

Proceedings of the 41st Symposium on Ring Theory and Representation Theory

September 5 (Fri.) – 7 (Sun.), 2008
Shizuoka University, Shizuoka

Edited by
Hisaaki Fujita
University of Tsukuba

JSPS Grants-in-Aid for 2008 Scientific Research (B)
(Representative Researcher: Kiyochi Oshiro)

February, 2009
Tsukuba, JAPAN

第 41 回 環論および表現論シンポジウム報告集

2008年9月5日（金）－7日（日）

静岡大学

編集: 藤田尚昌 (筑波大学)

平成 20 年度科学研究費補助金 基盤研究 (B)

(代表: 大城紀代市)

2009年2月

筑波大学

Organizing Committee of The Symposium on Ring Theory and Representation Theory

The Symposium on Ring Theory and Representation Theory has been held annually in Japan and the Proceedings have been published by the organizing committee. The first Symposium was organized in 1968 by H. Tominaga, H. Tachikawa, M. Harada and S. Endo. After their retirement, a new committee was organized in 1997 for managing the Symposium. The present members of the committee are H. Asashiba (Shizuoka Univ.), Y. Hirano (Naruto Univ. of Education), S. Koshitani (Chiba Univ.), M. Sato (Yamanashi Univ.) and K. Oshiro (Yamaguchi Univ.).

The Proceedings of each Symposium is edited by program organizer. Anyone who wants these Proceedings should ask to the program organizer of each Symposium or one of the committee members.

The Symposium in 2009 will be held at Osaka City University for Sep. 11-13, and the program will be arranged by S. Kawata (Osaka City Univ.).

Concerning several information on ring theory group in Japan containing schedules of meetings and symposiums as well as the addresses of members in the group, you should refer the following homepage, which is arranged by M. Sato (Yamanashi Univ.):

<http://fuji.cec.yamanashi.ac.jp/~ring/> (in Japanese)

civil2.cec.yamanashi.ac.jp/~ring/japan/ (in English)

Yasuyuki Hirano
Naruto Japan
December, 2008

CONTENTS

Derived equivalences for triangular matrix rings Hiroki Abe and Mitsuo Hoshino	1
The number of complete exceptional sequences Tokuji Araya	4
Some regular direct-sum decompositions in module theory Alberto Facchini	9
Picard groups of additive full subcategories Naoya Hiramatsu and Yuji Yoshino	23
Left differential operators of modules over rings Hiroaki Komatsu	28
On filtered semi-dualizing bimodules Hiroki Miyahara	32
Notes on the Feit-Thompson conjecture Kaoru Motose	40
Hochschild cohomology of Brauer algebras Hiroshi Nagase	42
Descent of divisor class groups of Krull domains Haruhisa Nakajima	46
The moduli spaces of non-thick irreducible representations for the free group of rank 2 Kazunori Nakamoto and Yasuhiro Omoda	55
Iwasawa algebras, crossed products and filtered rings Kenji Nishida	63
Support varieties and the Hochschild cohomology ring modulo nilpotence Nicole Snashall	68
QF-3' modules relative to torsion theories and others Yasuhiko Takehana	83

About decomposition number of J_4	
Katsushi Waki	91
Polynomial invariants of finite-dimensional Hopf algebras derived from braiding structures	
Michihisa Wakui	96

PREFACE

The 41st Symposium on Ring Theory and Representation Theory was held at Shizuoka University, Shizuoka. The symposium and the proceedings are financially supported by Kiyochi Oshiro (Yamaguchi University) JSPS Grant-in-Aid for 2008 Scientific Research (B), No.18340011.

This volume consists of several (15) articles presented at the symposium. We would like to thank all speakers and coauthors for their contributions.

We would also like to express our thanks to all members of the organizing committee (Professors Hideto Asashiba, Yasuyuki Hirano, Shigeo Koshitani, Kiyochi Oshiro and Masahisa Sato) for their helpful suggestions concerning the symposium. Finally we would like to express our gratitude to Professors Hideto Asashiba and Izuru Mori, and students of Shizuoka University who contributed in the organization of the symposium.

