

# **Springer Proceedings in Mathematics & Statistics**

Volume 228

## **Springer Proceedings in Mathematics & Statistics**

This book series features volumes composed of selected contributions from workshops and conferences in all areas of current research in mathematics and statistics, including operation research and optimization. In addition to an overall evaluation of the interest, scientific quality, and timeliness of each proposal at the hands of the publisher, individual contributions are all refereed to the high quality standards of leading journals in the field. Thus, this series provides the research community with well-edited, authoritative reports on developments in the most exciting areas of mathematical and statistical research today.

More information about this series at <http://www.springer.com/series/10533>

Ayman Badawi · Mohammad Reza Vedadi  
Siamak Yassemi · Ahmad Yousefian Darani  
Editors

# Homological and Combinatorial Methods in Algebra

SAA 4, Ardabil, Iran, August 2016

 Springer

*Editors*

Ayman Badawi  
Department of Mathematics  
American University of Sharjah  
Sharjah  
United Arab Emirates

Mohammad Reza Vedadi  
Faculty of Mathematical Science  
Isfahan University of Technology  
Isfahan  
Iran

Siamak Yassemi  
School of Mathematics, Statistics,  
and Computer Science  
University of Tehran  
Tehran  
Iran

Ahmad Yousefian Darani  
Department of Mathematics and  
Applications  
University of Mohaghegh Ardabili  
Ardabil  
Iran

ISSN 2194-1009 ISSN 2194-1017 (electronic)  
Springer Proceedings in Mathematics & Statistics  
ISBN 978-3-319-74194-9 ISBN 978-3-319-74195-6 (eBook)  
<https://doi.org/10.1007/978-3-319-74195-6>

Library of Congress Control Number: 2017963530

Mathematics Subject Classification (2010): 13A15, 12F15, 13B05, 13C10, 16E05, 13F05

© Springer International Publishing AG 2018

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by Springer Nature  
The registered company is Springer International Publishing AG  
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

# Preface

The 4th SAA 2016, fourth in the series of international seminars on algebra and its applications, was held at the Department of Mathematics and Applications, University of Mohaghegh Ardabili, Iran, during 9–11 August, 2016. Following the tradition of its predecessors, this meeting gathered researchers around topics in present recent progress and new trends in algebra and its applications. A total number of 105 participants from several countries have attended the conference in the University of Mohaghegh Ardabili (UMA). The main goal of the seminar is to introduce Iranian faculty and graduate students to important ideas in the mainstream of algebra. A secondary goal is for Iranian mathematicians to open channels of communication with algebraists from around the globe and eventually begin collaborative research projects. The audience was multidisciplinary allowing the participants to exchange diversified ideas and to show the wide attraction of algebra and its applications. There were two kinds of lectures: invited talks of one hour presented by distinguished experts and half an hour contributions.

The Scientific Committee consisted of Kamran Divaani-Azar (Alzahra University), Hossien Abdolzadeh, Jafar Azami—Chair, Kamal Bahmanpour, Adel P. Kazemi, Ahmad Khojali, Majid Rahro-Zargar, Ahmad Yousefian Darani, and Naser Zamani all from UMA.

The Organizing Committee was constituted by Goudarz Sadeghi, Mohammad Narimani, Yousef Abbaspour, Daioush Latifi, Kazem Haghnejad, Hossein Abdolzadeh, Abbas Najati, and Ahmad Yousefian Darani (Chair) all from UMA.

We are particularly indebted to our plenary speakers: Moharam Aghapour (Arak University), Fariborz Azar Panah (Shahid Chamran University of Ahvaz), Ayman Badawi (American University of Sharjah), Reza Naghipour (University of Tabriz), Peyman Nasehpour (University of Tehran), Mohammad Reza Vedadi (Isfahan University of Technology), Roger Wiegand (University of Nebraska-Lincoln), Sylvia Wiegand (University of Nebraska Lincoln), Siamak Yassemi (University of Tehran), and Rahim Zaare-Nahandi (University of Tehran). Thanks are also due to the presenters of contributed papers, as well as everyone who attended for making the seminar a success. According to the evaluations of the scientific committee, there were several excellent talks presented by invited speakers.

The 4th SAA 2016 was sponsored by the UMA, and organized by the Faculty of Mathematics and Department of Mathematics and Applications, UMA. We would like to publicly acknowledge the financial support of the Vice-Chancellorship for Research and Technology of UMA, as well as the hospitality of the Faculty of Mathematics and Department of Mathematics and Applications of UMA. We are also very grateful for the secretarial help of Negin Karimi. Selected papers of 4th SAA 2016 are presented in the volume *Homological and Combinatorial Methods in Algebra* in the series Springer Proceedings of Mathematics & Statistics published by Springer. With the publication of this proceeding, we hope that a wider mathematical audience will benefit from the seminar research achievements and new contributions to the field of algebra and its applications. More details of the event can be found at <http://uma.ac.ir/links/4saa>.

Sharjah, United Arab Emirates  
Isfahan, Iran  
Tehran, Iran  
Ardabil, Iran

Ayman Badawi  
Mohammad Reza Vedadi  
Siamak Yassemi  
Ahmad Yousefian Darani

# Contents

<b><i>b</i>-Symbol Distance Distribution of Repeated-Root Cyclic Codes</b> . . . . .	1
Hojjat Mostafanasab and Esra Sengelen Sevim	
<b>Bhargava Rings Over Subsets</b> . . . . .	9
I. Al-Rasasi and L. Izelgue	
<b>On Commutativity of Banach <math>*</math>-Algebras with Derivation</b> . . . . .	27
Mohammad Ashraf and Bilal Ahmad Wani	
<b>An Application of Linear Algebra to Image Compression</b> . . . . .	41
Khalid EL Asnaoui, Mohamed Ouhda, Brahim Aksasse and Mohammed Ouanan	
<b>Intuitionistic Fuzzy Group With Extended Operations</b> . . . . .	55
S. Melliani, I. Bakhadach and L. S. Chadli	
<b>Generalization of Quasi-modular Extensions</b> . . . . .	67
El Hassane Fliouet	
<b>A Class of Finite 2-groups <math>G</math> with Every Automorphism Fixing <math>G/\Phi(G)</math> Elementwise</b> . . . . .	83
Hossein Abdolzadeh and Reza Sabzchi	
<b>Fuzzy Rings and Fuzzy Polynomial Rings</b> . . . . .	89
S. Melliani, I. Bakhadach and L. S. Chadli	
<b>On (Completely) Weak<math>*</math> Rad-<math>\oplus</math>-Supplemented Modules</b> . . . . .	99
Manoj Kumar Patel	
<b>When Is <math>\text{Int}(E, D)</math> a Locally Free <math>D</math>-Module</b> . . . . .	105
Lahoucine Izelgue and Ali Tamoussit	
<b>Pairs of Rings Whose All Intermediate Rings Are <math>G</math>-Rings</b> . . . . .	111
Lahoucine Izelgue and Omar Ouzaouit	

**Weakly Finite Conductor Property in Amalgamated Algebra . . . . .** 117  
Haitham El Alaoui

**Coherence in Bi-amalgamated Algebras Along Ideals . . . . .** 127  
Mounir El Ouarrachi and Najib Mahdou

**On the Set of Intermediate Artinian Subrings . . . . .** 139  
Driss Karim