular rings (e.g., uniquely clean rings) are quasipolar, and quasipolar rings are strongly clean. In particular, we show that every strongly π-regular element in a ring R is quasipolar and every quasipolar element in R is strongly clean by establishing the following result: for a module M, $\alpha \in \mathrm{end}(M)$ is quasipolar iff there exist strongly α-invariant submodules P and Q such that $M = P \oplus Q$, $\alpha|_P$ is an isomorphism and $\alpha|_Q$ is quasinilpotent (This can be viewed as a generalization of Fitting's lemma). A class of quasipolar rings are given through triangular matrix rings. It is proved that every $n \times n$ triangular matrix ring over a commutative uniquely clean ring or a uniquely bleached local ring is quasipolar. Furthermore, we determine when a 2×2 matrix over a commutative local ring is quasipolar in terms of solvability of the characteristic equation. Consequently, we obtain several equivalent conditions for the 2×2 matrix ring over a commutative local ring to be quasipolar.

Keywords: Quasipolar ring; strongly clean ring; strongly π-regular ring; local ring; spectral idempotent.

PS-3 June 28(Tuesday), 10:30-11:00 / 211-1 : Yang Lee*(Pusan National University), Chan Yong Hong(Kyung Hee University), Nam Kyun Kim(Hanbat National University)

Radicals of skew polynomial rings and skew Laurent polynomial rings

We first introduce the σ-Wedderburn radical and the σ-Levitzki radical of a ring R, where σ is an automorphism of R. Using the properties of these radicals, we study the Wedderburn radical of the skew polynomial ring $R[x;\sigma]$ and the skew Laurent polynomial ring $R[x,x^{-1};\sigma]$, and next observe the Levitzki radical of $R[x;\sigma]$ and $R[x,x^{-1};\sigma]$. Furthermore we characterize the upper nilradical of $R[x;\sigma]$ and $R[x,x^{-1};\sigma]$, via the upper σ-nil radical of R.

PS-4 June 28(Tuesday), 11:10-11:40 / 211-1 : MOHAMMAD ASHRAF(Aligarh Muslim University)

JORDAN TRIPLE (σ,τ)-HIGHER DERIVATIONS IN RINGS

Let R be an associative ring and σ,τ be endomorphisms of R. An additive mapping $d : R \to R$ is said to be a (σ,τ)-derivation on R if $d(xy) = d(x)\tau(y) + \sigma(x)d(y)$ holds for all $x,y \in R$. Brešer [J. Algebra 127(1989)] introduced the notion of Jordan triple derivation as follows: A Jordan triple derivation d of a ring R is an additive mapping $d : R \to R$ such that $d(aba) = d(a)ba+ad(b)a+abd(a)$, for every $a,b \in R$. An additive mapping $\delta : R \to R$ is said to be a Jordan triple (σ,τ)-derivation on R if $\delta(aba) = \delta(a)\tau(b)\tau(a) + \sigma(a)\delta(b)\tau(a) + \sigma(a)\sigma(b)\delta(a)$ holds for all $a,b \in R$. Following Liu and Shiue [Taiwanese J. Math. 11 (2007)], an additive mapping $F : R \to R$ is said to be a generalized Jordan triple (σ,τ)-derivation if there exists a Jordan triple (σ,τ)-derivation $\delta : R \to R$ such that $F(aba) = F(a)\tau(b)\tau(a) + \sigma(a)\delta(b)\tau(a) + \sigma(a)\sigma(b)\delta(a)$ holds for all $a,b \in R$. The concept of higher derivation was extended to (σ,τ)-higher derivation by the author together with Almas and Haetinger [Int. Electronic J. Algebra 8(2010)] Let $D = \{d_n\}_{n\in\mathbb{N}}$ be a family of additive maps $d_n : R \to R$. Then D is said to be a (σ,τ)-higher derivation on R if $d_0 = I_R$, and $d_n(ab) = \sum_{i+j=n} d_i(\sigma^{n-i}(a))d_j(\tau^{n-j}(b))$ holds for all $a,b \in R$ and for each $n \in \mathbb{N}$. A family $F = \{f_n\}_{n\in\mathbb{N}}$ of additive mappings $f_n : R \to R$ is said to be generalized (σ,τ)-higher derivation of R if there exists a (σ,τ)-higher derivation $D = \{d_n\}_{n\in\mathbb{N}}$ of R such that $f_0 = I_R$, and $f_n(ab) = \sum_{i+j=n} f_i(\sigma^{n-i}(a))d_j(\tau^{n-j}(b))$ for all $a,b \in R$ and for each $n \in \mathbb{N}$. Motivated by the concept of Jordan triple derivation and generalized (σ,τ)-higher derivation we introduce generalized Jordan triple (σ,τ)-higher derivation as follows: a family $F = \{f_n\}_{n\in\mathbb{N}}$ of additive mappings $f_n : R \to R$ is said to be a generalized Jordan triple (σ,τ)-higher derivation of R if there exists a (σ,τ)-higher derivation $D = \{d_n\}_{n\in\mathbb{N}}$ of R such that $f_0 = I_R$, and $f_n(aba) = \sum_{i+j+k=n} f_i(\sigma^{n-i}(a))d_j(\sigma^k\tau^i(b))d_k(\tau^{n-k}(a))$ holds for all $a,b \in R$ and every $n \in \mathbb{N}$. It can be easily seen that on a 2-torsion free ring R, every generalized (σ,τ)-higher derivation of R is a generalized Jordan triple (σ,τ)-higher derivation of R but the converse need not be true in general. In the present talk our objective is to discuss the conditions on R under which every generalized Jordan triple (σ,τ)-higher derivation of R becomes a generalized (σ,τ)-higher derivation of R.

PS-5 June 28(Tuesday), 11:45-12:15 / 211-1 : TOMA ALBU (Simion Stoilow Institute of Mathematics of the Romanian Academy)

THE OSOFSKY-SMITH THEOREM FOR MODULAR LATTICES AND APPLICATIONS

In this talk we present a latticial version of the renown Osofsky-Smith Theorem saying that a cyclic right R-module having all of its subfactors extending (i.e., CS) is a finite direct sum of uniform submodules. Though the Osofsky-Smith Theorem is a module-theoretical result, our contention is that it is a result of a strong latticial nature. Applications to Grothendieck categories and module categories equipped with a torsion theory are given.

Branch Session I

BS1-1 June 28(Tuesday), 14:00-14:20/ 211-1 : Rekha Rani (N.R.E.C., College)

Some decomposition theorems for rings

Using commutativity of rings satisfying $(xy)^{n(x,y)} = xy$ proved by Searcoid and MacHale [16], Ligh and Luh [13] have given a direct sum decomposition for rings with the mentioned condition. Further Bell and Ligh [9] sharpened the result and obtained a decomposition theorem for rings with the property $xy = (xy)^2 f(x,y)$ where $f(X,Y) \in Z$, the ring of polynomials in two noncommuting indeterminates. In the present paper we continue the study and investigate structure of certain rings and near rings satisfying the following condition which is more general than the mentioned conditions : $xy = p(x,y)$, where $p(x,y)$ is an admissible polynomial in Z. Moreover we deduce the commutativity of such rings. In fact we prove the following result:
Theorem 2.1. Let R be a ring such that for each $x, y \in R$ there exists an admissible $p(X,Y) \in Z$ for which $xy = p(x,y)$. Then R is periodic and commutative. Moreover, $R = P \uplus N$, where P is a subring and N is a subnear ring with trivial multiplication.

BS1-2 June 28(Tuesday), 14:25-14:45/ 211-1 : John S. Kauta (Universiti Brunei Darussalam)

On a class of hereditary crossed-product orders

In [1], D. E. Haile introduced a class of crossed product orders over a valuation ring of the following form: Let F be a field, let V be a discrete valuation ring of F, let K be a finite Galois extension of F with group G, and let S be the integral closure of V in K. Let $f : G \times G \mapsto K \setminus \{0\}$ be a normalized two-cocycle such that $f(G \times G) \subseteq S \setminus \{0\}$, *but we do not require that f should take values in $U(S)$, the group of multiplicative units of S.* One can construct a crossed-product V-algebra $A_f = \sum_{\sigma \in G} Sx_\sigma$ in a natural way. Then A_f is associative, with identity $1 = x_1$, and center $V = Vx_1$. Further, A_f is a V-order in the crossed-product F-algebra $(K/F, G, f) = \sum_{\sigma \in G} Kx_\sigma$. Observe that, since we do not require that $f(G \times G) \subseteq U(S)$, the study of these orders constitutes a drastic departure from the classical theory of crossed-product orders over DVRs, such as can be found in [2]. Let $H = \{\sigma \in G \mid f(\sigma, \sigma^{-1}) \in U(S)\}$. Then H is a subgroup of G. On G/H, the left coset space of G by H, one can define a partial ordering by the rule $\sigma H \leq \tau H \quad \text{if} \quad f(\sigma, \sigma^{-1}\tau) \in U(S)$. Then "$\leq$" is well-defined, and depends only on the cohomology class of f over S. Further, H is the unique least element. Haile called this partial ordering on G/H *the graph of f*. If V is unramified in K, Haile determined, among other things, conditions equivalent to such orders being maximal orders, making heavy use of both the two-cocycle f and its graph. In this talk, we will present simple but useful criteria, which involve only the two-cocycle f, for determining whether or not A_f is a hereditary order, or a maximal order. As in [1], we will always assuming that V is unramified in K.

REFERENCES

[1] D. E. Haile, *Crossed-Product Orders over Discrete Valuation Rings*, J. Algebra **105** (1987), 116–148.

[2] M. Harada, *Some criteria for hereditarity of crossed products*, Osaka J. Math. **1** (1964), 69–80.

BS1-3 June 28(Tuesday), 14:50-15:10/ 211-1 : SHAKIR ALI (Aligarh Muslim University)

On derivations in *-rings and H*-algebras

Let R be a $*$- ring and A be a H^*-algebra. Suppose that α and β are endomorphisms of R(or homomorphisms of A). An additive mapping $d : R \to R$ is called a $(\alpha, \beta)^*$-derivation(resp. reverse $(\alpha, \beta)^*$-derivation) if $d(xy) = d(x)\alpha(y^*) + \beta(x)d(y)$ (resp. $d(xy) = d(y)\alpha(x^*) + \beta(y)d(x)$) holds for all $x, y \in R$.
Let S be a nonempty subset of R. A function $f : R \longrightarrow R$ is said to be commuting on S if $[f(x), x] = 0$ for all $x \in S$. Comparing $(\alpha, \beta)^*$-derivation with commuting mapping on a $*$-ring R, it turns out that notion of $(\alpha, \beta)^*$-derivation is in a close connection with the commuting mapping on R. There has been considerable interest for commuting mappings on prime and semiprime rings. The fundamental result in this direction is due to Posner [Proc. Amer. Math. Soc. $8(1957), 1093 - 1100$] which states that if a prime ring R admits a nonzero commuting derivation, then R is commutative. This result was subsequently refined and extended by a number of authors (cf., [J. Algebra $161(1993), 432 - 357$] where further references can be found).
In this talk, I would like to put on record the progress made on this topic in past. Also, I would highlight the current work done in this area and research proposal for future considerations.

BS1-4 June 28(Tuesday), 15:20-15:40/ 211-1 : Mamoru Kutami (Yamaguchi University)

Von Neumann regular rings with generalized almost comparability

The notion of almost comparability for regular rings was first introduced by Ara and Goodearl [1], for giving an alternative proof of the epoch-making O'Meara's Theorem [4] that directly finite simple regular rings with weak comparability are unit-regular. After that the study of almost comparability for regular rings was continued by Ara et al. [2, 3]. Recently the author gave the notion of generalized almost comparability, as an extension for one of almost comparability. In the talk, we give the forms of regular rings with generalized almost comparability by connecting with almost comparability, and investigate the strict cancellation property and the strict unperforation property for the family of all finitely generated projective modules over these regular rings. Here, we recall the definitions of almost comparability and generalized almost comparability, as follows. A regular ring R satisfies *almost comparability* if, for each $x, y \in R$, either $xR \prec yR \oplus zR$ for all nonzero elements $z \in R$ or $yR \prec xR \oplus zR$ for all nonzero elements $z \in R$, and it satisfies *generalized almost comparability* if, for each $x, y \in R$ and each nonzero element $z \in R$, either $xR \prec yR \oplus zR$ or $yR \prec xR \oplus zR$, where $A \prec B$ means that there exists a monomorphism f from A to B such that $f(A) < B$.

REFERENCES

[1] P. Ara and K.R. Goodearl, *The almost isomorphism relation for simple regular rings*, Publ. Mat. UAB **36** (1992), 369–388.

