

<<紧黎曼曲面>>

图书基本信息

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前言

The present book started from a set of lecture notes for a course taught to students at an intermediate level in the German system (roughly corresponding to the beginning graduate student level in the US) in the winter term 86 / 87 in Bochum. The original manuscript has been thoroughly reworked several times although its essential aim has not been changed. Traditionally, many graduate courses in mathematics, and in particular those on Riemann surface theory, develop their subject in a most systematic, coherent, and elegant manner from a single point of view and perspective with great methodological purity. My aim was instead to exhibit the connections of Riemann surfaces with other areas of mathematics, in particular (two-dimensional) differential geometry, algebraic topology, algebraic geometry, the calculus of variations and (linear and nonlinear) elliptic partial differential equations. I consider Riemann surfaces as an ideal meeting ground for analysis, geometry, and algebra and as ideally suited for displaying the unity of mathematics. Therefore, they are perfect for introducing intermediate students to advanced mathematics. A student who has understood the material presented in this book knows the fundamental concepts of algebraic topology (fundamental group, homology and cohomology), the most important notions and results of (two-dimensional) Riemannian geometry (metric, curvature, geodesic lines, Gauss-Bonnet theorem), the regularity theory for elliptic partial differential equations including the relevant concepts of functional analysis (Hilbert- and Banach spaces and in particular Sobolev spaces), the basic principles of the calculus of variations and many important ideas and results from algebraic geometry (divisors, Riemann-Roch theorem, projective spaces, algebraic curves, valuations, and many others). Also, she or he has seen the meaning and the power of all these concepts, methods, and ideas at the interesting and nontrivial example of Riemann surfaces. There are three fundamental theorems in Riemann surface theory, namely the Uniformization theorem that is concerned with the function theoretic aspects, the Teichmüller's theorem that describes the various conformal structures on a given topological surface and for that purpose needs methods from real analysis, and the Riemann-Roch theorem that is basic for the algebraic geometric theory of compact Riemann surfaces. Among those.

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内容概要

Uniformization of Compact Riemann Surfaces Geometric Structures on Riemann Surfaces、 Preliminaries : Cohomology and Homology Groups、 Harmonic and Holomorphic Differential Forms on Riemann Surfaces 、 The Periods of Holomorphic and Meromorphic Differential Forms、 Divisors. The Riemann-Roch Theorem 、 Holomorphic 1-Forms and Metrics on Compact Riemann Surfaces、 Divisors and Line Bundles等。

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