
Preface to the English Edition

The German original was intended for courses on differential geometry for students in the middle of their academic education, that is, in the second or third year. In the Anglo-American system of university education, the contents of this textbook corresponds to an undergraduate course in elementary differential geometry (Chapters 1 – 4), followed by a beginning course in Riemannian geometry (Chapters 5 – 8). This led to the idea of having a translation of the German original into English.

I am very glad that the American Mathematical Society supported this project and published the present English version. I thank the translator, Bruce Hunt, for the hard work he had spent on the translation. From the beginning he was surprised by the quantity of text, compared to the quantity of formulas. In addition he had to struggle with complicated and long paragraphs in German. One of the major problems was to adapt the terminology of special notions in the theory of curves and surfaces to the English language. Another problem was to replace almost all references to German texts by references to English texts, in particular, all references to elementary textbooks on calculus, linear algebra, geometry, and topology. Ultimately all these problems could be solved, at least to a certain approximation. The

bibliography contains only books in English, with just three exceptions. Therefore, the English version can be used as a textbook for third-year undergraduates and beginning graduate students.

Furthermore, I am grateful to Edward Dunne from the AMS who was extremely helpful at all stages of the project, not only for editorial and technical matters, but also for questions concerning the terminology and the tradition of notations. He pointed out that the ordinary spherical coordinates on the sphere, denoted by φ, ϑ in this book, are denoted ϑ, φ (that is, the other way around) in many English textbooks on calculus. We hope that this does not lead to major confusions.

In the second English edition a number of errors were corrected and a number of additional figures were added, following the second German edition. Most of the additional figures were provided by Gabriele Preissler and Michael Steller. The illustrations play an important rôle in this book. Hopefully they make the book more readable. The concept of having boxes around important statements was kept from the German original, even though now we have a few very large boxes covering major parts of certain pages.

Stuttgart, June 2005

W. Kühnel

The present third edition is a corrected and updated version that incorporates the development of altogether six editions in German, the last one from 2013. Each of these German editions was corrected, extended and improved in several directions. As an example, a number of proofs were made more precise if they turned out to be too short in the first edition. In comparison to the second English edition, the third edition includes many improvements, there are more figures and more exercises, and - as a new feature - at the end a number of solutions to selected exercises are given.

Stuttgart, July 2014

W. Kühnel