[2] P. Ara, K.R. Goodearl, E. Pardo and D.V. Tyukavkin, *K-theoretically simple von Neumann regular rings*, J. Algebra **174** (1995), 659–677.

[3] P. Ara, K.C. O'Meara and D.V. Tyukavkin, *Cancellation of projective modules over regular rings with comparability*, J. Pure Appl. Algebra **107** (1996), 19–38.

[4] K.C. O'Meara, *Simple regular rings satisfying weak comparability*, J. Algebra **141** (1991), 162–186.

BS1-5 June 28(Tuesday), 15:45-16:05/ 211-1 : B. N. Waphare (University of Pune)

On Unitification Problem of Weakly Rickart *-rings

K. Berberian raised the open problem namely, ‘Can every weakly Rickart *-ring be embedded in a Rickart *-ring with preservation of RP’s’. In this paper we discuss many partial solutions to the open problem. The partial solutions are handled using ring theoretic as well as lattice theoretic aspects.

BS1-6 June 28(Tuesday), 16:15-16:35/ 211-1 : Jian Cui*, Jianlong Chen (Southeast University)

The McCoy condition on Modules

Let R be a ring and α a ring endomorphism. R is called right McCoy if the equation $f(x)g(x) = 0$ with nonzero $f(x), g(x) \in R[x]$, implies that there exists $r \in R\backslash\{0\}$ such that $f(x)r = 0$. Extending the notion of right McCoy rings, we introduce the class of McCoy modules. Over a given ring, it contains the class of Armendariz modules. We also define the notion of α-skew McCoy modules, which can be regarded as a generalization of α-skew Armendariz modules. A number of illustrative examples of these two sorts of modules are given, and equivalent conditions are established. Furthermore, we study the relationship between a module and its polynomial module.

BS1-7 June 28(Tuesday), 16:40-17:00/ 211-1 : Juncheol Han*(Pusan National University), Sangwon Park (Dong-A University)

Generalized Commuting Idempotents in Rings

Let R be a ring with identity, $I(R)$ be the set of all nonunit idempotents in R and $M(R)$ be the set of all primitive idempotents and 0 of R. Two idempotents $e, f \in R$ are called generalized commuting if $(ef)^n = (fe)^n$ for some positive integer n. In this paper, the following are investigated: (1) $e, f \in R$ are generalized commuting if and only if $1-e, 1-f \in R$ are generalized commuting; in this case, there exist $e \wedge f = (ef)^n$ and $e \vee f = 1-(1-e)(1-f)^n$; (2) $M(R)$ is commuting if and only if $M(R)$ is generalized commuting.

Branch Session II

BS2-1 June 28(Tuesday), 14:00-14:20/ 218 : Huiling Song* (Hiroshima University and Harbin Finance University), Hiroyuki Ito (Tokyo University of Science)

A new pseudorandom number generator using an Artin-Schreier tower

In the communication or the record of digital information, the use for the error correcting code and the cryptography, etc. is one of the indispensable elemental technologies because it improves the reliability of information. The origin is an information theory, which is on the basis of the mathematical abundant theories. Especially, it plays an important role in the algebraic system of the finite fields. As a result of applications in a wide variety of areas, finite fields are increasingly important in several areas of mathematics, including linear and abstract algebra, number theory and algebraic geometry, as well as in computer science, information theory, and engineering. For example the pseudorandom number generator, which is an algorithm for generating a sequence of numbers that approximates the properties of random numbers. It is wildely used in simulation and crytography. If a word x is regarded as a row vector $x \in \mathbb{F}_{2^w}$ with word size w, then any algebraic operation can be regarded as being in the field $\mathbb{F}_{2^w}$. When one constructs a finite field, one needs to find a primitive irreducible polynomial of given degree. Thus, this construction is hard to apply for the construction of huge finite fields. To avoid the decision problem of primitivity, we give the another construction of finite fields using the Artin-Schreier tower which has a beautiful recursive structure. Frist, we give a method that one can construct a field such as $\mathbb{F}_{p^{p^r}}$, not requiring to have a primitive polynomial, and at the same time, yields a simple recursive basis of the generated field. And give a multiplication algorithm using the recursive basis. It is possible to construct and execute various operations in a finite field. The second, we propose a new generator AST using an Artin-Schreier tower, which is a slightly modified version of the TGFSR. Using the recursive structure of Artin- Schreier towers, we define a matrix B_r whose order is fairly near the upper bound $2^{2^r} - 1$. Using this matrix B_r, we give an algorithm of a new random number generator. This generator gives a sequence with a long period which is fairly near to the theoretical upper bound. Furthermore, the standard statistical test for pseudorandom number generators, TestU01, certifies our new generator has a good property as a pseudorandom number generator.

BS2-2 June 28(Tuesday), 14:25-14:45/ 218 : Liang Shen*, Jianlong Chen (Southeast University)

On Countably Σ-C2 Rings

A ring R is called a right (countably) Σ-C2 ring if every (countable) direct sum of copies of R_R is a C2 module. The following are equivalent for R: (1) R is a right countably Σ-C2 ring. (2) R is a right Σ-C2 ring. (3) Every (countable) direct sum of copies of R_R is a C3 module. (4) R is a right perfect ring and every finite direct sum of copies of R_R is a C2 (or C3) module.

BS2-3 June 28(Tuesday), 14:50-15:10/ 218 : Yasuhiko Takehana (Hakodate national college)

A generalization of hereditary torsion theory and their dualization

Let R be a ring with identity and Mod-R a category of right R-modules. A torsion theory for Mod-R is a pair (T,F) of classes of objects of Mod-R such that (i) Hom(M,N) = 0 for all M in T and N in F.(ii)If Hom(M,N) = 0 for all M in T,then N is in F. (iii) If Hom(M,N) = 0 for all N in F,then M is in T. (T,F) is called hereditary if T is closed under taking submodules. Let be an idempotent radical and N a submodule of a module M. N is called a -dense submodule of M if (M/N) = M/N. We call (T,F) -hereditary if T is closed under taking -dense submodules. In this talk we characterize -hereditary torsion theories and their dualization.

BS2-4 June 28(Tuesday), 15:20-15:40/ 218 : Larry (Lianyong) Xue*, George Szeto (Bradley University)

The Galoie Map and its Induced Maps

Let B be a Galois extension of B^G with Galois group G such that B^G is a separable C^G-algebra where C is the center of B, $J_g = \{b \in B \,|\, bx = g(x)b \text{ for each } x \in B\}$ for $g \in G$, $\alpha : H \longrightarrow B^H$ the Galois map for a subgroup H of G, $\beta : H \longrightarrow \alpha(H)C$, and $\gamma : H \longrightarrow V_B(\alpha(H))$ where $V_B(\alpha(H))$ is the commutator subring of $\alpha(H)$ in B. Relations between α, β, and γ are obtained, and several conditions are given for a one-to-one Galois map α.

BS2-5 June 28(Tuesday), 15:45-16:05/ 218 : Sang Cheol Lee* (Chonbuk National University), Yeong Moo Song (Suncheon National University)

The Quillen Splitting Lemma

Throughout this paper every *ring* will be a commutative ring with identity and every *module* will be a finitely generated unitary module. In section 2, if R is a (not necessarily commutative) ring, then we let $(1 + XR[X])^{\cdot}$ denote the group of invertible elements in the polynomial ring $R[X]$ which are congruent to 1 modulo X. That is, $(1 + XR[X])^{\cdot} = \{f(X) \in U(R[X]) \mid f(X) - 1 \in XR[X]\}$. Now taking $R = End_A(P)$, we have $Aut_{A[X]}(P[X]) = \{\alpha(X) \in End_{A[X]}(P[X]) \mid det(\alpha(X)) \in U(A[X])\}$ and $(id + XEnd_{A[X]}(P[X]))^{\cdot} = \{\alpha(X) \in Aut_{A[X]}(P[X]) \mid \alpha(0) = id\}$. If $(A, \mathfrak{m})$ is a local ring with $dim(A) \geq \mu(\mathfrak{m})$, then $(id + XEnd_{A[X]}(P[X]))^{\cdot}$ is a normal subgroup of $SL_{A[X]}(P[X])$. Also, we will show that under these conditions the similar conclusion can be drawn for the ring of formal power series. In section 3, let P be a projective A-module. Let $s_1, s_2 \in A$ be such that $As_1 + As_2 = A$. Then if we use the Splitting Lemma of Quillen, we will show that every element of $(id_{P_{s_1s_2}} + XEnd_{A_{s_1s_2}[X]}(P_{s_1s_2}[X]))^{\cdot}$ has two decompositions. That is, for every element $\sigma(X)$ in $(id_{P_{s_1s_2}} + XEnd_{A_{s_1s_2}[X]}(P_{s_1s_2}[X]))^{\cdot}$,

(1) there exists an element $\alpha_1(X) \in (id_{P_{s_1}} + XEnd_{A_{s_1}[X]}(P_{s_1}[X]))^{\cdot}$ and an element $\alpha_2(X) \in (id_{P_{s_2}} + XEnd_{A_{s_2}[X]}(P_{s_2}[X]))^{\cdot}$ such that $\sigma(X) = \alpha_1(X)_{s_2}\alpha_2(X)_{s_1}$, and

(2) there exists an element $\beta_1(X) \in (id_{P_{s_1}} + XEnd_{A_{s_1}[X]}(P_{s_1}[X]))^{\cdot}$ and an element $\beta_2(X) \in (id_{P_{s_2}} + XEnd_{A_{s_2}[X]}(P_{s_2}[X]))^{\cdot}$ such that $\sigma(X) = \beta_2(X)_{s_1}\beta_1(X)_{s_2}$.

Finally, we generalize the result to Theorem 3.4 and its corollary and consequently we provide its new proof.

BS2-6 June 28(Tuesday), 16:15-16:35/ 218 : Fahad Sikander*, Sabah A R K Naji (Aligarh Muslim University)

Generalization of Basic and Large Submodules of QTAG-Modules

A $QTAG$-module M over an associative ring R with unity is k-projective if $H_k(M) = 0$ and for a limit ordinal σ, it is σ-projective if there exists a submodule N bounded by σ such that M/N is a direct sum of uniserial modules. M is totally projective if it is σ-projective for all limit ordinals σ. If α denotes the class of all $QTAG$-modules M such that $M/H_\beta(M)$ is totally projective for all ordinals $\beta < \alpha$, then these modules are called α-modules. Here we study these α-modules and generalize the concept of basic submodules as α-basic submodules. It is found that every α-module M contains an α-basic submodule and any two α-basic submodules of M are isomorphic. A submodule L of an α-module is α-large if $M = L + B$, for any α-basic submodule B of M. Many interesting properties of α-basic, α-large and α-modules are studied.

BS2-7 June 28(Tuesday), 16:40-17:00/ 218 : Ayazul Hasan*, Sabah A R K Naji (Aligarh Muslim University)

Elongations of QTAG-Modules

For a $QTAG$-module M over an associative ring R with unity, $H_k(M)$ denotes the submodule generated by the elements of height at least k, while $H^k(M)$ denotes the submodule generated by the elements of exponents at most k. Mehdi studied $(\omega + k)$-projective $QTAG$-modules with the help of their submodules contained in $H^k(M)$. These modules contain nice submodules N contained in $H^k(M)$ such that M/N is a direct sum of uniserial modules. Here we investigate the class A of $QTAG$-modules, containing nice submodules $N \subseteq H^k(M)$ such that M/N is totally projective. Let A_k be the family of $QTAG$-modules such that every M in A_k contains nice submodules $N \subseteq H^k(M)$, free from the elements of infinite height such that M/N is totally projective. Then any module in A_k is an extension of a totally projective module $H_\omega(M)$ by a separable $(\omega + k)$-projective module $M/H_\omega(M)$ as M is a ω-elongation. We also study strong-elongations and separable elongations of $QTAG$-module.

Branch Session III

BS3-1 June 28(Tuesday), 14:00-14:20/ 219 : FRIMPONG EBENEZER KWABENA (TERNOPIL STATE MEDICAL UNIVERSITY)

HIGH PASS RATE OF RING AND MODULE THEORY BY STUDENTS

High pass rate of ring and module theory test undertook by students of King of Kings Junior High School, Duayaw-Nkwanta B/A Ghana in may 2001, is reported in the sudy. Students from the final year class were given a module theory task to solve.

