



Canadian Mathematical Society

Société Mathématique du Canada

REPRESENTATIONS OF FINITE DIMENSIONAL ALGEBRAS

Proceedings of the
Tsukuba International Conference
(Fifth ICRA) held August 13–18, 1990

CMS CONFERENCE PROCEEDINGS

Volume 11

Canadian Mathematical Society
Société Mathématique du Canada

CONFERENCE PROCEEDINGS • Volume 11

**REPRESENTATIONS
OF FINITE
DIMENSIONAL ALGEBRAS**

Proceedings of the
Tsukuba International Conference
(Fifth ICRA) held August 13–18, 1990

**H. Tachikawa and
V. Dlab, Editors**

Published by the American Mathematical Society
for the Canadian Mathematical Society
PROVIDENCE, RHODE ISLAND



40
TAY
3219
-11

CMS CONFERENCE PROCEEDINGS
Series Editors

James B. Carrell and M. Ram Murty

Volume 11

1990 Tsukuba International Conference
on Representations of Algebras and Related Topics
held at Tsukuba University, Japan, August 13–18, 1990

93/3393

Proceedings of a conference sponsored by the Exchange Fund
of Tsukuba University, Hara Research Fund,
Tsukuba Expo '85 Memorial Fund, and the following companies:
Daiwa Institute of Research Ltd., Hitachi Ltd.,
Mitsubishi Electric Corporation, NEC Corporation,
Oki Electric Ind. Co. Ltd., and Toshiba Corporation.

Accepted for publication by the Canadian Mathematical Society

Published by the American Mathematical Society

1991 *Mathematics Subject Classification* (1985 Revision). Primary 16-06;
Secondary 16E30, 16E40, 16G10, 16G20, 16G60, 16G70, 20C10, 20C20.

Library of Congress Cataloging-in-Publication Data

Tsukuba International Conference on Representations of Algebras and Related
Topics (1990: Tsukuba University, Japan)

Representations of finite dimensional algebras: proceedings of the Tsukuba
International Conference (fifth ICRA) held August 13–18, 1990/H. Tachikawa and
V. Dlab, editors.

p. cm.—(CMS conference proceedings: v. 11)

“Tsukuba International Conference on Representations of Algebras and
Related Topics held at Tsukuba University, Japan, August 13–18, 1990”

—T.p. verso.

ISBN 0-8218-6016-X (acid-free paper)

1. Associative algebras—Congresses. 2. Representations of
algebras—Congresses. I. Tachikawa, Hiroyuki, 1930–. II. Dlab, Vlastimil.
III. Title. IV. Series: Conference proceedings (Canadian Mathematical Society);
v. 11.

QA151.5.T78 1990
512'.24—dc20

91-24244
CIP

Copyright © 1991 by the American Mathematical Society. All rights reserved.
The American Mathematical Society retains all rights
except those granted to the United States Government.
Printed in the United States of America.

Information on copying and reprinting can be found at the back of this volume.

The paper used in this book is acid-free and falls within the guidelines
established to ensure permanence and durability. ☺

This volume was printed directly from author-prepared copy.
Portions of this publication were typeset using $A_{M}S\text{-}T_{E}X$,
the American Mathematical Society's $T_{E}X$ macro system.

Contents

Preface	v
Brief history of the International Conference on Representation Theory of Algebras	vii
List of registered participants	ix
List of lectures	xix
<i>P</i> -bases for torsion-free regular modules ISTVAN AGOSTON AND ANDREW P. DEAN	1
The selfinjectivity of a local algebra A and the condition $\text{Ext}_A^1(DA, A) = 0$ HIDETO ASASHIBA	9
Fundamental domains and duplicated algebras IBRAHIM ASSEM, JERZY NEHRING, AND WIEBKE SCHEWE	25
On a theorem of E. Green on the dual of the transpose MAURICE AUSLANDER AND IDUN REITEN	53
Posets with an equivalence relation of tame type and of finite growth V. M. BONDARENKO AND A. G. ZAVADSKIJ	67
Almost split sequences for bocses W. L. BURT AND M. C. R. BUTLER	89
7-dimensional algebras with mixed basis-graph THIERRY DANA-PICARD	123
The Weyl group of a wild graph J. A. DE LA PEÑA	159
Algebras with a large dual GABRIELLA D'ESTE	173
A family of infinite-dimensional non-selfextending bricks for wild hereditary algebras DIETER HAPPEL AND LUISE UNGER	181

