Noncommutative Rings and Their Applications

International Conference on Noncommutative Rings and Their Applications
July 1–4, 2013
Université d’Artois, Lens, France

Steven Dougherty
Alberto Facchini
André Leroy
Edmund Puczyłowski
Patrick Solé
Editors
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Preface

The aim of the International Conference on Noncommutative Rings and Their Applications, held in Lens, France, in July 2013 was to gather specialists in ring theory and in areas where this theory is used. The meeting gave the experts from different domains the opportunity to exchange their views, share their research, and learn from one another new results and problems in a friendly atmosphere. The works of the conference concerned, on one hand, classical aspects of ring and module theory and, on the other, some applications of this theory, focusing on coding theory, in which rings and modules play a more and more substantial role. The interplay between ring and coding theory was emphasized by Professor Steven Dougherty’s course in which he showed some of the ways (noncommutative) ring theory has influenced coding theory. The four invited speakers, Alberto Facchini, Dolors Herbera, Edmund Puczyłowski, and Patrick Solé, presented their most recent works and many participants contributed to enrich further the themes addressed by this conference.

This meeting was supported by the Laboratoire de Mathématiques de Lens (LML), by different bodies from the Université de Artois (RI, BQR), as well as by a regional organization (the Fédération des Laboratoires de Mathématiques du Nord pas de Calais).

We would like to thank all the participants for their efforts and enthusiasm. Special thanks to Pramod Kanwar and Jerzy Matczuk who, during the conference, made practical matters go more smoothly.

A very special thanks to the colleagues who kindly agreed to referee the papers. Their expertise, promptitude, and professionalism improved the quality of the articles in this volume.

Many thanks are due to the editorial staff of the AMS, in particular Christine Thivierge, for the very efficient way she managed the process of preparing and publishing these proceedings.

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This volume contains the Proceedings of an International Conference on Noncommutative Rings and Their Applications, held July 1–4, 2013, at the Université d’Artois, Lens, France. It presents recent developments in the theories of noncommutative rings and modules over such rings as well as applications of these to coding theory, enveloping algebras, and Leavitt path algebras.

Material from the course “Foundations of Algebraic Coding Theory”, given by Steven Dougherty, is included and provides the reader with the history and background of coding theory as well as the interplay between coding theory and algebra. In module theory, many new results related to (almost) injective modules, injective hulls and automorphism-invariant modules are presented. Broad generalizations of classical projective covers are studied and category theory is used to describe the structure of some modules. In some papers related to more classical ring theory such as quasi duo rings or clean elements, new points of view on classical conjectures and standard open problems are given. Descriptions of codes over local commutative Frobenius rings are discussed, and a list of open problems in coding theory is presented within their context.