BS3-2 June 28(Tuesday), 14:25-14:45/ 219 : Radwan M. Alomary*, Nadeem ur Rehman (Aligarh Muslim University)

$*-$Lie ideals and Generalized Derivations on prime rings

Let $(R,*)$ be a 2-torsion free $*-$prime ring with involution $*$ and center $Z(R)$. An additive mapping $*: R \longrightarrow R$ defined by $x \mapsto *(x)$ is called an involution if $*(*(x)) = x$ and $*(xy) = *(y) * (x)$ hold for all $x, y \in R$. A ring R with an involution $*$ is said to $*-$prime if $xRy = xR * (y) = 0$ implies that either $x = 0$ or $y = 0$. The set of symmetric and skew-symmetric elements of a $*-$ ring will be denoted by $S_*(R)$ i.e., $S_*(R) = \{x \in R \mid *(x) = \pm x\}$. An additive subgroup L of R is said to be a Lie ideal of R if $[L, R] \subseteq L$. A Lie ideal is said to be a $*-$Lie ideal if $*(L) = L$. If L is a Lie (resp. $*$-Lie) ideal of R, then L is called a square closed Lie (resp. $*$- Lie) ideal of R if $x^2 \in L$ for all $x \in L$. An additive mapping F: $R \longrightarrow R$ is called a generalized derivation on R if there exists a derivation d such that $F(xy) = F(x)y + xd(y)$ holds for all $x, y \in R$. In the present paper, we shall show that a $*-$Lie ideal L is central if R is a $*$-prime ring admits a generalized derivation F with associated derivation d commuting with $*$ satisfying certain differential identities in rings.

BS3-3 June 28(Tuesday), 14:50-15:10/ 219 : Faiza Shujat*, Asma Ali (Aligarh Muslim University)

On Lie ideals and centralizing derivations in semiprime rings

Let R be a ring with centre Z(R) and S be a non-empty subset of R. A mapping $f : R \longrightarrow R$ is said to be centralizing (resp. commuting) on S if $[x, f(x)] \in Z(R)$ (resp. $[x, f(x)] = 0$) for all $x \in S$. A ring R is said to be prime (resp. semiprime) if $aRb = \{0\}$ implies that either $a = 0$ or $b = 0$ (resp. $aRa = \{0\}$ implies that $a = 0$). An additive mapping $d : R \longrightarrow R$ is said to be a derivation if $d(xy) = d(x)y + xd(y)$ for all $x, y \in R$. Many algebraist studied generalized derivation in the context of algebras on certain normed spaces. By a generalized derivation on an algebra A one usually means a map of the form $x \mapsto ax + xb$ where a and b are fixed elements in A. We prefer to call such maps generalized inner derivations for the reason they present a generalization of the concept of inner derivation (i.e. the map $x \mapsto ax - xb$). Now in a ring, let F be a generalized inner derivation given by $F(x) = ax+xb$. Notice that $F(xy) = F(x)y+xI_b(y)$, where $I_b(y) = yb-by$ is an inner derivation. Motivated by these observations, Bresar [Glasgow Math. J. 33 (1991), 89-93] introduced the notion of generalized derivation in rings. An additive mapping $F : R \longrightarrow R$ is said to be a generalized derivation if there exists a derivation $d : R \longrightarrow R$ such that $F(xy) = F(x)y + xd(y)$, for all $x, y \in R$. Hence the concept of generalized derivation covers both the concepts of derivation and left multipliers (i.e. additive maps satisfying $f(xy) = f(x)y$) for all $x, y \in R$. Basic examples are derivations and generalized inner derivations. Some results on generalized derivation can be found in [Comm. Algebra, 26(1998), 1147-1166]. In the present paper we prove that if a semiprime ring R admits a derivation d which is nonzero and centralizing on a nonzero Lie ideal U of R, then $U \subseteq Z(R)$. Our result extends the well known Theorem of Posner [Proc. Amer. Math. Soc. 8 (1957), 1093-1100] and a result of Bell and Martindale [Canad. Math. Bull. 30 (1987), 92-101].

BS3-4 June 28(Tuesday), 15:20-15:40/ 219 : Claus Haetinger* (UNIVATES University Center), Radwan Al-Omary, Nadeem ur Rehman (Aligarh Muslim University)

On Lie structure of prime rings with generalized (α, β)-derivations

Let R be a ring and α, β be automorphisms of R. An additive mapping F: $R \to R$ is called a generalized (α, β)-derivation on R if there exists an (α, β)-derivation d: $R \to R$ such that $F(xy) = F(x)\alpha(y)+\beta(x)d(y)$ holds for all $x, y \in R$. For any $x, y \in R$, set $[x, y]_{\alpha,\beta} = x\alpha(y)-\beta(y)x$ and $(x\circ y)_{\alpha,\beta} = x\alpha(y)+\beta(y)x$. In the present paper, we shall discuss the commutativity of a prime ring R admitting generalized (α, β)-derivations F and G satisfying any one of the following properties: (i) $F([x, y]) = (x\circ y)_{\alpha,\beta}$, (ii) $F(x\circ y) = [x, y]_{\alpha,\beta}$, (iii) $[F(x), y]_{\alpha,\beta} = (F(x)\circ y)_{\alpha,\beta}$, (iv) $F([x, y]) = [F(x), y]_{\alpha,\beta}$, (v) $F(x \circ y) = (F(x) \circ y)_{\alpha,\beta}$, (vi) $F([x, y] = [\alpha(x), G(y)]$ and (vii) $F(x\circ y) = (\alpha(x)\circ G(y))$ for all x, y in some appropriate subset of R. Finally, obtain some results on semi-projective Morita context with generalized (α, β)-derivations.

BS3-5 June 28(Tuesday), 15:45-16:05/ 219 : Almas Khan (Aligarh Muslim University)

Identities with Generalized Derivations of Semiprime Rings

Let R be an associative ring not necessarily with the identity element. For any $x, y \in R$, $[x, y] = xy - yx$ and $x \circ y = xy + yx$ will denote the Lie product and the Jordan product respectively. An additive mapping $d : R \to R$ is said to be a derivation on R if $d(ab) = d(a)b+ad(b)$ holds for all $a, b \in R$. Further the concept of derivation was extended to generalized derivation by Bresar (Glasgow Math. J. 33 (1991), 89-93) An additive mapping $F : R \to R$ is said to be generalized derivation on R if $F(ab) = F(a)b + aF(b)$ holds for all $a, b \in R$. An additive subgroup U of R is said to be a Lie ideal of R if $[U, R] \subseteq U$. A Lie ideal U of R is called a square closed Lie ideal if $u^2 \in U$ for all $u \in U$.
Over the past few decades, many authors have studied commutativity of prime and semi prime rings admitting certain differential identities and generalized differential identities. The objective of this paper is to study the commutativity of semiprime rings satisfying various identities involving generalized derivations in rings. In fact we obtain rather more general results by considering various conditions on a subset of the ring R viz. Lie ideal of R.

BS3-6 June 28(Tuesday), 16:15-16:35/ 219 : Wang Yanhua (Shanghai University of Finance and Economics)

A class of non-Hopf bi-Frobenius algebras

We construct a class of bi-Frobenius algebras, which are not Hopf algebras. The constructed algebras are related to the Yoneda algebras of Artin-Schelter regular algebras of dimension three.

BS3-7 June 28(Tuesday), 16:40-17:00/ 219 : Malik Rashid Jamal*, Mohammad Ashraf (Aligarh Muslim University)

Some Differential Identities In Prime Gamma-Rings

Let M and Γ be additive abelian groups. If for any $a, b, c \in M$ and $\alpha, \beta \in \Gamma$, the following conditions are satisfied, (i) $a\alpha b \in M$ (ii) $(a+b)\alpha c = a\alpha c + b\alpha c$, $a(\alpha+\beta)b = a\alpha b + a\beta b$, $a\alpha(b + c) = a\alpha b + a\alpha c$ (iii) $(a\alpha b)\beta c = a\alpha(b\beta c)$, then M is called a gamma ring. An additive subgroup U of M is called a right (resp. a left) ideal of M if $U\Gamma M \subseteq U$ (resp. $M\Gamma U \subseteq U$). U is said to be an ideal of M if it is both a right as well as a left ideal of M. M is said to be prime Γ-ring if $a\Gamma M\Gamma b = \{0\}$ implies that either $a = 0$ or $b = 0$ for $a, b \in M$. An additive mapping $d : M \longrightarrow M$, where M is a Γ-ring, is called a derivation if for any $a, b \in M$ and $\alpha \in \Gamma$, $d(a\alpha b) = d(a)\alpha b + a\alpha d(b)$. Many authors had explored commutativity of prime and semiprime rings satisfying various conditions on rings. In the present paper, our objective is to investigate commutativity of prime Γ-rings satisfying certain identities on Γ-rings.

Plenary Session

PS-1 June 29(Wednesday), 09:00-09:30 / 211-1 : Changchang Xi*, Hongxing Chen (Beijing Normal University)

Tilting modules and stratification of derived module categories

Tilting theory of finitely generated tilting modules has played a fundamental role in the representation theory of algebras as well as in many other fields, for example, in algebraic groups, triangulated categories, and coherent sheaves of projective spaces. Recently, infinitely generated tilting modules over arbitrary rings seem to be of particular interest for understanding the whole tilting theory. In this talk, I will present some new results in this direction. Particularly, we shall show that the derived categories of the endomorphism rings of infinitely generated good tilting modules admit recollements by derived module categories. In this situation the notions of coproducts, universal localizations and ring epimorphisms in ring theory are substantial and play an important role in our discussions. This talk reports part of the joint works with Hongxing Chen.

PS-2 June 29(Wednesday), 09:35-10:05 / 211-1 : Izuru Mori (Shizuoka University)

McKay Type Correspondence for AS-regular Algebras

One of the formulation of the classical McKay correspondence claims that the minimal resolution of the affine scheme associated to the fixed subalgebra of the polynomial algebra in two variables by a finite subgroup of the special linear group of degree 2 is derived equivalent to the preprojective algebra of the McKay quiver of that group. In this talk, we will see that there is a similar derived equivalence in the case that a finite cyclic subgroup of the general linear group of degree n acts on an AS-regular algebra in n variables. Since AS-regular algebras are noncommutative analogues of the polynomial algebra, this can be thought of as a McKay type correspondence in noncommutative algebraic geometry.

PS-3 June 29(Wednesday), 10:10-10:40 / 211-1 : W. K. Nicholson* (University of Calgary), M. Alkan (Akdeniz University), A. Cigdem Ozcan (Hacettepe University)

Strong Lifting Splits

The concept of an enabling ideal is introduced so that an ideal I is strongly lifting if and only if it is lifting and enabling. These ideals are studied and their properties are described. It is shown that a left duo ring is an exchange ring if and only if every ideal is enabling, that Zhou's δ-ideal is always enabling, and that the right singular ideal is enabling if and only if it is contained in the Jacobson radical. The notion of a weakly enabling left ideal is defined, and it is shown that a ring is an exchange ring if and only if every left ideal is weakly enabling. Two related conditions, interesting in themselves, are investigated: The first gives a new characterization of δ-small left ideals, and the second characterizes weakly enabling left ideals. As an application (which motivated the paper), let M be an I-semiregular left module where I is an enabling ideal. It is shown that mM is I-semiregular if and only if $m - qIM$ for some regular element q of M and, as a consequence, that if M is countably generated and IM is δ-small in M, then $M \cong \oplus_{i=1} Re_i$ where $e_i = e_i R$ for each I.

PS-4 June 29(Wednesday), 10:50-11:20 / 211-1 : Pjek-Hwee Lee (National Taiwan University)

Herstein's Questions on Simple Rings revisited

At his 1961 AMS Hour Talk Herstein suggested that the results on the Lie structures can be applied to study more purely associative questions. More precisely, he asked the following questions: (a) If R is a simple ring with a nonzero zero-divisor and if T is a subring of R invariant under all the automorphisms of R, is $T \subseteq Z$ or $T = R$? (b) If R is a simple ring, and if the nilpotent elements of R form a subring W of R, is $W = (0)$ or $W = R$? (c) In the special case of (b) wherein any two nilpotent elements of R commute, is it true that R must have no nonzero nilpotent elements? (d) If R is a simple ring with a nonzero zero-divisor, is every $ab - ba$ in R a sum of nilpotent elements? (e) If R is a simple ring and has a nonzero nil right ideal, is R itself nil? In this talk we shall give a survey on the recent progress of the research on these problems.

PS-5 June 29(Wednesday), 11:25-11:55 / 211-1 : S. Tariq Rizvi (The Ohio State University)

Direct Sum Problem for Baer and Rickart Modules

Kaplansky (1955) and Maeda (1960) defined the notions of a Baer and a Rickart ring, respectively. Using the endomorphism ring of a module, we have extended these notions to a general module theoretic setting recently. Let R be any ring, M be an R-module and $S = End_R(M)$. M is said to be a *Baer module* if the right annihilator in M of any subset of S is a direct summand of M (equivalently, the left annihilator in S of any submodule of M is generated by an idempotent of S). The module M is called a *Rickart module* if for all $\varphi \in S$, $Ker\varphi$ is a direct summand of M.