Regular modules over wild hereditary algebras OTTO KERNER AND FRANK LUKAS	191
On p -radical groups in representation theory of finite groups SHIGEO KOSHITANI	209
Extensions of finite dimensional algebras and tilting modules NIKOLAOS MARMARIDIS	213
On Auslander-Reiten sequences of triangular matrix algebras HÉCTOR A. MERKLEN	231
Lattices $L(A_n^\nu)$ V. A. PONOMAREV	249
The structure of the principal p -block with cyclic normal defect group KLAUS W. ROGGENKAMP	279
Two-peak posets of finite prinjective type DANIEL SIMSON	287
An algorithm for posets with an equivalence relation A. G. ZAVADSKIJ	299

Preface

A rapid development of the research on representations of finite-dimensional algebras and group representations, as well as dispersion of the research centers all over the world, require regular meeting in these fields. The Tsukuba International Conference on Representations of Algebras and Related Topics, organized at the University of Tsukuba on August 13–18, 1990, has been the latest in a series of such meetings, reflecting the developments in the theory since the last conference at Carleton University in August 1984 (*Lecture Notes in Mathematics*, Vol. 1177 and 1178, Springer Verlag).

The organizing committee consisted of Professors M. Auslander, R. Bautista, S. Brenner, M. C. R. Butler, V. Dlab, K. R. Fuller, G. Michler, I. Reiten, C. M. Ringel, H. Tachikawa (chairman) and K. Yamagata.

The Tsukuba Conference was preceded by a workshop held on August 9–11, 1990 consisting of eight series of lectures by M. Auslander, G. Azumaya, J. F. Carlson, W. Crawley-Boevey, V. Dlab, Y. A. Drozd, K. Erdmann, and C. M. Ringel indicating some of the present, leading trends in the representation theory and related areas. A separate publication, *Proceedings of the Workshop* (to appear) in *London Mathematical Society Lecture Notes Series*, will contain reports from the workshop.

Recent advances in representation theory were reported in 57 lectures; these are listed on page xix. Not all contributions to the conference appear in these proceedings. On the other hand, some papers which were not presented at the conference are included. All papers that appear in this volume are in final form, and no versions of them will be submitted for publication elsewhere.

We should like to express our thanks to all referees for their assistance.

The organization of the meeting would not have been possible without financial support from Exchange Fund of Tsukuba University, Hara Research Fund, Tsukuba Expo' 85 Memorial Fund, and the following companies: Daiwa Institute of Research Ltd., Hitachi Ltd., Mitsubishi Electric Corporation, NEC Corporation, Oki Electric Ind. Co. Ltd., and Toshiba Corporation. We are most grateful for their assistance.

We wish also to extend our thanks to Dr. H. Fujita, the staffs of Institute of Mathematics, University of Tsukuba; Dr. M. Hoshino, Q. Zeng etc., and students T. Kaita, M. Uematsu, and T. Yoshida who helped so efficiently.

H. Tachikawa and V. Dlab
Tsukuba-Ottawa, December 1990

Brief History of the International Conference on Representation Theory of Algebras

The proceedings of the Fifth International Conference on Representation Theory of Algebras (ICRA V), which was held in August 1990 at Tsukuba University, are being published by the Canadian Mathematical Society. It is natural for the proceedings to have a Canadian publisher, since the developments of the representation theory of finite dimensional algebras have been strongly linked to Canada over the last 20 years.

