CONTEMPORARY MATHEMATICS

750

Centre de Recherches Mathématiques Proceedings

Linear and Multilinear Algebra and Function Spaces

International Conference
Algebra and Related Topics (ICART 2018)
July 2–5, 2018
Mohammed V University, Rabat, Morocco

A. Bourhim
J. Mashreghi
L. Oubbi
Z. Abdelali
Editors

AMS American Mathematical Society

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2010 *Mathematics Subject Classification.* Primary 15-XX, 16-XX, 30-XX, 46-XX, 47-XX.

Library of Congress Cataloging-in-Publication Data

Names: International Conference on Algebra and Related Topics (2018 : Rabat, Morocco), author. | Bourhim, Abdellatif, 1972– editor. | Mashreghi, Javad, editor. | Oubbi, Lahbib, 1960– editor. | Abdelali, Zine El Abidine, 1974– editor.

Title: Linear and multilinear algebra and function spaces : International Conference on Algebra and Related Topics: Linear and Multilinear Algebra and Function Spaces, July 2–5, 2018, Université Mohammed V, Rabat, Marocco / A. Bourhim, J. Mashreghi, L. Oubbi, Z. Abdelai, editors.

Description: Providence, Rhode Island : American Mathematical Society, [2020] | Series: Contemporary mathematics, 0271-4132 ; volume 750 | Includes bibliographical references.

Identifiers: LCCN 2019051607 | ISBN 9781470446932 (paperback) | ISBN 9781470456078 (ebook)

Subjects: LCSH: Algebras, Linear–Congresses. | Multilinear algebra–Congresses. | Function spaces–Congresses. | AMS: Linear and multilinear algebra; matrix theory. | Associative rings and algebras For the commutative case, see 13-XX. | Functions of a complex variable For analysis on manifolds, see 58-XX. | Functional analysis For manifolds modeled on topological linear spaces, see 57Nxx, 58Bxx. | Operator theory.

Classification: LCC QA184.2 .I58 2020 | DDC 512/.5–dc23

LC record available at https://lccn.loc.gov/2019051607

Contemporary Mathematics ISSN: 0271-4132 (print); ISSN: 1098-3627 (online)

DOI: https://doi.org/10.1090/conm/750

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10 9 8 7 6 5 4 3 2 1 25 24 23 22 21 20

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Preface

The International Conference on Algebra and Related Topics (ICART 2018) was held at Faculty of Sciences, Mohammed V University in Rabat, Morocco, from July 2 to 5, 2018. It covered various research areas presented in three parallel sessions. "Linear and Multilinear Algebra, and Function spaces (in short LMAFS)" was one of them. The topics of interest of this session included linear and nonlinear preserver problems, Banach algebras, topological algebras, operator theory, and weighted function spaces. Numerous international experts in these areas presented their ongoing research, and interacted with their colleagues and Ph.D students working in their fields.

Linear preserver problems demand the characterization of linear maps between algebras that leave invariant certain properties or subsets or relations. The earliest result on linear preserver problems was established by Frobenius in 1896. Frobenius characterized all bijective linear transformations on the algebra $M_n(\mathbb{C})$ of complex matrices that preserve the determinant of matrices. His result was generalized in 1925 by Schur for subdeterminants of a fixed order and in 1949 by Dieudonné to arbitrary fields and for linear maps preserving the set of singular matrices. Since then, various linear preserver problems have been considered and a number of techniques have been developed to treat them. One of the most intractable unsolved problems in this active research area is the famous Kaplansky's conjecture that asserts that every surjective unital invertibility preserving linear map between two semisimple Banach algebras is a Jordan homomorphism. This conjecture has not been fully solved yet and remains open even for general C^*-algebras, but it has been confirmed, in particular, for von Neumann algebras and for the algebra of all bounded linear operators on a Banach space.

More recently, there has been an upsurge of interest in nonlinear preservers, where the maps studied are no longer assumed linear but instead a weak algebraic condition is somehow involved through the preserving property. The well-known theorem of Gleason-Kahane-Żelazko in the theory of Banach algebras states that every unital invertibility preserving linear map from a Banach algebra to a semisimple commutative Banach algebra is multiplicative. This ressult has been generalized in many directions. In particular, a number of techniques have been developed to treat nonlinear preservers related to various fields such as Algebra, Analysis, Functional Analysis, Geometry, Linear Algebra, Mathematical Physics and Operator Theory

As to the weighted spaces, they have been the subject matter of a lot of work over the last few decades. The weighted spaces of scalar-valued continuous functions appeared first in the work of Nachbin, specially in connection with approximation

theory. But, over the years, weighted spaces and algebras of holomorphic or harmonic functions have also been studied. Such spaces have provided a general setting for the study of several function spaces encountered in analysis (e.g., in distributions and measure theory). Therefore, they have been investigated in several directions, mainly, in the approximation theory, in the theory of composition and multiplication operators, in connection with duality problems, with embedding problems into sequence spaces, with dynamical systems, with evolution equations, and so on.

This proceedings volume is the outcome of LMAFS, which brought mathematicians from various areas who are either working on or interested in preserver problems and/or function spaces. The editors would like to thank the Faculty of Sciences of Rabat for hosting this event and for its generous financial support for the invited speakers. The last day and the closing day of LMAFS was hosted by l'Ecole Normale Suprieure de Rabat. The editors would also like to thank l'Ecole Normale Suprieure, the Centre Régional des Métiers de l'Enseignement et de Formation, IMU-CDC, the Clay Mathematics Institute, the Centre National de Recherche Scientifique et Technique, Acadmie Hassan 2, and the Rabat City Hall for their financial support.

Rabat, Morocco
Summer 2018

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This volume contains several articles on various aspects of preservers, including such topics as Jordan isomorphisms, Aluthge transform, joint numerical radius on C^*-algebras, advertible complete algebras, and Gelfand-Mazur algebras. The volume also contains a survey on recent progress on local spectrum-preserving maps.

Several articles in the volume present results about weighted spaces and algebras of holomorphic or harmonic functions, including biduality in weighted spaces of analytic functions, interpolation in the analytic Wiener algebra, and weighted composition operators on non-locally convex weighted spaces.

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ISBN 978-1-4704-4693-2
9 781470 446932
CONM/750

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