

# Preface

These lecture notes grew out of notes I prepared for my lecture *Topology* held in Erlangen in Summer Term 2012. The course is aimed at bachelor students in their second year being familiar with the basic notions from calculus. The purpose of this small course is to give some first introduction to the notions of general (or point set) topology as they are needed in many other areas of mathematics. Of course, there are many excellent textbooks on topology available. However, the aim of these notes as well as of the lecture itself is to give bachelor students after their first year a *minimal* amount of topology needed to continue with more advanced topics in a mathematics (or physics) programme but still providing detailed proofs. Moreover, the idea is to require only very basic preliminary knowledge as offered by the introductory calculus and linear algebra courses.

The text is self-contained and provides many exercises which will enable the student to work through these notes on her own. Alternatively, the text may serve as a companion for a small lecture on topology.

The first four chapters can be seen as the core of the theory which every mathematics student and hopefully also some physics students should be exposed to. The remaining two chapters give a certain personal preference: I have chosen to put some focus on possible applications in functional analysis. This explains why the last two chapters are on continuous functions as well as on Baire's Theorem in different formulations. On the other hand, I have omitted other important concepts like the fundamental groupoid or topological groups and their continuous actions due to the lack of time and space.

The participants of the original lecture in Erlangen showed great patience with the first versions, not only of these notes but also with the lecture itself. I would like to thank all of them for their comments, remarks and suggestions, which all found their way into these notes in one form or the other. In particular, I would like to mention here Alexander Spies for numerous corrections and a careful proofreading of the entire manuscript. Moreover, I am much obliged to Florian Unger for taking care of the *LATEX*-files and all the typing of the first version of the draft. Without his help, the manuscript would never have been finished. It is a pleasure to thank Karl-Hermann Neeb for various discussions on the pedagogical aspects of teaching

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