Preface

This text started out as a revised version of *Buildings* by the second-named author [53], but it has grown into a much more voluminous book. The earlier book was intended to give a short, friendly, elementary introduction to the theory, accessible to readers with a minimal background. Moreover, it approached buildings from only one point of view, sometimes called the “old-fashioned” approach: A building is a simplicial complex with certain properties.

The current book includes all the material of the earlier one, but we have added a lot. In particular, we have included the “modern” (or “W-metric”) approach to buildings, which looks quite different from the old-fashioned approach but is equivalent to it. This has become increasingly important in the theory and applications of buildings. We have also added a thorough treatment of the Moufang property, which occupies two chapters. And we have added many new exercises and illustrations. Some of the exercises have hints or solutions in the back of the book. A more extensive set of solutions is available in a separate solutions manual, which may be obtained from Springer’s Mathematics Editorial Department.

We have tried to add the new material in such a way that readers who are content with the old-fashioned approach can still get an elementary treatment of it by reading selected chapters or sections. In particular, many readers will want to omit the optional sections (marked with a star). The introduction below provides more detailed guidance to the reader.

In spite of the fact that the book has almost quadrupled in size, we were still not able to cover all important aspects of the theory of buildings. For example, we give very little detail concerning the connections with incidence geometry. And we do not prove Tits’s fundamental classification theorems for spherical and Euclidean buildings. Fortunately, the recent books of Weiss [281, 283] treat these classification theorems thoroughly.

Applications of buildings to various aspects of group theory occur in several chapters of the book, starting in Chapter 6. In addition, Chapter 13 is devoted to applications to the cohomology theory of groups, while Chapter 14 sketches a variety of other applications.

Most of the material in this book is due to Jacques Tits, who originated the theory of buildings. It has been a pleasure studying Tits's work. We were especially pleased to learn, while this book was in the final stages of production, that Tits was named as a corecipient of the 2008 Abel prize. The citation states:

> Tits created a new and highly influential vision of groups as geometric objects. He introduced what is now known as a Tits building, which encodes in geometric terms the algebraic structure of linear groups. The theory of buildings is a central unifying principle with an amazing range of applications. . . .

We hope that our exposition helps make Tits's beautiful ideas accessible to a broad mathematical audience.

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