

Foreword

Classical Teichmüller theory concerns moduli spaces of conformal structures on surfaces. By the uniformization theorem, any conformal structure on a surface can be represented by a unique complete Riemannian metric of constant curvature -1 , 0 or 1 . From this point of view, Teichmüller theory can also be considered as the study of moduli spaces of metrics of constant curvature -1 , 0 or 1 on surfaces. In most cases (more precisely, when the Euler characteristic of the surface is negative), the curvature is negative, and Teichmüller theory can be viewed as the theory of moduli spaces of hyperbolic structures, that is, metrics of constant curvature -1 on surfaces.

In this multi-volume Handbook, the expression “Teichmüller theory” is used in a broader sense, namely, as the study of moduli of general geometric structures on surfaces, with methods inspired or adapted from those of classical Teichmüller theory. Such a theory has ramifications in group theory, in representation theory, in dynamical systems, in symplectic geometry, in three- and four-manifolds topology, and in other domains of mathematics.

The present volume of the Handbook contains four parts, namely:

Part A : The metric and the analytic theory, 2

Part B: The group theory, 2

Part C: Representation spaces and geometric structures, 1

Part D: The Grothendieck–Teichmüller theory

Parts A and B are sequels to parts with the same names in Volume I of the Handbook.

We hope that the various volumes of this Handbook will give the interested reader an overview of the old and of the recent work on Teichmüller theory and its applications, that they will open new perspectives and that they will contribute to further research in that field. In relation to future developments, it is worth mentioning that several chapters of the present volume contain a discussion of open problems. These include the chapters by Kojima, Korkmaz & Stipsicz, Möller, Šarić, Fletcher & Markovic, and Fujiwara.

Finally, let me mention that some of the contributions that were announced to appear in this volume will appear in later volumes. (At the time where these contributions were planned, only two volumes of the Handbook were expected.)

I would like to thank again Vladimir Turaev for his encouragement in this Handbook project, and Irene Zimmermann from the EMS publishing House for the seriousness of her work. Of course, I thank all of the 24 authors who contributed to this volume for their pleasant and fruitful collaboration.

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