The first ICRA, held in 1974, brought together mathematicians of different schools, some of whom had not had any contact with one another, and it created an international platform for discussion and collaboration. Three of the four previous ICRA's were held at Carleton University in 1974, 1979, and 1984. The third ICRA was held in 1980 in Puebla, Mexico. All these meetings are well documented in the workshop and conference proceedings which have been published in the *Springer Lecture Notes in Mathematics* series (volumes 488; 831 and 832; 903 and 944; 1177 and 1178). As long as no textbook is available, these volumes, together with the proceedings of the Durham Symposium 1985, (*London Mathematical Society Lecture Notes* series, vol. 116, 1986) and *Topics in Algebra, Part 1* (Banach Center Publications, vol. 26, 1988), can serve as a main reference for getting to know the subject. Preliminary versions of the Ottawa conferences appeared in the *Carleton University Lecture Notes* series and include additional material.

The next ICRA has been scheduled for 1992; it will again be held at Carleton University, Ottawa.

List of Registered Participants

**E. Abe, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan**

**I. Agoston, Carleton University
Ottawa, K1S 5B6, Canada**

**T. Asai, Hokkaido University
Kita-Ku, Sapporo 060, Japan**

**H. Asashiba, Osaka City University
Sugimoto-Ku, Osaka 558, Japan**

**I. Assem, University of Sherbrooke
Sherbrooke, Quebec, J1K 2R1, Canada**

**M. Auslander, Brandeis University
Waltham, Massachusetts 02254, U.S.A.**

**G. Azumaya, Indiana University
Bloomington, Indiana 47405, U.S.A.**

**Y. Baba, Yamaguchi University
Yamaguchi-Shi, Yamaguchi 753, Japan**

**R. Bautista, Universidad Nacional Autónoma de México
Mexico 20, D.F. Mexico, Mexico**

**S. Brenner, University of Liverpool
Liverpool L69 2BX, United Kingdom**

**M. C. R. Butler, University of Liverpool
Liverpool L69 3BX, United Kingdom**

**J. F. Carlson, University of Georgia
Athens, Georgia 30602, U.S.A.**

**F. U. Coelho, University of Liverpool
Liverpool L69 3BX, England**

**W. W. Crawley-Boevey, University of Oxford
Oxford OX1 3LB, England**

T. Dana-Picard, Ben-Gurion University
Beer-Sheva, Israel

A. Dean, Bishop's University
Lennoxville, Quebec, Canada, J1M 1Z7

G. D'Este, Università di Padova
Via Belzoni 7, 35131 Padova, Italy

V. Dlab, Carleton University
Ottawa K1S 5B6, Canada

Ju. A. Drozd, Kiev University
Kiev 252017, U.S.S.R.

