Introduction

This volume contains three surveys corresponding to lectures given by the main speakers during the conference GABY, that cover a broad range of themes, from representation theory and growth of groups to geometric group theory.

The first chapter is an introduction to p-modular representations of p-adic groups, given by Ramla Abdellatif. The author covers the fundamental aspects of the subject, with a particular focus on the general linear group $GL_2(F)$ and on the special linear group $SL_2(F)$, when F is a finite extension of the field of p-adic numbers, and presents recent developments. The final section contains many open questions.

In the second chapter Anna Giordano Bruno presents a survey on growth of groups and of group endomorphisms. The author starts by recalling the classical notions of growth and growth rate for finitely generated groups and the main results in the theory related to Milnor's problem. She then extends these concepts and results to the general case of group endomorphisms, using the language and features of the algebraic entropy and offering new results and open problems in the field.

The final chapter is due to Davide Spriano, who gives an introduction to hyperbolic groups. His work is intended as a first course in geometric group theory and as such gives many basic definitions, with a particular focus on pictures and examples to build intuition. The author then focus on hyperbolic groups and quasi-isometric invariance of hyperbolicity, presenting some notable properties of these structures. The material covered is mostly classical, but contains recent results and open questions as well.

We hope these surveys will offer a good starting point and the right motivation to explore the areas of mathematics they cover.

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