## <<张量几何>>

### 图书基本信息

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#### 前言

This edition is essentially a reprinting of the Second Edition , with the addi-tion of two items to the Supplementary Bibliography namely Dodson and Parker: A Users Guide to Algebraic Topology, and Gray: Modern Differential Geometry of Curves and Surfaces. This latter text is very important since it contains Mathematica programs to perform all of the essential differential geometric operations on curves and surfaces in 3-dimensional Euclidean space. The programs are available by an onymous ftp from bianchi.umd.edu/pub/ and are being used as support for a course at , among other places ,

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#### 内容概要

《张量几何(第2版)(英文版)》是Springer数学研究生丛书之一,是一部详细讲述张量几何的教程。书中对微分几何的处理方式,以及学习广义相对论需要的数学知识使得本教程对于稍微了解单变量基本微积分和一些向量代数的知识就可以完全读懂该书的内容。

《张量几何(第2版)(英文版)》用以书的形式能够提供的三维或更多维的图的形式使得内容更加形象化 ,重点强调数学的几何。

为了表达的流畅和增强可读性,许多证明都是以练习的形式展示给读者,而非长篇的列举方程。 这样,读者只能亲自进行实际计算,而不是跳过现成的例子。

这本内容丰富的教程对微分几何在相对论研究中的应用是个巨大的贡献。



#### 书籍目录

Introduction 0. Fundamental Not(at)ions Sets 2. Functions 3. Physical Background I. Real Vector Spaces Subspace geometry, components 2. Maps Linearity, singularity, matrices 3. Operators 1. Spaces Projections, eigenvMues, determinant, traceII. Affine Spaces 1. Spaces Tangent vectors, parallelism, coordinates 2. Combinations of Points Midpoints, convexity 3. Maps Linear parts, translations, components III. Dual Spaces 1. Contours, Co- and Contravariance, Dual Basis IV. Metric Vector Spaces Basic geometry and examples, Lorentz geometry 2. Maps Isometries, orthogonal projections Orthonormal bases 4. Diagonalising Symmetric Operators and complements, adjoints 3. Coordinates Principal directions, isotropy V. Tensors and Multilinear Forms 1. Multilinear Forms Tensor Products, Degree, Contraction, Raising Indices Vii Topological Vector Spaces 1. Continuity Metrics: topologies, Convergence and continuity 3. The Usual Topology Continuity in finite homeomorphisms 2. Limits Intermediate Value Theorem, convergence, extremaVII. dimensions 4. Compactness and Completeness Differentiation and Manifolds 1. Differentiation Derivative as local linear approxiamation 2. Manifolds Charts, maps, diffeomorphisms 3. Bundles and Fields Tangent and tensor bundles, metric tensors 4. Components Hairy Ball Theorem, transformation formulae, raising indic 5. Curves Parametrisation. length, integration 6. Vector Fields and Flows First order ordinary differential equations 7. Lie Brackets Commuting vector fields and flows VIII. Connections and Covariant Differentiation 1. Curves and Tangent Representing a vector by a curve 2. Rolling Without Turning Differentiation along curves in Vectors embedded manifolds 3. Differentiating Sections Connections horizontal vectors, Christoffel symbols 4. Parallel Transport Integrating a connection IX. Geodesics X. Curvature XI. Special Relativity XII. General RelativityBibliographyIndex of NotationsIndex

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