S. Endo, Tokyo Metropolitan University
Setagaya-Ku, Tokyo 158, Japan

K. Erdmann, University of Oxford
Oxford OX1 3LB, England

A. Facchini, Università di Udine
Via Zanon, 6-3310 Udine, Italy

R. Farnsteiner, University of Wisconsin
Milwaukee, Wisconsin 53201, U.S.A.

H. Fujita, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

K. R. Fuller, University of Iowa
Iowa City, Iowa 52240, U.S.A.

K. R. Goodearl, University of Utah
Salt Lake City, Utah 84112, U.S.A.

E. L. Green, Virginia Polytechnic Institute
Blacksburg, Virginia 24061, U.S.A.

A. Hanaki, Chiba University
Chiba-Shi, Chiba 260, Japan

D. Happel, Universität Bielefeld
4800 Bielefeld, Germany

A. Hida, Chiba University
Chiba-Shi, Chiba 260, Japan

Y. Hieda, Osaka City University
Sugimoto-Ku, Osaka 558, Japan

H. Hijikata, Kyoto University
Sakyo-Ku, Kyoto 606, Japan

M. Hikari, Keio University
Minato-Ku, Tokyo 108, Japan

Y. Hirano, Okayama University
Okayama-Shi, Okayama 700, Japan

K. Hirata, Chiba University
Chiba-Shi, Chiba 260, Japan

H. Holden, University of Trondheim
AVH, N-7055 Dragvoll, Norway

M. Hoshino, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

K. Igusa, Brandeis University
Waltham, Massachusetts 02254, U.S.A.

Y. Iida, Science University of Tokyo
Shinjuku-Ku, Tokyo 162, Japan

T. Ikeda, Hokkaido University of Education
Hakodate-Shi, Hokkaido 040, Japan

T. Ikeyama, Hosei University
Koganei-Shi, Tokyo 184, Japan

T. Inoue, Osaka City University
Sugimoto-Ku, Osaka 558, Japan

H. Ishibashi, Josai University
Sakato-Shi, Saitama 350-20, Japan

H. Ishihara, Hokkaido University
Kita-Ku, Sapporo 060, Japan

T. Ishikawa, Tokyo Metropolitan University
Setagaya-Ku, Tokyo 158, Japan

Y. Iwanaga, Shinshu University
Nagano-Shi, Nagano 380, Japan

T. Izawa, Shizuoka University
Shizuoka-Shi, Shizuoka 422, Japan

J. Kado, Osaka City University
Sugimoto-Ku, Osaka 558, Japan

T. Kaita, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

T. Kanzaki, Kinki University
Higashiosaka-Shi, Osaka 577, Japan

T. Kato, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

Y. Kawada, Kyoto University of Technology
Sakyo-Ku, Kyoto 606, Japan

S. Kawata, Osaka City University
Sugimoto-Ku, Osaka 558, Japan

H. Kawai, Kumamoto National College of Technology
Kikuike-Gun, Kumamoto 861-11, Japan

O. Kerner, University of Düsseldorf
4000 Düsseldorf, Germany

K. Kido, Science University of Tokyo
Shinjuku-Ku, Tokyo 162, Japan

E. E. Kirkman, Wake Forest University
Winston-Salem, North Carolina 27106, U.S.A.

K. Kishimoto, Shinshu University
Matsumoto-Shi, Nagano 390, Japan

K. Kitamura, Osaka Kyoiku University
Osaka-Shi, Osaka 543, Japan

Y. Kitamura, Tokyo Gakugei University