While direct summands of Baer and Rickart modules inherit the respective properties, neither a direct sum of two (or more) Baer modules is Baer in general nor is the direct sum of two Rickart modules always Rickart. The general question of when do the direct sums of such modules inherit the respective property remains open. In this talk we will provide some background information and discuss some recent progress we have made on this question. In one such result we show that if M_i is M_j-injective for all $i < j \in \mathcal{I} = \{1, 2, \cdots, n\}$ then $\bigoplus_{i=1}^{n} M_i$ is a Rickart module if and only if M_i is M_j-Rickart for all i, j in $\mathcal{I}$. As a consequence, we can obtain a similar result for the direct sum of Baer modules and show that for a nonsingular extending module M, $E(M) \oplus M$ is always a Baer module.

Other results on direct sums to inherit the properties under certain assumptions and relevant examples will be presented.

(This is a joint work with Gangyong Lee and Cosmin S. Roman.)

PS-6 June 29(Wednesday), 12:00-12:30 / 211-1 : Pace P. Nielsen (Brigham Young University)

Dedekind-finite strongly clean rings

We investigate two questions of Nicholson concerning strongly clean rings, and prove interesting connections related to the Dedekind-finite condition.

Branch Session I

BS1-1 June 29(Wednesday), 14:00-14:20/ 211-1 : Tsiu-Kwen Lee*, Chen-Lian Chuang (National Taiwan University)

DERIVATIONS MODULO ELEMENTARY OPERATORS

Let R be a prime ring with extended centroid C and symmetric Martindale quotient ring $Q_s(R)$. Suppose that $Q_s(R)$ contains a nontrivial idempotent e such that $eR+Re \subseteq R$. We characterize biadditive maps on R preserving zero-products. Let $\phi\colon R\times R \to RC+C$ be the bi-additive map $(x,y) \mapsto G(x)y+xH(y)+\sum_i a_i x b_i y c_i$, where $G, H\colon R \to R$ are additive maps and where $a_i, b_i, c_i \in RC + C$ are fixed. Suppose that ϕ is zero-product preserving, that is, $\phi(x,y) = 0$ for $x, y \in R$ with $xy = 0$. Then there exists a derivation $\delta\colon R \to Q_s(RC)$ such that both G and H are equal to δ plus elementary operators. Moreover, there is an additive map $F\colon R \to Q_s(RC)$ such that $\phi(x,y) = F(xy)$ for all $x, y \in R$. The result is a natural generalization of several related theorems in the literature. Actually we prove some more general theorems.

2000 *Mathematics Subject Classification.* 16N60, 16W25.
Key words and phrases. Derivation, idempotent, prime ring, elementary operator, zero-product preserving, functional identity.
Members of Mathematics Division, NCTS (Taipei Office).
This is a paper joint with Professor C.-L. Chuang.

BS1-2 June 29(Wednesday), 14:25-14:45/ 211-1 : Lixin Mao (Nanjing Institute of Technology)

Simple-Baer rings and minannihilator modules

Let R be a ring. M is said to be a minannihilator left R-module if $r_M l_R(I) = IM$ for any simple right ideal I of R. A right R-module N is called simple-flat if $Nl_R(I) = l_N(I)$ for any simple right ideal I of R. R is said to be a left simple-Baer (resp. left simple-coherent) ring if the left annihilator of every simple right ideal is a direct summand of ${}_RR$ (resp. finitely generated). We first obtain some properties of minannihilator and simple-flat modules. Then we characterize simple-coherent rings, simple-Baer rings and universally mininjective rings using minannihilator and simple-flat modules.

BS1-3 June 29(Wednesday), 14:50-15:10/ 211-1 : Nam Kyun Kim* (Hanbat National University), C.Y. Hong (Kyung Hee University), Y. Lee (Pusan National University)

The McCoy theorem on non-commutative rings

McCoy proved that for a right ideal A of $S = R[x_1, \ldots, x_k]$ over a ring R, if $r_S(A) \neq 0$ then $r_R(A) \neq 0$. We extend the result to the Ore extensions, the skew monoid rings and the skew power series rings over noncommutative rings, and so on. Moreover, over a commutative ring R, McCoy obtained the following: $f(x)$ is a zero divisor in $R[x]$ if and only if $f(x)c = 0$ for some nonzero $c \in R$. We extend the McCoy's theorem to non-commutative rings, introducing the concept of strong right McCoyness. The strong McCoyness is shown to have a place between the reversibleness (right duoness) and the McCoyness. We introduce a simple way to construct a right McCoy ring but not strongly right McCoy, from given any (strongly) right McCoy ring. If given a ring is reversible or right duo then the polynomial ring over it is proved to be strongly right McCoy. It is shown that the (strong) right McCoyness can go up to classical right quotient rings.

BS1-4 June 29(Wednesday), 15:20-15:40/ 211-1 : Chris Ryan*, Gary Birkenmeier (University of Louisiana)

Decomposition theory of modules and applications to quasi-Baer rings

For (torsion) modules over a commutative PID, there is an important decomposition theory based on the prime ideals in the ring. This leads to the question: can we decompose modules over more general rings by utilizing the ideals of the ring in a similar manner to that of the PID case? Some basic results are shown, and a few applications involving modules over quasi-Baer rings are examined, in which nonsingular modules play a key role.

BS1-5 June 29(Wednesday), 15:45-16:05/ 211-1 : Hisaya Tsutsui (Embry-Riddle University)

On fully prime rings

The structure of rings in which every ideal is prime is studied.

BS1-6 June 29(Wednesday), 16:15-16:35/ 211-1 : Yasuyuki Hirano (Naruto University of Education)

Homogeneous functions on rings

A function f from a ring R to the set of real numbers is said to be left homogeneous if f satisfies the following condition: If Rx = Ry then f(x) = f(y) for all x, y in R. We consider left homogeneous functions on some rings.

BS1-7 June 29(Wednesday), 16:40-17:00/ 211-1 : Jung Wook Lim*, Byung Gyun Kang (POSTECH)

A characterization of some integral domains of the form $A + B[\Gamma^*]$

Let $A \subseteq B$ be an extension of integral domains, Γ be a torsion-free (additive) grading monoid with $\Gamma \cap -\Gamma = \{0\}$ and $\Gamma^* = \Gamma \setminus \{0\}$. In this talk, we characterize some integral domains of the form $A + B[\Gamma^*]$.

Branch Session II

BS2-1 June 29(Wednesday), 14:00-14:20/ 218 : Xian Wang(China University of Mining and Technology)

Local derivations of a matrix algebra over a commutative ring

This is a joint work with Dengyin Wang. Let R be a commutative ring with identity, $N_n(R)$ the matrix algebra consisting of all $n \times n$ strictly upper triangular matrices over R. In this paper we constructed several types of proper local derivations of $N_n(R)(n \leq 4)$, which is used as a standard local derivations. We proved that any local derivations of $N_n(R)(n \leq 4)$ can be derived as a summation of the standard local derivations over$R$, When $N_n(R)$ is domain. The result not only confirmed that the matrix algebra $N_n(R)(n \leq 4)$ has proper local

derivations but also gave an explicit expression of $N_n(R)'s$ local derivations.

REFERENCES

[1] S. Ou, D.Wang and R. Yao, *Derivations of the Lie algebra of strictly upper triangular matrices over a commutative ring*, Linear Algebra Appl., **424**(2007), 378–383.

[2] D. Wang, S. Ou, Q. Yu, *Derivations of the intermediate Lie algebras between the Lie algebra of diagonal matrices and that of upper triangular matrices over a commutative ring*, Linear and Multilinear Algebra, **54**(2006), 369–377.

BS2-2 June 29(Wednesday), 14:25-14:45/ 218 : Yosuke Kuratomi* (Kitakyushu National College of Technology), Derya Keskin Tütüncü (University of Hacettepe)

RELATIVE MONO-INJECTIVE MODULES AND RELATIVE MONO-OJECTIVE MODULES

In [1] and [2], we have introduced a couple of relative generalized epi-projectivities and given several properties of these projectivities. The contents of my talk is joint work with D.Keskin Tütüncü. In this talk, we consider relative generalized injectivities that are dual to these relative projectivities and apply them to the study of direct sums of extending modules. Firstly we show that for an extending module N, a module M is N-injective if and only if M is mono-N-injective and essentially N-injective. Then we define a mono-ojectivity that plays an important role in the study of direct sums of extending modules. The structure of (mono-)ojectivity is complicated and hence it is difficult to determine whether these injectivities are inherited by finite direct sums and direct summands even in the case where each module is quasi-continuous (cf. [3], [4]). Finally we show several characterizations of these injectivities and find necessary and sufficient conditions for the direct sums of extending modules to be extending.

REFERENCES

[1] D.Keskin Tütüncü and Y.Kuratomi, *On Epi-projective Modules*, East-West Journal of Math., **10**, (2008), 27-35.

[2] D.Keskin Tütüncü and Y.Kuratomi, *On Generalized Epi-projective Modules*, Mathematical Journal of Okayama University, **52**, (2010), 111-122.

[3] K.Hanada, Y.Kuratomi and K.Oshiro, *On direct sums of extending modules and internal exchange property*, J. Algebra **250** (2002), 115-133.

[4] S.H.Mohamed and B.J.Müller, *Ojective modules*, Comm. Algebra **30** (2002), 1817-1827.

BS2-3 June 29(Wednesday), 14:50-15:10/ 218 : Mohd. Yahya Abbasi (Jamia Millia Islamia)

HF-Modules and Isomorphic High Submodules of QTAG-Modules

A module M over an associative ring R with unity is a QTAG-module if every finitely generated submodule of any homomorphic image of M is a direct sum of uniserial modules. $H_k(M)$ denotes the submodules of M generated by the elements of height at least k. Here we study some properties of M, shared by $H_k(M)$. The cardinality of the minimal generating set of M is denoted by $g(M)$ and M is said to be an HF-module if and only if every infinitely generated h-pure submodule N of M is contained in a summand K generated by the set of same cardinality i.e., $g(N) = g(K)$. Property of being an HF-module is also shared by M and $H_k(M)$. If all the high submodules of M are isomorphic then M is said to be an IH-module. Sigma-modules are well known IH-modules. Here we investigate the structure and properties of IH-modules.

BS2-4 June 29(Wednesday), 15:20-15:40/ 218 : Nguyen Viet Dung (Ohio University)

Rings whose left modules are direct sums of finitely generated modules

A ring R for which every left R-module is a direct sum of finitely generated modules has left pure global dimension zero, and is called left pure semisimple. It is well known that left and right pure semisimple rings are precisely the rings of finite representation type, however it is still an open problem whether left pure semisimple rings are also right pure semisimple. In this talk we will discuss some recent results in this topic. A subcategory C of R-Mod is called definable if it is closed under products, direct limits, and pure submodules. In particular, we will discuss definable subcategories over left pure semisimple rings, and show how definable subcategories can be used to provide a better understanding of the module category over a left pure semisimple ring. (This is joint work with Jose Luis Garcia).

BS2-5 June 29(Wednesday), 15:45-16:05/ 218 : Fatemeh Dehghani-Zadeh (Islamic Azad University)

Finiteness properties Generalized local cohomology with respect to an ideal containing the irrelevant ideal

The membership of the generalized local cohomology modules $H^i_\alpha(M, N)$ of two $R-$ modules $M$and N with respect to an ideal α in certain serre subcategories of the category of modules is studied from below ($i < t$). Furthermore, using the above result, we study, in certain graded situations, the behaviour of the n-th graded component $H^i_\alpha(M, N)_n$ of the generalized local cohomology modules with respect to an ideal containing the irrelevant ideal as $n \longrightarrow \infty$.

BS2-6 June 29(Wednesday), 16:15-16:35/ 218 : Gangyong Lee*, S. Tariq Rizvi, Cosmin Roman (The Ohio State University)

On Endoregular Modules

The class of von Neumann regular rings has been extensively studied in the literature. Among other factors, the abundance of idempotent elements in such a ring makes its very useful. It is well-known that a ring R is von Neumann regular iff $Imsvarphi_a = aR$ is a direct summand of R_R for all $asinR$ and for all $sforallsvarphi_a : RsrightarrowR$ given by left multiplication by a. L. Fuchs in 1960 raised the question of characterizing abelian groups whose endomorphism rings are von Neumann regular. This was answered by Rangaswamy. Also, recently we studied the condition that, for a module M and for all $svarphisinEnd_R(M)$, $Kersvarphi$ is a direct summand of M (such an M is called a semphRickart module) and the condition that $Imsvarphi$ is a direct summand of M (such an M is named a semphdual Rickart module). So, we study modules which satisfy semphboth of those two conditions, i.e., $Kersvarphisleq^soplusM$ semphand $Imsvarphisleq^soplusM$ for all $svarphisinEnd_R(M)$. In view of Rangaswamy's result, this is precisely the same as the study of modules whose endomorphism rings are von Neumann regular. We extend the study of modules whose endomorphism rings are von Neumann regular and call such modules semphendoregular. In this talk, we provide several characterizations of endoregular modules and obtain their basic properties. It is of a natural interest to investigate whether or not an algebraic notion is inherited by direct summands and direct sums. We show that every direct summand of an endoregular module is endoregular, while the direct sums of endoregular modules are not endoregular, in general. We show that $End_R(M)$ is strongly regular precisely when a module M decomposes into a direct sum of the image and the kernel of any endomorphism. Such a module M is called an abelian endoregular module. We provide examples which delineate the concepts and results.

