

Introduction

This book is a collection of selected papers on recent trends in the study of infinite discrete groups. The authors who contributed to this volume were invited plenary speakers at the International Conference on Group Theory: “Geometric, Combinatorial and Dynamical Aspects of Infinite Groups” which was held in Gaeta, Italy, in June 1-6, 2003. The exceptional quality of their lectures and the great interest they arose among the almost two hundred conference participants from over twenty countries gave us, the organisers of the conference, the idea of this book. We are most grateful to the authors who have all responded with wonderful enthusiasm to our request for a contribution.

This volume is far from being a book of conference proceedings. It is rather a one-of-a-sort collection of papers which aims at reflecting the present state of the art in a most active area of research at the intersection of several branches of mathematics.

Topics discussed in the book include geometric and combinatorial group theory; ergodic theory and operator algebras; low-dimensional topology; groups acting on trees and their boundaries; random walks; amenability; growth; groups and fractals; L^2 -cohomology.

The articles collected in this volume should be of interest to specialists not only in group theory but also in such areas of mathematics as dynamical systems, geometry, topology, operator algebras, probability theory and combinatorics. The broad spectrum of topics covered should also present an exciting opportunity for graduate students and young researchers working in any of these areas who are willing to put their research in a wider mathematical perspective.

On the other hand, there is a strong unity among the diverse topics in this book. This reflects, we believe, a characteristic feature of the theory of infinite discrete groups, which progresses much through its interactions with other areas of mathematics. This is one of the great attractions of this subject, for us, as well as for many of our colleagues.

The idea of the conference stemmed from the spectacular dynamism of this subject over the past twenty years, and the occasion was offered by the fiftieth anniversary of Slava Grigorchuk. Slava’s research has deeply influenced group theory in the recent years. His impact on our own mathematical development has been tremendous. We would like to dedicate this book to him.

Last but not the least, we are very grateful to Birkhäuser for publishing this volume in the “Progress in Mathematics” series, and in particular to Dr. Thomas Hempfling whose expert advice and encouragement during the preparation of the volume have been greatly appreciated.

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