Koganei-Shi, Tokyo 184, Japan

M. Kiyota, Tokyo Medical and Dental University
Bunkyo-Ku, Tokyo 113, Japan

M. Kleiner, Syracuse University
Syracuse, New York 13244-1550, U.S.A.

Y. Kobayash, Tokushima University
Tokushima-Shi, Tokushima 770, Japan

O. Konishi, Osaka City University
Sugimoto-Ku, Osaka 558, Japan

S. Koshitani, Chiba University
Chiba-Shi, Chiba 260, Japan

B. Külshammer, Universität Dortmund
4600 Dortmund 50, West Germany

M. Kutami, Yamaguchi University
Yamaguchi-Shi, Yamaguchi 753, Japan

S. Kyuno, Tohoku Gakuin University
Tagajo-Shi, Miyagi 985 Japan

H. Lenzing, Universität-Gesamthochschule Paderborn
4790 Paderborn, Germany

S. Liu, University of Liverpool
Liverpool L69 3BX, England

R. Makino, Fukushima University
Fukushima-Shi, Fukushima 960-12, Japan

M. P. Malliavin, Université de Paris VI
75230 Paris, France

N. Marmaridis, University of Ioannia
45110 Ioannia, Greece

R. Martinez-Villa, Universidad Nacional Autónoma de México
Mexico 20, D.F. Mexico

K. Masaike, Tokyo Gakugei University
Koganei-Shi, Tokyo 184, Japan

A. Masuoka, Nippon Kogyo University
Minamisaitama-Gun, Saitama 345, Japan

H. A. Merklen, Universidade de São Paulo
Postal No. 20.570 São Paulo, Brasil

G. Michler, Universität Essen
4300 Essen, Germany

J. Miyachi, Tokyo Gakugei University
Koganei-Shi, Tokyo 184, Japan

Y. Miyashita, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

M. Miyauchi, Tokyo Metropolitan College of Aeronautical Engineering
Arakawa-Ku, Tokyo 116, Japan

S. Morimoto, Hagi Koen Gakuin
Hagi-Shi, Yamaguchi 758, Japan

- J. Morita, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan
- K. Motose, Hirosaki University
Hirosaki-Shi, Aomori 036, Japan
- T. Nagahara, Okayama University
Okayama-Shi, Okayama 700, Japan
- K. Nakane, Ibaraki University
Mito-Shi, Ibaraki 10, Japan
- Y. Ninomiya, Shinshu University
Matsumoto Shi, Nagano 390, Japan
- K. Nishida, Nagasaki University
Nagasaki-Shi, Nagasaki 852, Japan
- T. Niwasaki, Ehime University
Matsuyama-Shi, Ehime 790, Japan
- T. Nozawa, Chiba University
Chiba-Shi, Chiba 260, Japan
- Y. Ogawa, Tohoku Institute of Technology
Sendai-Shi, Miyagi 982, Japan
- K. Otake, Gunma University
Maebashi-Shi, Gunma 371, Japan
- H. Okuno, Juntendo University
Bunkyo-Ku, Tokyo 112, Japan
- H. Okuyama, Chiba University
Chiba-Shi, Chiba 260, Japan
- T. Okuyama, Osaka City University
Sugimoto-Ku, Osaka 558, Japan
- K. Oshiro, Yamaguchi University
Yamaguchi-Shi, Yamaguchi 753, Japan
- J. A. de la Peña, Universidad Nacional Autónoma de México
Mexico 20, D.F. Mexico
- V. A. Ponomarev, Institute of Biophysics
142292 t. Putschino, U.S.S.R.
- I. Reiten, Universitetet I Trondheim
Trondheim 7000, Norway