BS2-7 June 29(Wednesday), 16:40-17:00/ 218 : Cosmin Roman*, Gangyong Lee, S. Tariq Rizvi (The Ohio State University)

Modules whose endomorphism rings are von Neumann regular

It is well-known that a ring R is von Neumann regular iff $Im\varphi_a = aR$ is a direct summand of R_R for all $a \in R$ and $\varphi_a(r) = ar$.
We recently studied and introduced the notions of a Rickart module and a dual Rickart module. Let R be a ring. An R-module M is called a *Rickart module* if for all $\varphi \in End_R(M)$, $Ker\varphi$ is a direct summand of M. Dually, M is called a *dual Rickart module* if $Im\varphi$ is a direct summand of M for all $\varphi \in End_R(M)$. We see that a module whose endomorphism ring is von Neumann regular turn out to be precisely one which is both Rickart and dual Rickart. We call such a module endoregular.
In this talk we further our research on endoregular modules and characterize several classes of rings in terms of endoregular modules. In particular, we obtain characterizations of semisimple artinian rings, von Neumann regular rings, and right V-rings via endoregular modules. Properties of abelian endoregular modules are discussed and it is shown that indecomposable endoregular modules have division rings as their endomorphism rings.

(This is a joint work with S. Tariq Rizvi and Gangyong Lee.)

Branch Session III

BS3-1 June 29(Wednesday), 14:00-14:20/ 219 : Nadeem ur Rehman (Aligarh Muslim University)

On n-commuting and n-skew-commuting maps with generalized derivations in rings

Let R be an associative ring with center $Z(R)$, and n be a fixed positive integer and for each $x, y \in R$ denote the commutator $xy - yx$ by $[x, y]$ and the skew commutator $xy + yx$ by (x, y). Let $h : R \to R$ to be n-commuting on S if $[h(x), x^n] = 0$ for all $x \in S$ and n-centralizing if $[h(x), x^n] \in Z(R)$ for all $x \in S$. Analogously a mapping $h : R \to R$ is said to be n-skew commuting (n-skew centralizing) on S if $h(x)x^n + x^n h(x) = 0$ (respectively $h(x)x^n + x^n h(x) \in Z(R)$) for all $x \in S$ Recall that an additive mapping $d : R \longrightarrow R$ is called a derivation if $d(xy) = d(x)y + xd(y)$ for all $x, y \in R$. In particular, for fixed $a \in R$, the mapping $I_a : R \longrightarrow R$ given by $I_a(x) = [x, a]$ is a derivation called an inner derivation.
An additive map $F : R \longrightarrow R$ is said to be a generalized derivation if there is a derivation d of R such that, for all $x, y \in R$, $F(xy) = F(x)y + xd(y)$. In particular $F : R \longrightarrow R$ is called a generalized inner derivation if $F(x) = ax + xb$ for fixed $a, b \in R$. For such a mapping F, it is easy to see that

$$F(xy) = F(x)y + x[y, b] = F(x)y + xI_b(y) \text{ for all } x, y \in R.$$

In the present talk we will analyze the more natural question in the area of additive mappings in semiprime rings, i.e. what happens when the map $F^2 + G$ is n-commuting and continue our investigation on the generalized derivation F and G, by studying n-skew-commuting mappings.

BS3-2 June 29(Wednesday), 14:25-14:45/ 219 : Yong Uk Cho (Silla University)

Some results on s.g. near-rings and $< R, S >$-groups

In this paper, we denote that R is a near-ring and G an R-group. We initiate the study of the substructures of R and G. Next, we investigate some properties of T-subgroups and T-homomorphisms. Distributive near-rings, which are near-rings satisfying both distributive laws, are very close to rings and will be considered a bit more closely later. In the mean time, we consider a larger class of near-rings which has a lot of distributivity built in.

In the period 1958-1962, A. Frohlich published some papers on distributively generated near-rings. These mark the real beginning of these subjects.

A near-ring R is called a *distributively generated near-ring*, denoted by *d.g. near-ring*, if $(R, +)$ is generated as a group by a semigroup $(S, \cdot)$ of distributive elements.

A d.g. near-ring R which is generated by a semigroup S is denoted by (R, S).

Rings are special cases of d.g. near-rings, because of all elements of a ring are distributive.

We can define more generalization of d.g. near-rings which are s.g. near-rings, and give a double definitions which will be useful in the sequence work.

Let R be an near-ring and let G and H be two R-groups. Let T be a multiplicative subsemigroup of R.

(1) The near-ring R is called a *s.g. near-ring*, if $(R, +)$ is generated as a group by a semigroup $(T, \cdot)$ of R.

(2) A subgroup K of G such that $KT \subseteq K$ is called a *T-subgroup*of G.

(3) A homomorphism of groups θ from G to H is called a *T-homomorphism* if

$$(xt)\theta = (x\theta)t, \ \forall x \in G, \ \forall t \in T.$$

Also, all rings R are special cases of s.g. near-rings, because of $(R, \cdot)$ is a semigroup.

REFERENCES

[1] F. W. Anderson and K.R. Fuller, *Rings and categories of modules*, Springer-Verlag, New York, Heidelberg, Berlin (1974).

[2] C.G. Lyons and J.D.P. Meldrum, *Characterizing series for faithful D.G. near-rings*, Proc. Amer. Math. Soc. **72** (1978), 221-227.

[3] J.D.P. Meldrum, *Upper faithful D.G. near-rings*, Proc. Edinburgh Math. Soc. **26** (1983), 361-370.

[4] G. Pilz, *Near-rings*, North Holland Publishing Company, Amsterdam, New York, Oxford (1983).

2000 Math. Subj. Class.: 16Y30

Keywords and phrases: representations, zero symmetric, monogenic R-groups, d.g. near-rings, s.g. near-rings, T-subgroups and T-homomorphisms

BS3-3 June 29(Wednesday), 14:50-15:10/ 219 : Abu Zaid Ansari (Aligarh Muslim University)

Lie ideals and generalized derivations in semiprime rings

Let R be an associative ring with center $Z(R)$. For each $x, y \in R$ denote the commutator $xy - yx$ by $[x, y]$ and the anti-commutator $xy + yx$ by $x \circ y$. An additive subgroup L of R is said to be Lie ideal of R if $[L, R] \subseteq L$. An additive mapping $F : R \to R$ is called generalized inner derivation if $F(x) = ax + xb$ for Fixed $a, b \in R$. For such a mapping F, it is easy to see that $F(xy) = F(x)y + xI(b)y$ for all $x, y \in R$. This observation leads to the following definition given in [Communication Algebra 26(1998), 1149-1166]. An additive mapping $F : R \to R$ is called generalized derivation d if $F(xy) = F(x)y + xd(y)$ for all $x, y \in R$. In the present paper we shall show that $L \subseteq Z(R)$ such that R is semiprime ring satisfying several conditions.

BS3-4 June 29(Wednesday), 15:20-15:40/ 219 : M. Salahuddin Khan*, Shakir Ali (Aligarh Muslim University)

On Orthogonal (σ, τ)-Derivations in Γ-Rings

Let M be a Γ-ring and σ, τ be the endomorphisms of M. An additive mapping $d : M \longrightarrow M$ is called a (σ, τ)-derivation if $d(x\alpha y) = d(x)\alpha\sigma(y) + \tau(x)\alpha d(y)$ holds for all $x, y \in M$ and $\alpha \in \Gamma$. An additive mapping $D : M \longrightarrow M$ is called a generalized (σ, τ)-derivation if there exists a (σ, τ)-derivation $d : M \longrightarrow M$ such that $D(x\alpha y) = D(x)\alpha\sigma(y) + \tau(x)\alpha d(y)$ holds for all $x, y \in M$ and $\alpha \in \Gamma$. Two (σ, τ)-derivations d and g of M are said to be orthogonal if $d(x)\Gamma M\Gamma g(y) = (0) = g(y)\Gamma M\Gamma d(x)$ for all $x, y \in M$. In this paper, we establish some necessary and sufficient conditions for (σ, τ)-derivations and generalized (σ, τ)-derivations to be orthogonal.

BS3-5 June 29(Wednesday), 15:45-16:05/ 219 : Norihiro Nakashima* (Hokkaido University), Go Okuyama (Hokkaido Institute of Technology), Mutsumi Saito (Hokkaido University)

Modules of Differential Operators of a Generic Hyperplane Arrangement

This is based on a joint work with Go Okuyama and Mutsumi Saito.

Let K be a field of characteristic 0 and let S be the polynomial ring over K in n variables.

We call a finite collection of hyperplanes through the origin in K^n a central (hyperplane) arrangement. Suppose $n \geq 2$ and $r > n$. A central arrangement $\mathcal{A}$ is said to be a generic if every intersection of n hyperplanes of $\mathcal{A}$ coincides with the origin.

Let $\mathcal{A}$ be a generic arrangement with r hyperplanes. Fix a polynomial p_H defining $H \in \mathcal{A}$, and set $Q := \prod_{H \in \mathcal{A}} p_H$. Let $D^{(m)}(\mathcal{A})$ denote the module of differential operators homogeneous of order m that preserve the ideal generated by Q.

P. Holm studied the freeness of the S-module $D^{(m)}(\mathcal{A})$, and among others. He proved the following:

•If $n = 2$, then $D^{(m)}(\mathcal{A})$ is free for any m.

•If $n \geq 3, r > n, m = r - n + 1$, then $D^{(m)}(\mathcal{A})$ is free.

•If $n \geq 3, r > n, m < r - n + 1$, then $D^{(m)}(\mathcal{A})$ is not free.

He also conjectured that $D^{(m)}(\mathcal{A})$ is free if $n \geq 3, r > n, m > r - n + 1$D J. Snellman conjectured the Poincaré-Betti series of $D^{(m)}(\mathcal{A})$ when $n \geq 3, r > n, m < r - n + 1$.

We proved their conjectures. Furthermore we gave a minimal free resolution of $D^{(m)}(\mathcal{A})$ when $n \geq 3, r > n, m < r - n + 1$.

BS3-6 June 29(Wednesday), 16:15-16:35/ 219 : Kazunori NAKAMOTO (University of Yamanashi)

Topics on the moduli of representations of degree 2

2-dimensional representations for groups, monoids and algebras are classified into 5 types: absolutely irreducible representations, representations with Borel mold, semi-simple representations, unipotent representations, and representations with scalar mold. The speaker talks about topics on the moduli of representations of each types.

BS3-7 June 29(Wednesday), 16:40-17:00/ 219 : Hirotaka Koga (University of Tsukuba)

On mutation of tilting modules over noetherian algebras

In this talk, we discuss indecomposable direct summands of tilting modules over noetherian algebras. Let R be a commutative complete local ring and A a noetherian R-algebra, i.e., A is a ring endowed with a ring homomorphism $R \to A$ whose image is contained in the center of A and A is finitely generated as an R-module. Note that A is left and right noetherian and that every noetherian R-algebra is semiperfect, so that the Krull-Schmidt theorem holds in mod-A, the category of finitely generated A-modules. Recall that a module $T \in$ mod-A is said to be a tilting module if for some integer $r \geq 0$ the following conditions are satisfied: (1) There exists an exact sequence $0 \to P^{-r} \to \cdots \to P^{-1} \to P^0 \to T \to 0$ in mod-A with P^{-i} projective for $i = 0, 1, \cdots, r$; (2) $\mathrm{Ext}^i_A(T, T) = 0$ for $i \neq 0$; (3) There exists an exact sequence $0 \to A \to T^0 \to T^1 \to \cdots \to T^r \to 0$ in mod-A with $T^i \in \mathrm{add}(T)$, the full subcategory of mod-A consisting of direct summands of finite direct sums of copies of T, for $i = 0, 1, \cdots, r$ (cf. [Mi]). Let $T = T_0 \oplus X \in$ mod-A be a tilting module with X indecomposable and $X \notin \mathrm{add}(T_0)$. It is well-known that if we have an exact sequence $0 \to Y \to E \to X \to 0$ in mod-A with Y indecomposable, $E \in \mathrm{add}(T_0)$ and $\mathrm{Ext}^i_A(T_0, Y) = 0$ for $i \neq 0$, then $T_0 \oplus Y$ is also a tilting module (see e.g. [CHU]). We observe a relation between this phenomenon and T^i in the minimal resolution (3) above which admits X as a direct summand.

