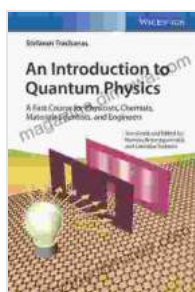


Lie Groups, Physics, and Geometry: A Journey into the Mathematics of Symmetry

In the realm of modern physics and mathematics, Lie groups hold a place of profound significance. These abstract mathematical structures emerge as the language of symmetry, revealing the hidden beauty that underpins the universe we inhabit.



Lie Groups, Physics, and Geometry: An Introduction for Physicists, Engineers and Chemists by Robert Gilmore

★★★★☆ 4.3 out of 5

Language : English
File size : 12869 KB
Text-to-Speech : Enabled
Enhanced typesetting : Enabled
Print length : 332 pages
Screen Reader : Supported



This comprehensive book, "Lie Groups, Physics, and Geometry," serves as an illuminating guide to this fascinating subject, seamlessly intertwining the worlds of mathematics, physics, and geometry. It is a testament to the enduring power of symmetry and its far-reaching implications.

Symmetry in Physics

Symmetry is a fundamental concept that pervades the physical world. From the elegant dance of snowflakes to the intricate patterns of subatomic particles, symmetry manifests itself in myriad ways.

Lie groups provide a profound framework for understanding and classifying symmetries. They are the mathematical tools that allow physicists to describe the fundamental laws of nature in a concise and elegant manner. In particle physics, for instance, Lie groups play a pivotal role in understanding the behavior of elementary particles and the forces that govern their interactions.

Geometry of Lie Groups

Beyond their physical applications, Lie groups possess a rich geometric structure. They can be visualized as continuous manifolds, endowed with a distinctive curvature and topology. Differential geometry provides the essential tools for exploring this geometry, unveiling the intricate connections between Lie groups and other geometric concepts.

The interplay between Lie groups and geometry has profound implications for our understanding of space, time, and the nature of reality. It has led to the development of novel mathematical techniques, such as fiber bundles, which have found applications in a wide range of disciplines, from theoretical physics to condensed matter physics.

Applications in Physics

The applications of Lie groups extend far beyond the realm of pure mathematics. They underpin some of the most fundamental theories in contemporary physics, including:

- **General relativity:** Lie groups provide the mathematical framework for describing the curvature of spacetime and the dynamics of gravitational fields.

- **Gauge theory:** Lie groups play a central role in the formulation of gauge theories, which unify the electromagnetic, weak, and strong forces in a single, elegant framework.
- **Particle physics:** Lie groups are essential for classifying elementary particles and understanding their interactions through the Standard Model of physics.

A Journey into Mathematical Symmetry

"Lie Groups, Physics, and Geometry" invites readers on a captivating journey into the world of mathematical symmetry. Through clear and engaging prose, the authors guide readers from the basic concepts of Lie groups to their profound implications in physics and geometry.

This book is suitable for advanced undergraduate and graduate students in mathematics, physics, and related disciplines. It offers a comprehensive and accessible to a subject that continues to captivate and inspire researchers worldwide.

Embark on this intellectual adventure and delve into the fascinating world of Lie groups, where the beauty of symmetry unfolds in all its splendor.

Key Features:

- Clear and engaging exposition suitable for a wide audience
- Comprehensive coverage of Lie groups, from basic concepts to advanced topics
- Exploration of the interplay between Lie groups, physics, and geometry

- Discussion of applications in general relativity, gauge theory, and particle physics
- Numerous exercises and examples to aid understanding

About the Authors

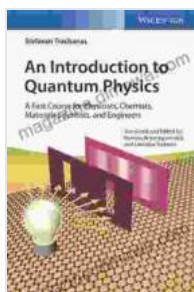
The authors of "Lie Groups, Physics, and Geometry" are renowned experts in the field, with decades of combined experience in teaching and research.

Dr. Peter Woit is a theoretical physicist and author at the Perimeter Institute for Theoretical Physics. He is known for his contributions to particle physics and his popular blog on particle physics and cosmology.

Dr. Mark J.D. Hamilton is a mathematician and Associate Professor at the University of Cambridge. He specializes in differential geometry and its applications in physics, including general relativity.

Together, these authors have created a definitive guide to Lie groups, providing readers with a deep understanding of this fascinating subject and its profound implications in physics and geometry.

Free Download your copy today and embark on the journey into the mathematics of symmetry!



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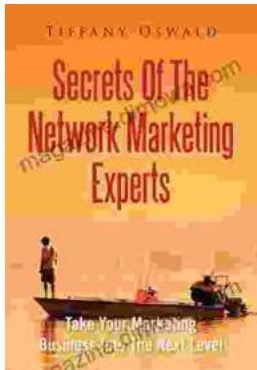
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