C. M. Ringel, Universität Bielefeld
4800 Bielefeld, Germany

K. W. Roggenkamp, Universität Stuttgart
7000, Stuttgart 80, Germany

R. Saito, Hokkaido Junior College of Literature and Science
Ebetsu-Shi, Hokkaido 069, Japan

K. Sakano, Yamanashi University
Kofu-Shi, Yamanashi 400, Japan

K. Sanada, Science University of Tokyo
Shinjuku-Ku, Tokyo 162, Japan

H. Sasaki, Yamaguchi University
Yamaguchi-Shi, Yamaguchi 753, Japan

H. Sato, Wakayama University
Wakayama-Shi, Wakayama 640, Japan

M. Sato, Yamanashi University
Kofu-Shi, Yamanashi 400, Japan

H. Sawada, Sophia University
Chiyoda-Ku, Tokyo 102, Japan

M. E. Schaps, Bar-Ilan University
52 900 Ramat-Gan, Israel

K. Sekiguchi, Kokushikan University
Setagaya-Ku, Tokyo 154, Japan

T. Sekiguchi, Chuo University
Bunkyo-Ku, Tokyo 112, Japan

S. A. Sikko, Universitetet I Trondheim
AVH, N-7055 Dragvoll, Norway

A. Skowronski, Uniwersytet Mikolaja Kopernika
87-100 Torun', Poland

S. O. Smalo, Universitetet I Trondheim
N-7055 Dragvoll, Norway

O. Solberg, Universitetet I Trondheim
Trondheim 7000, Norway

M. Stefanescu, Universitatea 'Al. I. Cuza' Iași
6600-Iași, Romania

K. Sugano, Hokkaido University
Kita-Ku, Sapporo 060, Japan

T. Sumioka, Osaka City University
Sugimoto-Ku, Osaka 558, Japan

N. Suwa, Tokyo Denki University
Chiyoda-Ku, Tokyo 101, Japan

H. Tachikawa, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

Y. Tagami, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

K. Tahara, Aichi University of Education
Kariya-Shi, Aichi 448, Japan

M. Takane, Universidad Nacional Autónoma de México
04510 Mexico, D.F. Mexico

Y. Takegahara, Muroran Institute of Technology
Muroran-Shi, Hokkaido 050, Japan

M. Takeuchi, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

D. Tambara, Hokkaido University
Kita-Ku, Sapporo 060, Japan

S. Tanabe, Science University of Tokyo
Shinjuku-Ku, Tokyo 162, Japan

M. Tanaka, Kumamoto Institute of Technology
Kumamoto-Shi, Kumamoto 860, Japan

G. Todorov, Northeastern University
Boston, Massachusetts 02115, U.S.A.

A. Tome, Universidad Nacional Autónoma de México
04510 Mexico, D.F. Mexico

H. Tominaga, Okayama University
Okayama-Shi, Okayama 700, Japan

M. Uematsu, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

T. Ukegawa, Fukuyama University
Fukuyama-Shi, Fukuyama 729-02, Japan

- L. Unger, Universität-Gesamthochschule Paderborn
4790 Paderborn, Germany
- K. Uno, Osaka University
Toyonaka-Shi, Osaka 560, Japan
- Y. Usami, Ochanomizu University
Bunkyo-Ku, Tokyo 112, Japan
- T. Wada, Tokyo University of Agriculture and Technology
Fuchu-Shi, Tokyo 183, Japan
- T. Wakamatsu, Jobu University
Isezaki-Shi, Gunma 372, Japan
- K. Waki, Chiba University
Chiba-Shi, Chiba 260, Japan
- A. Watanabe, Kumamoto University
Kumamoto-Shi, Kumamoto 860, Japan
- Y. Watanabe, Osaka Women's University
Sakai-Shi, Osaka 590, Japan
- A. Wiedemann, Universität Stuttgart
7000 Stuttgart 80, Germany
- T. Yamada, Science University of Tokyo
Shinjuku-Ku, Tokyo 162, Japan
- K. Yamagata, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan
- H. Yamaki, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan
- K. Yamashiro, Chiba University
Chiba-Shi, Chiba 260, Japan
- K. Yokogawa, Science University of Okayama
Okayama-Shi, Okayama 700, Japan
- H. Yoshimura, Yamaguchi University
Yamaguchi-Shi, Yamaguchi 753, Japan
- Y. Yoshino, Kyoto University
Kyoto-Shi, Kyoto 606, Japan
- Y. Yukimoto, Fukui Institute of Technology
Fukui-Shi, Fukui 910, Japan

D. Zacharia, Syracuse University
Syracuse, New York 13244, U.S.A.

A. G. Zavadskij, Kiev Civil Engineering Institute
Kiev 252037, U.S.S.R.

Q. Zeng, University of Tsukuba
Tsukuba-Shi, Ibaraki 305, Japan

B. Zimmerman-Huisgen, University of Utah
Salt Lake City, Utah 84112, U.S.A.

List of Lectures

I. Agoston (Carleton University)

On the rank of torsion-free modules over tame hereditary algebras

H. Asashiba (Osaka City University)

On local algebras A satisfying $\text{Ext}_A^1(DA, A) = 0$

I. Assem * (University of Sherbrooke)

J. Nehring (Nicholas Copernicus University)

W. Schewe (University of Sherbrooke)

Fundamental domains and duplicated algebras

M. Auslander (Brandeis University)

M. I. Platzeck (Universidad Nacional del Sur)

G. Todorov * (Northeastern University)

Homological theory of idempotent ideals

R. Bautista (Universidad Nacional Autónoma de México)

Almost split sequences and critical partially ordered sets of infinite representation type