Plenary Session

PS-1 July 1(Friday), 09:00-09:30 / 211-1 : Kiyoichi Oshiro (Yamaguchi University)

On the Faith conjecture

In this talk, I show the following result on the Faith conjecture, which states a semiprimary right self-injective ring need not be a QF-ring. Let R be a basic semiprimary right self injective ring. For each primitive idempotent$e$, $D(e)$ denotes the division ring eRe/eJe (J: Jacobson radical). By $dimD(e)$, we denote the dimension of the division algebra $D(e)$ over its center, and by $\mid D(e) \mid$ we denotes the cardinal of $D(e)$. If $dimD(e) < \mid D(e) \mid$ for all primitive idempotent e, then R is a QF-ring. So, this result means that finite dimensional division algebras are not useful for making examples for the Faith conjecture.

PS-2 July 1(Friday), 09:35-10:05 / 211-1 : Chan Yong Hong*(Kyung Hee University), Nam Kyun Kim (Hanbat National University), Yang Lee (Pusan National University), Pace P. Nielsen (Brigham Young University)

The Minimal Prime Spectrum of Rings with Annihilator Conditions and Property (A)

We study rings with the annihilator condition (a.c.), Property (A) and rings whose space of minimal prime ideals, Min(R), is compact. We begin by extending the definition of (a.c.) to noncommutative rings. We then show that several extensions over semiprime rings have (a.c.). Moreover, we investigate the annihilator condition under the formation of matrix rings and classical quotient rings. Finally, we prove that if R is a reduced ring then: the classical right quotient ring $Q(R)$ is strongly regular if and only if R has a Property (A) and Min(R) is compact, if and only if R has (a.c.) and Min(R) is compact. This extends several results about commutative rings with (a.c.) to the noncommutative setting.

PS-3 July 1(Friday), 10:10-10:40 / 211-1 : Nanqing Ding (Nanjing University)

On Gorenstein modules

In the first part, we talk about $\mathcal{W}$-Gorenstein modules for a self-orthogonal class $\mathcal{W}$ of left R-modules. Special attention is paid to $\mathcal{W}_P$-Gorenstein and $\mathcal{W}_I$-Gorenstein modules, where $\mathcal{W}_P = \{C \otimes_R P | P$ is a projective left R-module$\}$ and $\mathcal{W}_I = \{Hom_S(C, E) | E$ is an injective left S-module$\}$ with ${}_SC_R$ a faithfully semidualizing bimodule. In the second part, we deal with stongly Gorenstein flat modules. Some examples are given to show that strongly Gorenstein flat modules over coherent rings lie strictly between projective modules and Gorenstein flat modules. The strongly Gorenstein flat dimension and the existence of strongly Gorenstein flat precovers and pre-envelopes are also studied. Finally, we discuss Goresstein FP-injective and Gorenstein flat modules. Some properties of Gorenstein FP-injective and Gorenstein flat modules over coherent rings are obtained. Several known results are extended.

Key Words: $\mathcal{W}$-Gorenstein module; stongly Gorenstein flat module; Goresstein FP-injective; Gorenstein flat module.

2010 Mathematics Subject Classification: 18G25; 18G20; 16D40, 16D50.

REFERENCES

[1] Yuxian Geng and Nanqing Ding, $\mathcal{W}$-Gorenstein modules, J. Algebra 325 (2011), 132-146.

[2] Nanqing Ding, Yuanlin Li and Lixin Mao, Strongly Gorenstein flat modules, J. Austral. Math. Soc. 86 (3) (2009), 323-338.

[3] Lixin Mao and Nanqing Ding, Gorenstein FP-injective and Gorenstein flat modules, J. Algebra Appl. 7 (4) (2008), 491-506.

[4] James Gillespie, Model structures on modules over Ding-Chen rings, Homology, Homotopy and Applications 12(1) (2010), 61-73.

PS-4 July 1(Friday), 10:50-11:20 / 211-1 : Miguel Ferrero(Universidade Federal do Rio Grande do Sul)

Partial Actions of Groups on Semiprime Rings

Partial actions of groups have been studied and applied first in C^* algebras and then in several other areas of mathematics. In a pure algebraic context, partial actions of groups on algebras have been introduced and studied by M. Dokuchaev and R. Exel [1]. In this survey lecture we recall the definition of partial actions. We consider, in particular, partial actions of groups on semiprime rings and study conditions under which a partial action in this case has an enveloping action (see [2], [3]).

REFERENCES

[1] Dokuchaev M. and Exel R.; Associativity of crossed products by partial actions, enveloping actions and partial representation; Trans. AMS 357, v. 5 (2005), 1931-1952.

[2] Ferrero, M.; Partial actions of groups on semiprime rings; Marcel Dekker, Proc. on Groups, Rings and Group Rings, v. 248 (2006), 155-162.

[3] Cortes W. and Ferrero, M.; Globalization on partial actions on semiprime rings; Contemp. Math. (AMS) 499 (2008), 27-36.

PS-5 July 1(Friday), 11:25-11:55 / 211-1 : Mohamed Yousif (The Ohio State University)

Recent developments on projective and injective modules

Branch Session I

BS1-1 July 1(Friday), 13:30-13:50/ 211-1 : Yiqiang Zhou (Memorial University of Newfoundland)

A class of clean rings

An element a of a ring R is a (uniquely) clean element if a can be (uniquely) expressed as the sum of an idempotent and a unit in R. The ring R is called (uniquely) clean if each of its elements is (uniquely) clean. It is known that a ring R with Jacobson radical $J(R)$ is uniquely clean if and only if $R/J(R)$ is a Boolean ring, idempotents of R are central and idempotents lift modulo $J(R)$. In this talk, we present a structure theorem for a larger class of clean rings including uniquely clean rings.

BS1-2 July 1(Friday), 13:55-14:15/ 211-1 : Thomas Dorsey* (CCR-La Jolla), Alexander Diesl (Wellesley College)

Strongly Clean Matrix Rings

An element of a ring is said to be strongly clean if it is the sum of a unit and an idempotent that commute. Several authors (including the present ones) have proved results relating strong cleanness of matrix rings to properties of the polynomial ring. We'll discuss further results along these lines, including results for algebraic algebras.

BS1-3 July 1(Friday), 14:20-14:40/ 211-1 : Nazer Halimi (The University of Queensl)

Star operation on Orders in Simple Artinian Rings

In this talk I will discuss the use of star operations to study multiplicative ideals theory, with the aim of constructing new orders in simple Artinian rings. I will define the notion of non-commutative Prüfer ν-multiplication order, and discuss the existence of such order which is not also a non-commutative Prüfer order.

BS1-4 July 1(Friday), 14:50-15:10/ 211-1 : Muzibur Rahman Mozumder*, Tsiu-Kwen Lee (National Taiwan University)

Generalized Derivations on prime rings

Let R be a prime ring with extended centroid C and symmetric Martindale quotient ring $Q_s(R)$. Suppose that $Q_s(R)$ contains a nontrivial idempotent e such that $eR+Re \subseteq R$. In this paper we prove that if R is a prime ring and $F : R \longrightarrow R$ is a generalized derivation associated with a non-zero derivation d and h is an additive mapping of R such that such that $F(x)x = xh(x)$ for all $x \in R$. Then either R is commutative or $F(x) = xp$ and $h(x) = px$ where $p \in Q_s(R)$.

2000 Mathematics Subject Classification. 16N60, 16W25.
Key Words and phrases. Generalized derivation, Functional identity, Martindale ring of quotients.

BS1-5 July 1(Friday), 15:15-15:35/ 211-1 : Chang Ik Lee*, Yang Lee (Pusan National University)

Some Generalization of IFP Rings and McCoy Rings

McCoy proved in 1942 that if two polynomials annihilate each other over a commutative ring then each polynomial has a nonzero annihilator in the base ring. Nielsen find an IFP ring over which McCoy's result does not hold, and proved that if $f(x)g(x) = 0$ for polynomials $f(x)$ and $g(x)$ over an IFP ring R, then one of the right annihilator of $f(x)$ or the right annihilator of $g(x)$ contains a nonzero element in R. In this note we investigate another direct method to find constant annihilators of zero-dividing polynomials over IFP rings.

BS1-6 July 1(Friday), 15:40-16:00/ 211-1 : Alexander Diesl (Wellesley College)

Some results and new questions about clean rings

A ring is called strongly clean if every element can be written as the sum of an idempotent and a unit which commute. It is known that the strongly clean property is a weakening of the classical strongly π-regular property. Therefore, an endomorphism of a module is strongly clean if and only if it satisfies a certain weakening of Fitting's Lemma. In this talk, we will explore how this idea can help us to characterize classes of strongly clean rings. Many open problems will be presented.

BS1-7 July 1(Friday), 16:10-16:30/ 211-1 : Da Woon Jung*, Yang Lee, Sung Pil Yang (Pusan National University), Nam Kyun Kim (Hanbat National University)

Nil-Armendariz rings and upper nilradicals

We continue the study of nil-Armendariz rings initiated by Antoine. We rst examine a kind of ring coproduct in which the Armendariz, nil-Armendariz, and weak Armendariz conditions are equivalent. We next observe the structure of nil-Armdnariz rings via the upper nilradicals. It is also shown that a ring R is Armendariz if and only if R is nil-Armenariz if and only if R is weak Armendariz, when R is a von Neumann regular ring.

BS1-8 July 1(Friday), 16:35-16:55/ 211-1 : Wooyoung Chin*, Jineon Baek, Jiwoong Choi, Taehyun Eom, Young Cheol Jeon (Korea Science Academy of KAIST)

Insertion-of-factors-property on nilpotent elements

We generalize the Insertion-of-factors-property by setting nilpotent products of elements. In the process we introduce the concept of *nil-IFP* ring that is also a generalization of NI ring. I t is shown that if Köthe's conjecture holds then every nil-IFP ring is NI. The class of minimal noncommutative nil-IFP rings is completely determined, up to isomorphism, where the minimal means having smallest cardinality.

Branch Session II

BS2-1 July 1(Friday), 13:30-13:50/ 218 : Sarapee Chairat*, Dinh Van Huynh, Chitlada Somsup, Maliwan Tunapan (Thaksin University)

On rings over which the injective hull of each cyclic module is Σ-extending

A right R-module M is called Σ-extending if the direct sum M power (A) of A copies of M is an extending module for any index set A. In this report, we introduce and investigate a class of rings over which every cyclic right R-module has a Σ-CS injective hull. We call such a class of rings right CSE-rings. The key of our work is that any right CSE-ring is right qfd, i.e., every cyclic right R-module has finite dimension. From this key, we see that every commutative CSE-ring is noetherian. In this report we get some results when is a right CSE-ring noetherian without conditions of commutativity.

BS2-2 July 1(Friday), 13:55-14:15/ 218 : Hong You* (Soochow University), Qingxia Zhou (Harbin Institute of Technology)

Structure of augmentation quotionts for integral group rings

Let G be a group, ZG its integral group ring and $\Delta(G)$ the augmentation ideal of ZG. Denote $\Delta^n(G)$ the nth power of $\Delta(G)$ which is generated as an abelian group by the products of $\{(g_1-1)(g_2-1)\cdots(g_n-1)\}$ where $g_1,\ g_2,\ \cdots,\ g_n \in G\setminus(1)$. Define

$$Q_n(G)=\Delta^n(G)/\Delta^{n+1}(G)$$

as the nth augmentation quotient group. This group has been intensively studied in the case G is finite abelian. For nonabelian finite groups, some special cases such as symmetric group, groups with order $p^3,\ p^4$ (p is a prime), the structure $Q_n(G)$ have been described. In the talk, we will present the structure for the group of order 2^5 and dihedral group.

BS2-3 July 1(Friday), 14:20-14:40/ 218 : Kazuho Ozeki (Meiji University)

Hilbert coefficients of parameter ideals

This is a joint work with L. Ghezzi, S. Goto, J. Hong, T. T. Phuong, and W. V. Vasconcelos. To state the results, let A be a commutative Noetherian local ring with maximal ideal $\mathbf{m}$ and $d=\dim A>0$. Let $\ell_A(M)$ denote, for an A-module M, the length of M. Then for each $\mathbf{m}$-primary ideal I in A we have integers $\{\mathbf{e}_I^i(A)\}_{0\le i\le d}$ such that the equality

$$\ell_A(A/I^{n+1})=\mathbf{e}_I^0(A)\binom{n+d}{d}-\mathbf{e}_I^1(A)\binom{n+d-1}{d-1}+\cdots+(-1)^d\mathbf{e}_I^d(A)$$

holds true for all $n\gg 0$, which we call the Hilbert coefficients of A with respect to I. We say that A is unmixed, if $\dim\widehat{A}/\mathbf{p}=d$ for every $\mathbf{p}\in\operatorname{Ass}\widehat{A}$, where $\widehat{A}$ denotes the $\mathbf{m}$-adic completion of A. With this notation Wolmer V. Vasconcelos posed, exploring the vanishing of $\mathbf{e}_Q^1(A)$ for parameter ideals Q, in his lecture at the conference in Yokohama of March, 2008 the following conjecture.

