
Preface

The inspiration for this book is the remarkable interplay, especially in the past few decades, between topology and the theory of orderable groups. Applications go in both directions. For example, orderability of the fundamental group of a 3-manifold is related to the existence of certain foliations. On the other hand, one can apply topology to study the space of all orderings of a given group, providing strong algebraic applications. Many groups of special topological interest are now known to have invariant orderings, for example braid groups, knot groups, fundamental groups of (almost all) surfaces and many interesting manifolds in higher dimensions.

There are several excellent books on orderable groups, and even more for topology. The current book emphasizes the *connections* between these subjects, leaving out some details that are available elsewhere, although we have tried to include enough to make the presentation reasonably self-contained. Regrettably we could not include all interesting recent developments, such as Mineyev's [74] use of left-orderable group theory to prove the Hanna Neumann conjecture.

This book may be used as a graduate-level text; there are quite a few problems assigned to the reader. It may also be of interest to experts in topology, dynamics and/or group theory as a reference. A modest familiarity with group theory and with basic topology is assumed of the reader.

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In these days the angel of topology and the devil of abstract algebra fight for the soul of each individual mathematical domain.

Hermann Weyl, 1939