

《动态系统与流体流的几何理论GEO》

图书基本信息

书名：《动态系统与流体流的几何理论GEOMETRICAL THEORY OF DYNAMICAL SYSTEMS AND FLUID FLOWS》

13位ISBN编号：9789812388063

10位ISBN编号：9812388060

出版时间：2004-12

出版社：World Scientific Publishing Company (2004年11月1日)

作者：Tsutomu Kambe

页数：416

版权说明：本站所提供下载的PDF图书仅提供预览和简介以及在线试读，请支持正版图书。

更多资源请访问：www.tushu111.com

《动态系统与流体流的几何理论GEO》

内容概要

This is an introductory textbook on the geometrical theory of dynamical systems, fluid flows, and certain integrable systems. The subjects are interdisciplinary and extend from mathematics, mechanics and physics to mechanical engineering, and the approach is very fundamental. The underlying concepts are based on differential geometry and theory of Lie groups in the mathematical aspect, and on transformation symmetries and gauge theory in the physical aspect. A great deal of effort has been directed toward making the description elementary, clear and concise, so that beginners will have an access to the topics.

《动态系统与流体流的几何理论GEO》

书籍目录

Preface	Mathematical Bases	1. Manifolds, Flows, Lie Groups and Lie Algebras	1.1 Dynamical Systems
1.2 Manifolds and Diffeomorphisms	1.3 Flows and Vector Fields	1.3.1 A steady flow and its velocity field	
1.3.2 Tangent vector and differential operator	1.3.3 Tangent space	1.3.4 Time-dependent (unsteady) velocity field	
1.4 Dynamical Trajectory	1.4.1 Fiber bundle (tangent bundle)	1.4.2 Lagrangian and Hamiltonian	
1.4.3 Legendre transformation	1.5 Differential and Inner Product	1.5.1 Covector (1-form)	
1.5.2 Inner (scalar) product	1.6 Mapping of Vectors and Covectors	1.6.1 Push-forward transformation	
1.6.2 Pull-back transformation	1.6.3 Coordinate transformation	1.7 Lie Group and Invariant Vector Fields	
1.8 Lie Algebra and Lie Derivative	1.8.1 Lie algebra, adjoint operator and Lie bracket	1.8.2 An example of the rotation group $SO(3)$	
1.8.3 Lie derivative and Lagrange derivative	1.9 Diffeomorphisms of a Circle S^1	1.10 Transformation of Tensors and Invariance	
1.10.1 Transformations of vectors and metric tensors . . .	1.10.2 Covariant tensors	1.10.3 Mixed tensors	1.10.4 Contravariant tensors
2. Geometry of Surfaces in R^3	2.1 First Fundamental Form	2.2 Second Fundamental Form	2.3 Gauss's Surface Equation and an Induced Connection
2.4 Gauss Mainardi Codazzi Equation and Integrability . .	2.5 Gaussian Curvature of a Surface	2.5.1 Riemann tensors	2.5.2 Gaussian curvature
2.5.3 Geodesic curvature and normal curvature	2.5.4 Principal curvatures	2.6 Geodesic Equation	2.7 Structure Equations in Differential Forms
2.7.1 Smooth surfaces in IR^3 and integrability	2.7.2 Structure equations	2.7.3 Geodesic equation	2.8 Gauss Spherical Map
2.9 Gauss Bonnet Theorem I	2.10 Gauss Bonnet Theorem II	2.11 Uniqueness: First and Second Fundamental Tensors	
3. Riemannian Geometry	3.1 Tangent Space	3.1.1 Tangent vectors and inner product	3.1.2 Riemannian metric
3.1.3 Examples of metric tensor	Dynamical Systems	Flows of Ideal Fluids	Geometry of Integrable Systems
Appendix A Topological Space and Mappings	Appendix B Exterior Forms, Products and Differentials	Appendix C Lie Groups and Rotation Groups	Appendix D A Curve and a Surface in R^3
Appendix E Curvature Transformation	Appendix F Function Spaces L_p , H_s and Orthogonal Decomposition	Appendix G Derivation of KdV Equation of a Shallow Water Wave	Appendix H Two-Cocycle, Central Extension and Bott Cocycle
Appendix I Additional Comment on the Gauge Theory of 7.3	Appendix J Frobenius Integration Theorem and Pfaffian System	Appendix K Orthogonal Coordinate Net and Lines of Curvature	References
Index			

《动态系统与流体流的几何理论GEO》

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:www.tushu111.com