Preface

Discrete subgroups form an important class of groups. They naturally appear in many branches of mathematics and in the physical phenomena. An arithmetic subgroup is a certain discrete subgroup whose definition emerges from congruence properties of integers. For this reason arithmetic subgroups carry with them deep arithmetic information. In particular, in connection with certain parts of number theory and geometry, such as elliptic curves, modular forms, or zeta functions of arithmetic varieties, the arithmetic significance of these groups is more transparent. There are several deep results in number theory, topology, group theory, and many deep questions in analytic theory of automorphic forms and geometric theory of automorphic forms whose understanding is almost impossible without a basic knowledge of some elementary properties of arithmetic subgroups.

Modern results in number theory include solutions of some classical problems by modern methods. On the other hand, modern methods in number theory use results from diverse parts of mathematics, such as group theory, geometry, topology (cohomology theories), and others. An example of this fact is the proof of Fermat's last theorem by A. Wiles [Wiles]. One can take a glance at the introduction of the paper of Wiles to see that the subjects treated in this book are of foundational importance for the deeper understanding of recent results in number theory and topics on which a large part of the modern number theory is built on.

Having all of this in mind, we have been led to write this book with the hope of providing the basic information on some aspects of arithmetic groups to a wider class of readers.

This book has its origin in a set of notes prepared for a weekly lectures before a group of 25 students ranging from Freshman to Doc-

torate at Sharif University of Technology (SUT), Tehran, during the period Jan.-March 1991, under a grant from the Institute for Studies in Theoretical Physics and Mathematics (IPM). The notes were slightly revised in 1995 where I was to lecture at SUT, under a grant from the United Nations (UN), before a small group of eight highly talented students selected among the final medalists at the International Mathematical Competition. I again lectured from the notes to a small group of very good students at the University of Brasília. That made possible to improve the presentations and correct some minor inaccuracies. Any inaccuracies which may have remained is my responsibility.

Salahoddin Shokranian,
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Departamento de Matemática
Universidade de Brasília
70910-900 Brasília-DF, Brasil,
and
International Center of Condensed Matter Physics
Universidade de Brasília
70910-900 Brasília-DF, Brasil.