

<<数学物理的几何方法>>

图书基本信息

书名：<<数学物理的几何方法>>

13位ISBN编号：9787510004513

10位ISBN编号：7510004519

出版时间：2009-6

出版单位：世界图书出版公司

作者：舒茨

页数：250

版权说明：本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问：<http://www.tushu007.com>

<<数学物理的几何方法>>

前言

Why study geometry ?

This book aims to introduce the beginning or working physicist to a wide range of analytic tools which have their origin in differential geometry and which have recently found increasing use in theoretical physics. It is not uncommon today for a physicist's mathematical education to ignore all but the simplest geometrical ideas, despite the fact that young physicists are encouraged to develop mental 'pictures' and 'intuition' appropriate to physical phenomena. This curious neglect of 'pictures' of one's mathematical tools may be seen as the outcome of a gradual evolution over many centuries. Geometry was certainly extremely important to ancient and medieval natural philosophers; it was in geometrical terms that Ptolemy, Copernicus, Kepler, and Galileo all expressed their thinking. But when Descartes introduced coordinates into Euclidean geometry, he showed that the study of geometry could be regarded as an application of algebra. Since then, the importance of the study of geometry in the education of scientists has steadily declined, so that at present a university undergraduate physicist or applied mathematician is not likely to encounter much geometry at all. One reason for this suggests itself immediately: the relatively simple geometry of the three-dimensional Euclidean world that the nineteenth-century physicist believed he lived in can be mastered quickly, while learning the great diversity of analytic techniques that must be used to solve the differential equations of physics makes very heavy demands on the student's time. Another reason must surely be that these analytic techniques were developed at least partly in response to the profound realization by physicists that the laws of nature could be expressed as differential equations, and this led most mathematical physicists genuinely to neglect geometry until relatively recently. However, two developments in this century have markedly altered the balance between geometry and analysis in the twentieth-century physicist's outlook. The first is the development of the theory of relativity, according to which the Euclidean three-space of the nineteenth-century physicist is only an approximation to the correct description of the physical world. The second development, which is only beginning to have an impact.

<<数学物理的几何方法>>

内容概要

This book aims to introduce the beginning or working physicist to a wide range of analytic tools which have their origin in differential geometry and which have recently found increasing use in theoretical physics. It is not uncommon today for a physicist's mathematical education to ignore all but the simplest geometrical ideas, despite the fact that young physicists are encouraged to develop mental pictures and intuition appropriate to physical phenomena. This curious neglect of pictures of one's mathematical tools may be seen as the outcome of a gradual evolution over many centuries. Geometry was certainly extremely important to ancient and medieval natural philosophers; it was in geometrical terms that Ptolemy, Copernicus, Kepler, and Galileo all expressed their thinking. But when Descartes introduced coordinates into Euclidean geometry, he showed that the study of geometry could be regarded as an application of algebra. Since then, the importance of the study of geometry in the education of scientists has steadily

<<数学物理的几何方法>>

作者简介

作者：(英国)舒茨(Schutz.B.)

<<数学物理的几何方法>>

书籍目录

1 Some basic mathematics 1.1 The space R^n and its topology 1.2 Mappings 1.3 Real analysis 1.4 Group theory 1.5 Linear algebra 1.6 The algebra of square matrices 1.7 Bibliography2 Differentiable manifolds and tensors 2.1 Definition of a manifold 2.2 The sphere as a manifold 2.3 Other examples of manifolds 2.4 Global considerations 2.5 Curves 2.6 Functions on M 2.7 Vectors and vector fields 2.8 Basis vectors and basis vector fields 2.9 Fiber bundles 2.10 Examples of fiber bundles 2.11 A deeper look at fiber bundles 2.12 Vector fields and integral curves 2.13 Exponentiation of the operator d/dZ 2.14 Lie brackets and noncoordinate bases 2.15 When is a basis a coordinate basis ? 2.16 One-forms 2.17 Examples of one-forms 2.18 The Dirac delta function 2.19 The gradient and the pictorial representation of a one-form 2.20 Basis one-forms and components of one-forms 2.21 Index notation 2.22 Tensors and tensor fields 2.23 Examples of tensors 2.24 Components of tensors and the outer product 2.25 Contraction 2.26 Basis transformations 2.27 Tensor operations on components 2.28 Functions and scalars 2.29 The metric tensor on a vector space 2.30 The metric tensor field on a manifold 2.31 Special relativity 2.32 Bibliography3 Lie derivatives and Lie groups 3.1 Introduction: how a vector field maps a manifold into itself 3.2 Lie dragging a function 3.3 Lie dragging a vector field 3.4 Lie derivatives 3.5 Lie derivative of a one-form 3.6 Submanifolds 3.7 Frobenius' theorem (vector field version) 3.8 Proof of Frobenius' theorem 3.9 An example: the generators ors_2 3.10 Invariance 3.11 Killing vector fields 3.12 Killing vectors and conserved quantities in particle dynamics 3.13 Axial symmetry 3.14 Abstract Lie groups 3.15 Examples of Lie groups 3.16 Lie algebras and their groups 3.17 Realizations and representations 3.18 Spherical symmetry, spherical harmonics and representations of the rotation group 3.19 Bibliography4 Differential forms A The algebra and integral calculus of forms 4.1 Definition of volume - the geometrical role of differential forms 4.2 Notation and definitions for antisymmetric tensors 4.3 Differential forms 4.4 Manipulating differential forms 4.5 Restriction of forms 4.6 Fields of forms5 Applications in physics A Thermodynamics6 Connections for Riemannian manifolds and gauge theoriesAppendix: solutions and hints for selected exercisesNotationIndex

<<数学物理的几何方法>>

章节摘录

插图：

<<数学物理的几何方法>>

编辑推荐

《数学物理的几何方法(英文版)》是由世界图书出版公司出版的。

<<数学物理的几何方法>>

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:<http://www.tushu007.com>