[3] Assume that A is unmixed. Then A is a Cohen-Macaulay local ring, once $\mathbf{e}_Q^1(A)=0$ for some parameter ideal Q of A.

In my talk I shall settle this conjecture affirmatively. We note that $\mathbf{e}_Q^1(A)\le 0$ for every parameter ideal Q in arbitrary Noetherian local rings A with $\dim A>0$ (cf. [2]). The second purpose of this talk is to study when the set

$$\Lambda=\{\mathbf{e}_Q^1(A)\mid Q\text{ is a parameter ideal in }A\}$$

is finite, or a singleton. I shall show that the local cohomology modules $\{\mathbf{H}_{\mathbf{m}}^i(A)\}_{0\le i\le d-1}$ of A with respect to $\mathbf{m}$ are all finitely generated, if the set Λ is finite and A is unmixed. If A is a Buchsbaum ring, the first Hilbert coefficients $\mathbf{e}_Q^1(A)$ of A for parameter ideals Q are constant and equal to $\sum_{i=1}^{d-1}\binom{d-2}{i-1}h^i(A)$, where $h^i(A)$ denotes the length of the local cohomology module $\mathbf{H}_{\mathbf{fkm}}^i(A)$, whence the set Λ is a singleton. It seems natural to conjecture that the converse of the assertion holds true. We prove that A is a Buchsbaum ring, if A is unmixed and the values $\mathbf{e}_Q^1(A)$ are constant which are independent of the choice of parameter ideals Q in A. Hence the second conjecture of this talk also settles affirmatively.

REFERENCES

[1] L. Ghezzi, S. Goto, J. Hong, K. Ozeki, T. T. Phuong, and W. V. Vasconcelos, *Cohen-Macaulayness versus the vanishing of the first Hilbert coefficient of parameters*, J. London Math. Soc., **81** (2010), 679–695.

[2] M. Mandal and J. K. Verma, *On the Chern number of an ideal*, Preprint 2008. *Toward a theory of Buchsbaum singularities*, Amer. J. Math., **100** (1978), no. 4, 727–746.

[3] W. V. Vasconcelos, *The Chern coefficients of local rings*, Michigan Math. J., **57** (2008), 725–743.

BS2-4 July 1(Friday), 14:50-15:10/ 218 : Asma Ali (Aligarh Muslim University)

Differentiability of torsion theories

A torsion theory for a ring R is a pair $\tau = (\zeta, \Im)$ of classes of R-modules such that ζ and $\Im$ have the property that $Hom_R(M,T) = 0$ for all $M \in \zeta$ and $T \in \Im$. The modules in ζ are called torsion modules for ζ and the modules in $\Im$ are called torsion free modules for $\Im$. A given class ζ is a trosion class of a torsion theory if and only if it is closed under quotients , direct sums and extensions. A class $\Im$ is torsion free class of a torsion theory if it is closed under taking submodules, isomorphic images, direct products and extensions. A torsion theory $\tau = (\zeta, \Im)$ is a hereditary if the class ζ is closed under taking submodules (equivalently torsion free class is closed under formation of injective envelopes). It is called cohereditary if $\Im$ is closed undere factor modules. A derivation on a ring R is an additive mapping $\delta : R \longrightarrow R$ with $\delta(rs) = \delta(r)s + r\delta(s)$ for all $r, s \in R$. An additive mapping $d : M \longrightarrow M$ on a right R-module M is a δ-derivation if $d(xr) = d(x)r + x\delta(r)$ for $x \in M$ and $r \in R$. As these concepts are not intrinsically ring theoretic notions, it is of interest to study how they agree with the concepts that are intrinsically ring theoretic. In this discussion we concentrate on how derivations agree with hereditary torsion theory. A torsion theory is said to be differentiable if a derivation can be extended from any module to its module of quotients corresponding to the torsion theory. Finally we discuss conditions under which a derivation on a ring (module) can be extended to its ring (module) of quotients.

BS2-5 July 1(Friday), 15:15-15:35/ 218 : Mohammad Javad Nematollahi (Islamic Azad University)

H_δ-supplemented modules

A module M is called H-supplemented if for every submodule N of M, there exists a direct summand D of M, such that $A+X=M$ if and only if $D+X=M$, for any submodule X of M. (Equivalently, for each $X \leq M$, there exists a direct summand D of M such that $(X+D)/D \ll M/D$ and $(X+D)/X \ll M/X$. We call a module M, H_δ-supplemented, if for each $X \leq M$, there exists a direct summand D of M such that $(X+D)/D \ll_\delta M/D$ and $(X+D)/X \ll_\delta M/X$. In this article we investigate these modules and give some properties of them. Also direct summands and direct sums of H_δ-supplemented modules are studied.

BS2-6 July 1(Friday), 15:40-16:00/ 218 : Yahya Talebi*, A. R. Moniri Hamzekolaei, M. Hosseinpour (University of Mazandaran)

Modules Whose Non-cosingular Submodules are Direct Summand

In this paper we introduce the concept of CCLS-modules. Let M be a module. Then we call M a CCLS-module in case every P-coclosed (non-cosingular) submodule of M is a direct summand. We prove that every torsion-free $\mathbb{Z}$-module is CCLS. We give an equivalent condition for a weakly supplemented module to be a CCLS-module. Let M be non-cosingular with (D^*) and $M=M_1 \oplus \ldots \oplus M_n$ be a finite direct sum of relatively projective modules. It is shown that M is CCLS if and only if each M_i is CCLS for $i=1,\ldots,n$.

BS2-7 July 1(Friday), 16:10-16:30/ 218 : Tugba Guroglu* (Celal Bayar University), Gokhan Bilhan (Dokuz Eylul University)

A Note On Variation Of Supplemented Modules

Let R be an associative ring with unity and M be an unital left R-module. A module M is called supplemented, if for every submodule A of M, there is a submodule B of M such that $M = A + B$ and $A \cap B$ is a small submodule of B. A module M is *amply supplemented*, if whenever $M = A + B$, then B contains a supplement of A. We shall say that, a module M is *w-supplemented*, if every semisimple submodule of M has a supplement in M. A module M is called *amply w-supplemented*, if $M = A + B$ where A is semisimple submodule of M, then B contains a supplement of A.
In this work, the properties of w-supplemented modules are studied and obtained the following some results.

Proposition A module M is w-supplemented if and only if M is amply w-supplemented.

Lemma An extension of w-supplemented module by w-supplemented is w-supplemented. That is, let M be a module and L be a submodule of M. If L and M/L are w-supplemented and $L \ll M$, then M is w-supplemented.

Proposition Over a Dedekind domain R, all torsion modules are w-supplemented.
The following example shows that every submodule of w-supplemented module need not be w-supplemented.

Example Let R be a commutative ring with identity 1 and

$$S = \left\{ \begin{pmatrix} a & m \\ 0 & a \end{pmatrix} : a \in R, m \in M \right\}$$

is a ring with ordinary addition and multiplication. $Soc(_S S) = \begin{pmatrix} 0 & Soc(_R M) \\ 0 & 0 \end{pmatrix}$ and $Soc(_S S) \ll_S S$. Let M be faithful right R-module such that $Soc(_R M)$ does not have a supplement in M. Thus $_S S = \left\{ \begin{pmatrix} a & m \\ 0 & a \end{pmatrix} : a \in R, m \in M \right\}$ is w-supplemented but the submodule $_S N = \begin{pmatrix} 0 & M \\ 0 & 0 \end{pmatrix}$ is not w-supplemented.

REFERENVCES

[1] Alizade, R., Büyükaşık, E. Cofinitely Weak Supplemented Modules, Communication in Algebra, 31, (2003), 5377-5390.
[2] Anderson, F.W., Fuller, K.R. Rings and Categories of Modules, Springer, New York, (1992).
[3] Keskin, D., Orhan, N. Generalization of Weak Lifting Modules, Soochow Journal of Math., 32, 1, (2006), 71-76.
[4] Lomp, C., Wisbauer, R., Clark, J. and Vanaja, N. Lifting Modules, Birkhäuser-Verlag, (2006).
[5] Zöschinger, H. Komplementierte Moduln über Dedekindringen, Journal of Algebra, 29, (1974a), 42-56.
[6] Wisbauer, R. Foundations of Modules and Rings, Gordon and Breach, (1991).

Branch Session III

BS3-1 July 1(Friday), 13:30-13:50/ 219 : Kenta Ueyama (Shizuoka University)

Some results on AS-Gorenstein algebras

In the 1960s, Auslander introduced a homological invariant for finitely generated modules over a (commutative) noetherian ring which is called Gorenstein dimension (G-dimension for short). He developed the theory of G-dimension with Bridger [1]. So far, G-dimension has been studied from various points of view (see [2] for details). This invarant shares many of the nice properties of projective dimension. In particular, a commutative noetherian local ring is Gorenstein if and only if every finitely generated module has finite G-dimension. (This result parallels the regularity theorem: a commutative noetherian local ring is regular if and only if every finitely generated module has finite projective dimension.) A module of G-dimension zero is called a totally reflexive module. AS-Gorenstein algebras introduced by Artin and Schelter are the most important class of algebras studied in noncommutative algebraic geometry (see [3], [4] etc.). An AS-Gorenstein algebra is the non-commutative graded analogue of a commutative local Gorenstein ring. In this talk, we will present some results related to G-dimension, totally reflexive modules and AS-Gorenstein algebras inspired by the results in the commutative case.

REFERENCES

[1] M. Auslander and M. Bridger, *Stable module theory*, Memoirs of the American Mathematical Society, No. 94 American Mathematical Society, Providence, R.I. 1969.

[2] L. W. Christensen, *Gorenstein dimensions*, Lecture Notes in Mathematics 1747, Springer-Verlag, Berlin, 2000.

[3] P. Jørgensen, Local cohomology for non-commutative graded algebras, *Comm. Algebra* **25** (1997), 575-591.

[4] P. Jørgensen and J. J. Zhang, Gourmet's Guide to Gorensteinness, *Adv. Math.* **151** (2000), 313-345.

BS3-2 July 1(Friday), 13:55-14:15/ 219 : Takao Hayami (Hokkai-Gakuen University)

Hochschild cohomology ring of the integral group ring of the semidihedral group

Let R be a commutative ring and Λ an R-algebra which is a finitely generated projective R-module. Let $HH^n(\Lambda) := \mathrm{Ext}^n_{\Lambda^e}(\Lambda, \Lambda)$ be the nth Hochschild cohomology of Λ. The cup product gives $HH^*(\Lambda) := \bigoplus_{n\geq 0} HH^n(\Lambda)$ a graded ring structure with identity, and it is called the Hochschild cohomology ring of Λ. We consider the case Λ is a group ring RG for a finite group G. If G is an abelian group, Holm [3] and Cibils and Solotar [1] prove $HH^*(RG) \simeq RG \otimes_R H^*(G, R)$ as rings, where $H^*(G, R)$ denotes the ordinary cohomology ring of G with coefficients in R. The Hochschild cohomology $HH^n(RG)$ is isomorphic to the direct sum of the ordinary group cohomology of the centralizers of representatives of the conjugacy classes of G: $HH^*(RG) \simeq \bigoplus_j H^*(G_j, R)$. Siegel and Witherspoon [4] define a new product on $\bigoplus_j H^*(G_j, R)$ so that the above additive isomorphism is multiplicative. However there are few published examples in which the Hochschild cohomology ring of a group ring is completely described. In this talk, we give the precise description of the ring structure of the Hochschild cohomology $HH^*(\mathbb{Z}G)$ of the integral group ring of the semidihedral 2-group $G = SD_{2^r}$ of order 2^r for $r \geq 4$ ([2]).

REFERENCES

[1] C. Cibils and A. Solotar, *Hochschild cohomology algebra of abelian groups*, Arch. Math. **68** (1997), 17–21.

[2] T. Hayami, *Hochschild cohomology ring of the integral group ring of the semidihedral 2-group*, Algebra Colloq. (to appear).

[3] T. Holm, *The Hochschild cohomology ring of a modular group algebra: the commutative case*, Comm. Algebra **24** (1996), 1957–1969.

[4] S. F. Siegel and S. J. Witherspoon, *The Hochschild cohomology ring of a group algebra*, Proc. London Math. Soc. (3) **79** (1999), 131–157.

