

Equivariant Cohomology and Localization of Path Integrals

Bearbeitet von
Richard J. Szabo

1. Auflage 2000. Buch. xi, 315 S. Hardcover

ISBN 978 3 540 67126 8

Format (B x L): 15,5 x 23,5 cm

Gewicht: 637 g

[Weitere Fachgebiete > Physik, Astronomie > Physik Allgemein](#)

Zu [Leseprobe](#)

schnell und portofrei erhältlich bei

The logo for beck-shop.de features the text 'beck-shop.de' in a bold, red, sans-serif font. Above the 'i' in 'shop' are three red dots of increasing size. Below the main text, 'DIE FACHBUCHHANDLUNG' is written in a smaller, red, all-caps, sans-serif font.

beck-shop.de
DIE FACHBUCHHANDLUNG

Die Online-Fachbuchhandlung beck-shop.de ist spezialisiert auf Fachbücher, insbesondere Recht, Steuern und Wirtschaft. Im Sortiment finden Sie alle Medien (Bücher, Zeitschriften, CDs, eBooks, etc.) aller Verlage. Ergänzt wird das Programm durch Services wie Neuerscheinungsdienst oder Zusammenstellungen von Büchern zu Sonderpreisen. Der Shop führt mehr als 8 Millionen Produkte.

Contents

1. Introduction	1
1.1 Path Integrals in Quantum Mechanics, Integrable Models and Topological Field Theory	1
1.2 Equivariant Localization Theory	5
1.3 Outline	7
2. Equivariant Cohomology and the Localization Principle	11
2.1 Example: The Height Function of the Sphere	11
2.2 A Brief Review of DeRham Cohomology	13
2.3 The Cartan Model of Equivariant Cohomology	19
2.4 Fiber Bundles and Equivariant Characteristic Classes	24
2.5 The Equivariant Localization Principle	33
2.6 The Berline-Vergne Theorem	38
3. Finite-Dimensional Localization Theory for Dynamical Systems	43
3.1 Symplectic Geometry	44
3.2 Equivariant Cohomology on Symplectic Manifolds	47
3.3 Stationary-Phase Approximation and the Duistermaat-Heckman Theorem	51
3.4 Morse Theory and Kirwan's Theorem	56
3.5 Examples: The Height Function of a Riemann Surface	58
3.6 Equivariant Localization and Classical Integrability	62
3.7 Degenerate Version of the Duistermaat-Heckman Theorem	67
3.8 The Witten Localization Formula	70
3.9 The Wu Localization Formula	74
4. Quantum Localization Theory for Phase Space Path Integrals	77
4.1 Phase Space Path Integrals	78

4.2	Example: Path Integral Derivation of the Atiyah-Singer Index Theorem	84
4.3	Loop Space Symplectic Geometry and Equivariant Cohomology	95
4.4	Hidden Supersymmetry and the Loop Space Localization Principle	99
4.5	The WKB Localization Formula	105
4.6	Degenerate Path Integrals and the Niemi-Tirkkonen Localization Formula	107
4.7	Connections with the Duistermaat-Heckman Integration Formula	112
4.8	Equivariant Localization and Quantum Integrability	114
4.9	Localization for Functionals of Isometry Generators	117
4.10	Topological Quantum Field Theories	121
5.	Equivariant Localization on Simply Connected Phase Spaces: Applications to Quantum Mechanics, Group Theory and Spin Systems	127
5.1	Coadjoint Orbit Quantization and Character Formulas	130
5.2	Isometry Groups of Simply Connected Riemannian Spaces	137
5.3	Euclidean Phase Spaces and Holomorphic Quantization	146
5.4	Coherent States on Homogeneous Kähler Manifolds and Holomorphic Localization Formulas	153
5.5	Spherical Phase Spaces and Quantization of Spin Systems	158
5.6	Hyperbolic Phase Spaces	169
5.7	Localization of Generalized Spin Models and Hamiltonian Reduction	171
5.8	Quantization of Isospin Systems	180
5.9	Quantization on Non-Homogeneous Phase Spaces	191
6.	Equivariant Localization on Multiply Connected Phase Spaces: Applications to Homology and Modular Representations	203
6.1	Isometry Groups of Multiply Connected Spaces	205
6.2	Equivariant Hamiltonian Systems in Genus One	207
6.3	Homology Representations and Topological Quantum Field Theory	210
6.4	Integrability Properties and Localization Formulas	213
6.5	Holomorphic Quantization and Non-Symmetric Coadjoint Orbits	217
6.6	Generalization to Hyperbolic Riemann Surfaces	226

7. Beyond the Semi-Classical Approximation	233
7.1 Geometrical Characterizations of the Loop Expansion	234
7.2 Conformal and Geodetic Localization Symmetries	244
7.3 Corrections to the Duistermaat-Heckman Formula: A Geometric Approach	253
7.4 Examples	259
7.5 Heuristic Generalizations to Path Integrals: Supersymmetry Breaking	266
8. Equivariant Localization in Cohomological Field Theory	269
8.1 Two-Dimensional Yang-Mills Theory: Equivalences Between Physical and Topological Gauge Theories	270
8.2 Symplectic Geometry of Poincaré Supersymmetric Quantum Field Theories	276
8.3 Supergeometry and the Batalin-Fradkin-Vilkovisky Formalism	281
8.4 Equivariant Euler Numbers, Thom Classes and the Mathai-Quillen Formalism	287
8.5 The Mathai-Quillen Formalism for Infinite-Dimensional Vector Bundles	291
9. Appendix A: BRST Quantization	295
10. Appendix B: Other Models of Equivariant Cohomology	299
10.1 The Topological Definition	299
10.2 The Weil Model	300
10.3 The BRST Model	304
10.4 Loop Space Extensions	306
References	309