<<微分形式及其应用>>

图书基本信息

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前言

This is a free translation of a set of notes published originally in Portuguese in1971. They were translated for a course in the College of Differential Geometry， ICTP， Trieste， 1989. In the English translation we omitted a chapter onthe Frobenius theorem and an appendix on the nonexistence of a completehyperbolic plane in euclidean 3-space （Hilberts theorem）. For the presentedition， we introduced a chapter on line integrals.

In Chapter 1 we introduce the differential forms in Rn. We only assumean elementary knowledge of calculus, and the chapter can be used as a basisfor a course on differential forms for "users" of Mathematics. In Chapter 2 we start integrating differential forms of degree one alongcurves in Rn. This already allows some applications of the ideas of Chapter 1.This material is not used in the rest of the book. In Chapter 3 we present the basic notions of differentiable manifolds. Itis useful （but not essential） that the reader be familiar with the notion of aregular surface in R3. In Chapter 4 we introduce the notion of manifold with boundary andprove Stokes theorem and Poincares lemma. Starting from this basic material， we could follow any of the possi-ble routes for applications： Topology， Differential Geometry， Mechanics， LieGroups， etc. We have chosen Differential Geometry. For simplicity， we restricted ourselves to surfaces. Thus in Chapter 5 we develop the method of moving frames of Elie Cartanfor surfaces. We first treat immersed surfaces and next the intrinsic geometryof surfaces Finally， in Chapter 6， we prove the Gauss-Bonnet theorem for compactorientable surfaces. The proof we present here is essentially due to S.S.Chern.We also prove a relation， due to M. Morse, between the Euler characteristicof such a surface and the critical points of a certain class of differentiablefunctions on the surface.

内容概要

本书是一部简短的微分几何教程。
详细讲述了微分几何，并运用它们研究曲面微分几何的局部和全局知识。
引入微分几何的方式简洁易懂，使得这本书非常适合数学爱好者。
微分流形的介绍简明，具体，以致最主要定理Stokes定理很自然得呈现出来。
大量的应用实例，如用E. Cartan的活动标架方法来研究R3中浸入曲面的局部微分几何以及曲面的内蕴几何。
最后一章集中所有来讲述紧曲面Gauss-Bonnet定理的Chern证明。
每章末都附有练习。
目次：Rn中的微分几何；线性代数；微分流形；流形上的积分；曲面的微分几何；Gauss-Bonnet定理和Morse定理。

书籍目录

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