Foreword

The idea of collecting the surveys that constitute this Handbook came out of a desire to present in a single volume the foundations as well as the modern developments of Hilbert geometry. In the last two decades the subject has grown into a very active field of research. The Handbook will allow the student to learn this theory, to understand the questions and problems that it leads to, and to acquire the tools that can be used to approach them. It should also be useful to the confirmed researcher and to the specialist, for it contains an exposition and an update of the most recent developments. Thus, some chapters contain classical material, highlighting works of Beltrami, Klein, Hilbert, Berwald, Funk, Busemann, Benzécri and the other founders of the theory, and other chapters present recent developments. Hilbert geometry can be regarded from different points of view: the calculus of variations, Finsler geometry, projective geometry, dynamical systems, etc. At several places in this volume, the fruitful relations between Hilbert geometry and other subjects in mathematics are reported on. These subjects include Teichmüller spaces, convexity theory, Perron–Frobenius theory, representation theory, partial differential equations, coarse geometry, ergodic theory, algebraic groups, Coxeter groups, geometric group theory, Lie groups, and discrete group actions. All these important topics appear in one way or another in this book.

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