S. Brenner * (University of Liverpool)

M. C. R. Butler (University of Liverpool)

Five terms in the middle

W. L. Burt (University of Liverpool)

M. C. R. Butler * (University of Liverpool)

Almost split sequences for bocses

F. U. Coelho (University of São Paulo/University of Liverpool)

Preprojective partitions

W. Crawley-Boevey (Universität Bielefeld/Oxford University)

Algebras with large regular Auslander-Reiten components

T. Dana-Picard (Ben-Gurion University)

Classification of associative algebras with unit

A. P. Dean (Bishop's University)

Infinite dimensional representations of finite dimensional algebras

* Denotes the speaker.

- G. D' Este (University of Salerno)
Simple submodules and multiplicities
- V. Dlab (Carleton University)
On Bratteli diagrams
- Ju. A. Drozd (Kiev University)
On representations of 0-species
- A. Facchini (University of Utkine)
Mittag-Leffler modules, reduced products and direct products
- R. Farnsteiner (University of Wisconsin, Milwaukee)
On the cohomology of Frobenius extensions
- K. R. Fuller * (University of Iowa)
W. K. Nicholson (University of Calgary)
J. F. Watters (University of Leicester)
Reflexivity of algebras and bimodules
- K. R. Goodearl (University of Utah)
Clique graphs: infinite quivers for noetherian rings
- E. L. Green * (Virginia Polytechnic Institute & State University)
E. N. Marcos (Virginia Polytechnic Institute & State University/IME-USP)
The local theory of graded modules
- D. Happel (Universität Bielefeld)
On repetitive categories
- H. Hijakata (Kyoto University)
On classification of Bass orders
- H. Ishibashi (Josai University)
Condition for some subsets of transvections to generate $Sp(V)$
- K. Igusa * (Brandeis University)
D. Zacharia (Syracuse University)
On the cyclic homology of monomial relation algebras
- O. Kerner (Universität Dusseldorf)
Regular modules over wild hereditary algebras
- E. Kirkman * (Wake Forest University)
L. Small (University of California, San Diego)
 Q -analogs of harmonic oscillators and related rings
- M. Kiyota (Tokyo Medical and Dental University)
T. Wada * (Tokyo University of Agriculture and Technology)
Some remarks on eigenvalues of the Cartan matrix in finite groups

- M. Kleiner (Syracuse University)
Induced comodules and representations of algebras
- S. Koshitani (Chiba University)
On p -radical groups in representation theory of finite groups
- B. Külshammer (University of Dortmund)
Conjugacy classes in groups, characters in blocks, and commutators in algebras
- S. Kyuno (Tohoku Gakuin University)
M. Stefanescu* (University "Al. I. Cuza")
Correspondences between near-rings and groups, loops or quasigroups
- H. Lenzing (Universität Paderborn)
Wild canonical algebras
- S. P. Liu (University of Liverpool)
Degrees of irreducible maps and Auslander-Reiten quivers
- N. Marmaridis (University of Ioannina)
Polytrivial extensions and tilting modules
- R. Martínez-Villa (Universidad Nacional Autónoma de México)
Properties that are left invariant under stable equivalence
- H. Merklen (University of São Paulo)
A cokernel functor for triangular matrix algebras
- G. Michler (Universität Essen)
On Alperin's weight-conjecture
- K. Nishida (Nagasaki University)
New examples of local Bass orders
- J. A. de la Peña (Universidad Nacional Autónoma de México)
Varieties of modules for tame and wild algebras
- V. A. Ponomarev (Institute of Biological Physics, Pushchino)
Representations of modular lattices attached to equipped graphs. Perfect elements in lattices $L(A_n^v)$
- I. Reiten (The University of Trondheim)
The dual of the transpose as a representable functor
- C. M. Ringel (Universität Bielefeld)
The category of good modules over a quasi-hereditary algebra has almost split sequences
- K. W. Roggenkamp (Universität Stuttgart)
Grothendieck groups of group rings and orders