BS3-3 July 1(Friday), 14:20-14:40/ 219 : Fumiya Suenobu*, Fujio Kubo (Hiroshima University)

Study on the algebraic structures in terms of geometry and deformation theory

1. The closest associative algebra to an algebra We shall define the associative algebra structure closest to a given algebra structure. When we face a new multiplication, being caused by noise and so on, it must be useful to compute with the closest associative multiplication to such a perturbed one. We then give a procedure to find the closest associative structure and demonstrate our strategy for the 2 dimensional algebras over the field $\mathbb{R}$ of real numbers. For example, an algebra given by the following multiplication table

	x_1	x_2
x_1	$x_1 + x_2$	x_2
x_2	0	x_2

is not an associative algebra. That of the closest associative algebra is

	x_1	x_2
x_1	$1.03122x_1 + 0.96508x_2$	$0.611284x_1 - 0.129634x_2$
x_2	$0.611284x_1 - 0.129634x_2$	$-0.0817353x_1 + 0.766503x_2$

.

Our procedure is based on the decomposition of $\mathfrak{C} = \mathfrak{C}_1 \cup \cdots \cup \mathfrak{C}_5$ of the algebraic set of 2 dimensional associative algebras over $\mathbb{R}$. Note that we can also apply this theory to the case of Lie structures.

2. Tracing the points of the sets of structure constants of the deformed algebras After introducing a polynomial deformation, we shall show that any element of $\mathfrak{C}_i$ is obtainable from another one by a polynomial deformation.

3. Further topics J. M. A. Bermúdez et al classfied the 2 dimensional associative algebras over $\mathbb{R}$ to 7 types of them, in 2007. We figure out which algebraic set $\mathfrak{C}_i$ they are located in.

4. References

1.J. M. A. Bermúdez, J. Fresán, J. S. Hernández, “On the variety of two dimensional real associative algebras”, *Int. J. Contemp. Math. Sciences*, **26**, pp. 1293–1305(2007).

2.F. Kubo, F. Suenobu, “On the associative algebra structures closest to algebra structures”, *J. Algebra Appl.*, to appear.

3.F. Suenobu, F. Kubo, “On the Lie algebra structures closest to algebra structures”, *JP J. Algebra Number Theory Appl.*, **17**, pp. 117–128(2010).

BS3-4 July 1(Friday), 14:50-15:10/ 219 : Takahiko Furuya* (Tokyo University of Science), Nicole Snashall (University of Leicester)

Support varieties for modules over stacked monomial algebras

Koszul algebras play an important role in many branches of the representation theory of algebras. In [2], Green and Snashall introduced (D, A)-stacked monomial algebras which are generalizations of Koszul monomial algebras as well as D-Koszul monomial algebras and studied their Hochschild cohomology rings modulo nilpotence. In this talk we consider the support varieties for modules over (D, A)-stacked monomial algebras. We give a necessary and sufficient condition for the support variety of a simple module over a (D, A)-stacked monomial algebra to be nontrivial. We also provide some examples of (D, A)-stacked monomial algebras which are not self-injective but nevertheless satisfy the finite generation conditions **(Fg1)** and **(Fg2)** in [3].

REFERENCES

[1] T. Furuya and N. Snashall, *Support varieties for modules over stacked monomial algebras*, to appear in Comm. in Algebra.

[2] E. Green and N. Snashall, *The Hochschild cohomology ring modulo nilpotence of a stacked monomial algebra*, Colloq. Math. **105** (2006), 233–258.

[3] K. Erdmann, M. Holloway, R. Taillefer, N. Snashall and Ø. Solberg, *Support varieties for selfinjective algebras*, K-Theory **33** (2004), 67–87.

BS3-5 July 1(Friday), 15:15-15:35/ 219 : Ajda Fosner (University of Primorska)

Maps preserving matrix pairs with zero Lie or Jordan product

Let $\mathcal{A}$ and $\mathcal{B}$ be two algebras over the same field $\mathbb{F}$. Then a map $\varphi : \mathcal{A} \to \mathcal{B}$ preserves commutativity if $\varphi(a)\varphi(b) = \varphi(b)\varphi(a)$ whenever $ab = ba$, $a, b \in \mathcal{A}$. If φ is bijective and both φ and φ^{-1} preserve commutativity, then we say that φ preserves commutativity in both directions. Problems concerning commutativity preserving maps are closely related to the study of Lie homomorphisms. Every algebra $\mathcal{A}$ becomes a Lie algebra if we introduce the Lie product $[a, b]$ by $[a, b] = ab - ba$, $a, b \in \mathcal{A}$. We call a linear map $\varphi : \mathcal{A} \to \mathcal{B}$ a Lie homomorphism if $\varphi([a, b]) = [\varphi(a), \varphi(b)]$ for every pair $a, b \in \mathcal{A}$. It is easy to see that every Lie homomorphism preserves commutativity. The assumption of preserving commutativity can be reformulated as the assumption of preserving zero Lie products:

$$[a, b] = 0 \implies [\varphi(a), \varphi(b)] = 0, \ a, b \in \mathcal{A}.$$

This is probably one of the reasons that linear preserver problems concerning commutativity are among the most extensively studied preserver problems on matrix algebras and on operator algebras. Because of applications in quantum mechanics it is also of interest to study a more difficult problem of characterizing general (non-linear) commutativity preserving maps. Similarly, we can also define the Jordan product $a \circ b$ by $a \circ b = ab + ba$, $a, b \in \mathcal{A}$. As above, we say that a map $\varphi : \mathcal{A} \to \mathcal{B}$ preserves zero Jordan products if

$$a \circ b = 0 \implies \varphi(a) \circ \varphi(b) = 0, \ a, b \in \mathcal{A}.$$

We will represent recent results on general (non-linear) maps on some matrix algebras that preserve matrix pairs with zero Lie or Jordan product. We will talk about complex and real matrices, hermitian, symmetric, and alternate matrices.

BS3-6 July 1(Friday), 15:40-16:00/ 219 : Jia-Feng Lu (Zhejiang Normal University)

Introduction to piecewise-Koszul algebras

In this talk, we will introduce a new class of Koszul-type algebras: named piecewise-Koszul algebras. Some basic properties and applications of piecewise-Koszul algebras are given.

BS3-7 July 1(Friday), 16:10-16:30/ 219 : Ebrahim Hashemi (Shahrood University of Technology)

On near modules over skew polynomials

Throughout this paper all rings are associative with unity and all nearrings are left nearrings. We use R and N to denote a ring and a nearring respectively. Kaplansky introduced Baer rings. A ring R is *Baer* if R has a unity and the right annihilator of every nonempty subset of R is generated, as a right ideal, by an idempotent. Kaplansky shows that the definition of a Baer ring is left-right symmetric. The class of Baer rings includes all right Noetherian right PP rings, all right perfect right nonsingular right CS rings, and all von Neuman regular rings whose lattice of principal right ideals is complete.

BS3-8 July 1(Friday), 16:35-16:55/ 219 : Mohammad Shadab Khan (Aligarh Muslim University)

On Decomposition Theorems for Near Rings

Let R be a left near ring with multiplicative center Z. We shall denote by N, the set of all nilpotent elements and by P the set of potent elements of R that is $\{x \in R | x^{n(x)} = x, \text{for some positive integer } n(x) > 1\}$. The set of commutators is denoted by C. An element $x \in R$ is said to be distributive if $(y+z)x = yx + zx$ for all $y, z \in R$. A near ring R is said to be distributively generated if it contains a multiplicative semigroup of distributive elements which generates an additive group $(R, +)$. A near ring R is called periodic if for every $x \in R$ there exist distinct positive integers $m = m(x)$, $n = n(x)$ such that $x^m = x^n$.
In the present paper, our objective is to establish some decompositon theorems for near rings satisfying any one of the following conditions:(P_1) $xy = y^m(xy)^p y^n$, (P_2) $xy = y^m(yx)^p y^n$ for all $x, y \in R$ where $m = m(x, y) \geq 0$, $n = n(x, y) \geq 0$, $p = p(x, y) > 1$ are integers.

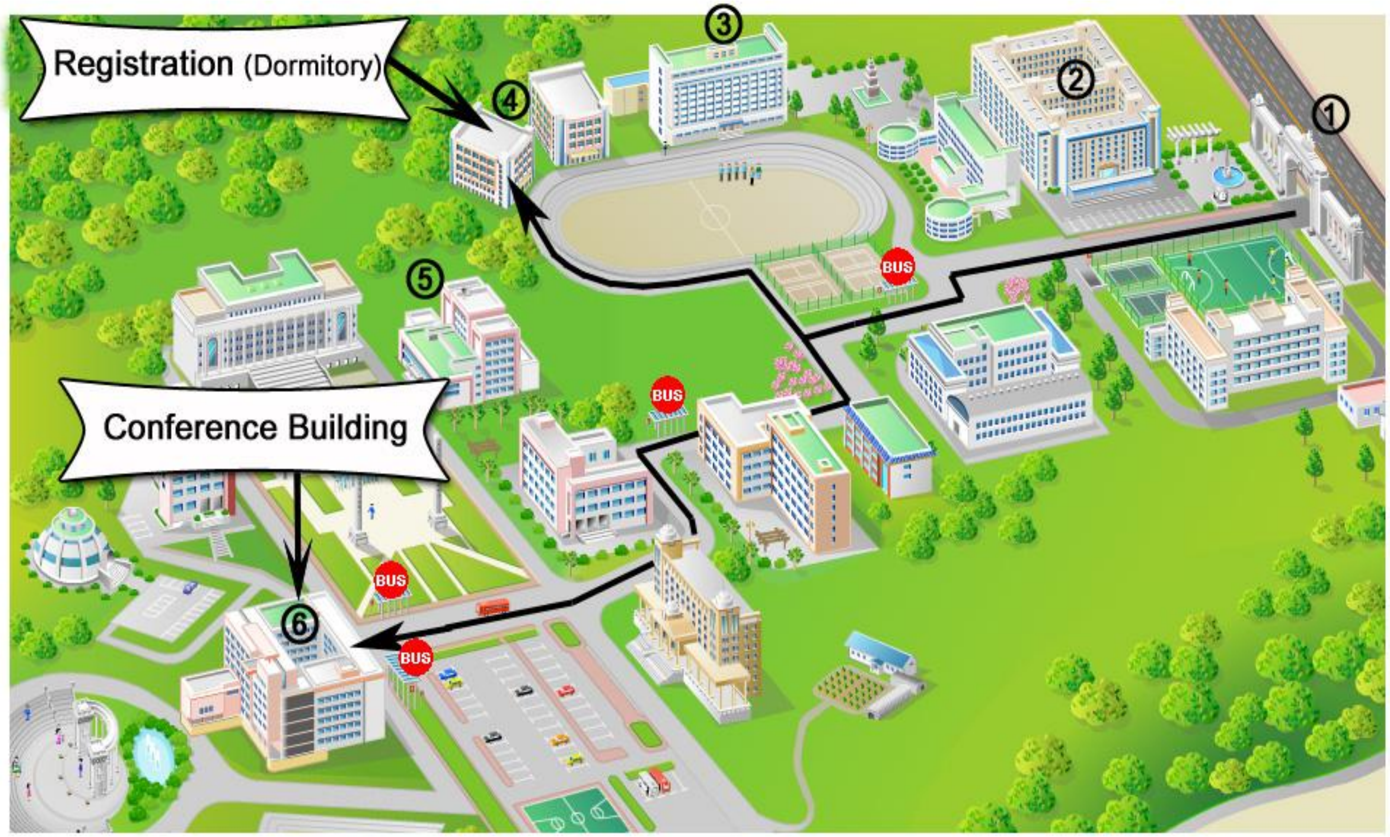
==
Homepage : http://cjk-icrt.khu.ac.kr/

THE SIXTH CHINA-JAPAN-KOREA INTERNATIONAL CONFERENCE
ON RING AND MODULE THEORY

Date: June 27 (Monday) - July 2 (Saturday) in 2011

Place: Kyung Hee University at Suwon, Korea
==

Campus Map



① Entrance Gate

② WooJungWon
- Book Store, Pharmacy, Restaurant

③ Multimedia Education Building

④ 2nd New Dormitory
-Registration
-Accommodation
-Café and bakery (08:00 – 21:00)
-Convenience Store (24 hours a day)

⑤ Student Union
-Wednesday: Banquet (1st floor)
-Thursday: Lunch and Dinner (1st floor)
- Restaurant, Post Office

⑥ **College of Applied Science**
-Conference Building
(2nd floor: Room — 211-1, 218, 219)

Notice

1. Thing to prepare: toothpaste, toothbrush
2. You can use the bus (FREE) to move to the conference building in the campus.
3. Please let the administration office know when you check out at the dormitory, and make sure to return your key.
4. It is the rainy season in Korea, please bring an umbrella.