

<<分析 (第1卷)>>

图书基本信息

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内容概要

The present book strives for clarity and transparency. Right from the beginning, it requires from the reader a willingness to deal with abstract concepts, as well as a considerable measure of self-initiative. For these efforts, the reader will be richly rewarded in his or her mathematical thinking abilities, and will possess the foundation needed for a deeper penetration into mathematics and its applications.

This book is the first volume of a three volume introduction to analysis. It developed from courses that the authors have taught over the last twenty six years at the Universities of Bochum, Kiel, Zurich, Basel and Kassel. Since we hope that this book will be used also for self-study and supplementary reading, we have included far more material than can be covered in a three semester sequence. This allows us to provide a wide overview of the subject and to present the many beautiful and important applications of the theory. We also demonstrate that mathematics possesses, not only elegance and inner beauty, but also provides efficient methods for the solution of concrete problems.

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章节摘录

版权页：插图： In this chapter, approximations are once again the center of our interest. Just as in Chapter , we study sequences and series. The difference is that we consider here the more complex situation of sequences whose terms are functions. In this circumstance there are two viewpoints: We can consider such sequences locally, that is, at each point, or globally. In the second case it is natural to consider the terms of the sequence as elements of a function space so that we are again in the situation of Chapter . If the functions in the sequence are all bounded, then we have a sequence in the Banach space of bounded functions, and we can apply all the results about sequences and series which we developed in the second chapter. This approach is particularly fruitful, allows short and elegant proofs, and, for the first time, demonstrates the advantages of the abstract framework in which we developed the fundamentals of analysis. In the first section we analyze the various concepts of convergence which appear in the study of sequences of functions. The most important of these is uniform convergence which is simply convergence in the space of bounded functions. The main result of this section is the Weierstrass majorant criterion which is nothing more than the majorant criterion from the second chapter applied to the Banach space of bounded functions. Section 2 is devoted to the connections between continuity, differentiability and convergence for sequences of functions. To our supply of concrete Banach spaces, we add one extremely important and natural example: the space of continuous functions on a compact metric space.

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