<<微分几何基础>>

图书基本信息

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前言

This book is an elementary account of the geometry of curves and surfaces. It is written for students who have completed standard courses in calculus and linear algebra， and its aim is to introduce some of the main ideas of differential geometry. The language of the book is established in Chapter 1 by a review of the core content of differential calculus， emphasizing linearity. Chapter 2 describes the method of moving frames， which is introduced， as in elementary calculus， to study curves in space. （This method turns out to apply with equal efficiency to surfaces.） Chapter 3 investigates the rigid motions of space， in terms of which congruence of curves and surfaces is defined in the same way as congruence of triangles in the plane. Chapter 4 requires special comment. One weakness of classical differential geometry is its lack of any adequate definition of surface. In this chapter we decide just what a surface is， and show that every surface has a differential and integral calculus of its own， strictly analogous to the familiar calculus of the plane. This exposition provides an introduction to the notion of differentiable manifold， which is the foundation for those branches of mathematics and its applications that are based on the calculus. The next two chapters are devoted to the geometry of surfaces in 3space. Chapter 5 measures the shape of a surface and derives basic geometric invariants， notably Gaussian curvature. Intuitive and computational aspects are stressed to give geometrical meaning to the theory in Chapter 6.

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内容概要

本书介绍曲线和曲面几何的入门知识，主要内容包括欧氏空间上的积分、帧场、欧氏几何、曲面积分、形状算子、曲面几何、黎曼几何、曲面上的球面结构等。
修订版扩展了一些主题，更加强调拓扑性质、测地线的性质、向量场的奇异性等。
更为重要的是，修订版增加了计算机建模的内容，提供了Mathematica和Maple程序。
此外，还增加了相应的计算机习题，补充了奇数号码习题的答案，更便于教学。
　　本书适合作为高等院校本科生相关课程的教材，也适合作为相关专业研究生和科研人员的参考书。

作者简介

Barrett ONeill，加州大学洛杉矶分校教授。
1951年在麻省理工学院获得博士学位。
他的研究方向包括：曲线和曲面几何，计算机和曲面，黎曼几何，黑洞理论等。
另著有Semi-Riemannian Geometry with Applications to Relativity和The Geometry of Kerr Black Holes等书。

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书籍目录

章节摘录

As mentioned in the Preface， the purpose of this initial chapter is to establish the mathematical language used throughout the book.Much of what we do is simply a review of that part of elementary calculus dealing with differentiation of functions of three variables and with curves in space.Our deftnitions have been formulated SO that they will apply smoothly to the later study of surfaces.　　1.1 Euclidean Space　　Three-dimensional space is often used in mathematics without being formally defined.Looking at the corner of a room， one can picture the familiar process by which rectangular coordinate axes are introduced and three numbers are measured to describe the position of each point.A precise definition that realizes this intuitive picture may be obtained by this device ：instead of saying that three numbers describe the position of a point， we define them to be a point.