CONTEMPORARY MATHEMATICS

607

Expository Lectures on Representation Theory

Maurice Auslander Distinguished Lectures
and International Conference
April 25–30, 2012
Woods Hole Oceanographic Institute, Quisset Campus,
Falmouth, MA

Kiyoshi Igusa
Alex Martsinkovsky
Gordana Todorov
Editors

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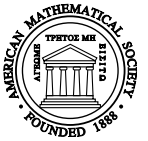

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Preface

Every year we organize the Maurice Auslander Distinguished Lectures and International Conference to celebrate the mathematical legacy of Maurice Auslander who was one of the founding fathers of the representation theory of artin algebras. These are selected notes from this event which took place April 25-30, 2012, at the Woods Hole Oceanographic Institute, Quissett Campus in Falmouth, MA.

The International Conference was particularly successful this year; using NSF funds we were able to invite participants from Argentina, Canada, Germany, Great Britain, Italy, Japan, Norway, and Russia. The seven invited expository talks were very well received and set the pace for accessible talks by others during the conference. Long coffee breaks and lunches at the conference center were very fruitful and enjoyable events in which participants discussed mathematics on the balcony with a beautiful view of the ocean.

A wide variety of topics were discussed at the conference. Birge Huisgen-Zimmermann opened the conference with an overview of the concept of fine and course moduli spaces for representation theory. Frauke Bleher discussed an emerging interaction between number theory (based on Mazur's theory of universal deformation rings) and representations of finite dimensional algebras. Otto Kerner, considered to be the leading expert on wild hereditary algebras, gave a review of basic theorems and latest results in this field. Aslak Buan, one of the founders of cluster categories talked about torsion pairs in tubes, but he describes a more complete classification in his contributed notes. Yuri Berest, with coauthors Felder and Ramadoss, develops the theory of derived representation schemes.

There were also several inspiring talks by others during the conference. Ivo Herzog gave a heart-felt tribute to Maurice Auslander when he explained his ideal approximation theory and how it was motivated by his desire to understand Maurice's work from a different perspective. Kunio Yamagata gave such a nice survey talk on Morita Theory leading up to the most recent results that we also invited him to contribute to the proceeding of the conference. Claudia Chaio and Markus Schmidmeier were also invited to contribute write ups of their talks since their topics were deemed to be suitable for these proceedings in terms of both novelty and accessibility. Claudia gives a very complete description of what is known about degrees of irreducible maps. Markus Schmidmeier gave an entertaining talk about arc diagrams which are intuitive pictorial descriptions of representations and how they deform. His contribution, with coauthor Justyna Kosakowska, gives new results on this topic.

We would like to thank Bernice Auslander for her initiation and continued support of the Maurice Auslander Distinguished Lectures, around which the conference

is built. And we gratefully acknowledge support for the International Conference in both 2012 and 2013 by the National Science Foundation, Grant DMS-1162304.

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Expository Lectures on Representation Theory • Igusa et al., Editors

This volume contains the proceedings of the Maurice Auslander Distinguished Lectures and International Conference, held April 25–30, 2012, in Falmouth, MA.

The representation theory of finite dimensional algebras and related topics, especially cluster combinatorics, is a very active topic of research. This volume contains papers covering both the history and the latest developments in this topic. In particular, Otto Kerner gives a review of basic theorems and latest results about wild hereditary algebras, Yuri Berest develops the theory of derived representation schemes, and Markus Schmidmeier presents new applications of arc diagrams.

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