Hisaaki Fujita
Tsukuba, Japan
January, 2009

第41回 環論および表現論シンポジウム プログラム

9月5日 (金曜日)

- 09:30 – 10:30** 西田 憲司 (信州大学)
Iwasawa algebras, crossed products and filtered rings
- 10:45 – 11:45** Alberto Facchini (Università di Padova)
Geometric regularity of direct-sum decompositions of modules
- 13:15 – 14:00** 伊山 修 (名古屋大学)
Tilting mutation and its application
- 14:15 – 14:45** 宮原 大樹 (信州大学)
On filtered semi-dualizing bimodules
- 14:55 – 15:15** 酒井 洋介 (筑波大学)
An elementary exact sequence of modules with application to tiled orders
- 15:30 – 15:50** 中島 晴久 (城西大学)
Some remarks on descent of divisor class groups of Krull domains
- 16:00 – 16:30** 荒谷 督司 (奈良教育大学)
The number of complete exceptional sequences
- 16:40 – 17:25** 平松直哉 (岡山大学), 吉野雄二 (岡山大学)
Picard groups of additive full subcategories

9月6日 (土曜日)

- 09:30 – 10:30** Alberto Facchini (Università di Padova)
Monogeny class, epigeny class, lower part, upper part
- 10:45 – 11:45** Nicole Snashall (University of Leicester)
Hochschild cohomology and support varieties of modules
- 13:15 – 14:00** 長瀬 潤 (奈良工業高等専門学校)
Hochschild cohomology of Brauer algebras
- 14:15 – 14:45** 阿部 弘樹 (筑波大学), 星野 光男 (筑波大学)
Derived equivalences for triangular matrix rings
- 14:55 – 15:15** 竹花 靖彦 (函館工業高等専門学校)
QF-3' modules relative to torsion theories and others

15:30 – 15:50 小松 弘明 (岡山県立大学)

Left differential operators of modules over rings

16:00 – 16:30 中本 和典 (山梨大学), 面田 康裕 (明石工業高等専門学校)

The moduli spaces of non-thick irreducible representations for the free group of rank 2

16:40 – 17:25 和久井 道久 (関西大学)

Polynomial invariants of representation categories of semisimple and cosemisimple Hopf algebras

9月7日 (日曜日)

09:30 – 10:30 Nicole Snashall (University of Leicester)

Representation theory and the structure of the Hochschild cohomology ring modulo nilpotence

10:45 – 11:15 脇 克志 (山形大学)

About decomposition numbers of J_4

11:25 – 11:55 本瀬 香 (弘前市)

Notes on the Feit-Thompson conjecture

The 41st Symposium on Ring Theory and Representation Theory (2008)

Program

September 5 (Friday)

- [09:30 – 10:30] Kenji Nishida (Shinshu University)
Iwasawa algebras, crossed products and filtered rings
- [10:45 – 11:45] Alberto Facchini (Università di Padova)
Geometric regularity of direct-sum decompositions of modules
- [13:15 – 14:00] Osamu Iyama (Nagoya University)
Tilting mutation and its application
- [14:15 – 14:45] Hiroki Miyahara (Shinshu University)
On filtered semi-dualizing bimodules
- [14:55 – 15:15] Yosuke Sakai (University of Tsukuba)
An elementary exact sequence of modules with application to tiled orders
- [15:30 – 15:50] Haruhisa Nakajima (Josai University)
Some remarks on descent of divisor class groups of Krull domains
- [16:00 – 16:30] Tokuji Araya (Nara University of Education)
The number of complete exceptional sequences
- [16:40 – 17:25] Naoya Hiramatsu (Okayama University),
Yuji Yoshino (Okayama University)
Picard groups of additive full subcategories

September 6 (Saturday)

- [09:30 – 10:30] Alberto Facchini (Università di Padova)
Monogeny class, epigeny class, lower part, upper part
- [10:45 – 11:45] Nicole Snashall (University of Leicester)
Hochschild cohomology and support varieties of modules
- [13:15 – 14:00] Hiroshi Nagase (Nara National College of Technology)
Hochschild cohomology of Brauer algebras
- [14:15 – 14:45] Hiroki Abe (University of Tsukuba),
Mitsuo Hoshino (University of Tsukuba)
Derived equivalences for triangular matrix rings
- [14:55 – 15:15] Yasuhiko Takehana (Hakodate National College of Technology)
QF-3' modules relative to torsion theories and others

[15:30 – 15:50] Hiroaki Komatsu (Okayama Prefectural University)

Left differential operators of modules over rings

[16:00 – 16:30] Kazunori Nakamoto (University of Yamanashi),

Yasuhiro Omoda (Akashi National College of Technology)

The moduli spaces of non-thick irreducible representations for the free group of rank 2

[16:40 – 17:25] Michihisa Wakui (Kansai University)

Polynomial invariants of representation categories of semisimple and cosemisimple Hopf algebras

September 7 (Sunday)

[09:30 – 10:30] Nicole Snashall (University of Leicester)

Representation theory and the structure of the Hochschild cohomology ring modulo nilpotence

[10:45 – 11:15] Katsushi Waki (Yamagata University)

About decomposition numbers of J_4

[11:25 – 11:55] Kaoru Motose (Hirosaki)

Notes on the Feit-Thompson conjecture