# CONTENTS LIST BY SUBJECT

Location references refer to the volume number and page number (separated by a colon).

#### INTRODUCTORY ARTICLES

Classical Mechanics 1:1
Differential Geometry 1:33
Electromagnetism 1:40
Equilibrium Statistical Mechanics 1:51
Functional Analysis 1:88
Minkowski Spacetime and Special Relativity 1:96
Quantum Mechanics 1:109
Topology 1:131

#### PHYSICS SUBJECTS

#### Classical Mechanics

Boundary Control Method and Inverse Problems of Wave Propagation 1:340
Constrained Systems 1:611
Cotangent Bundle Reduction 1:658
Gravitational N-body Problem (Classical) 2:575
Hamiltonian Fluid Dynamics 2:593
Hamiltonian Systems: Obstructions to Integrability 2:624
Infinite-Dimensional Hamiltonian Systems 3:37
Inverse Problem in Classical Mechanics 3:156
KAM Theory and Celestial Mechanics 3:189
Peakons 4:12
Poisson Reduction 4:79
Stability Problems in Celestial Mechanics 5:20
Symmetry and Symplectic Reduction 5:190

# Classical, Conformal and Topological Field Theory

Topological Quantum Field Theory:
Overview 5:278

AdS/CFT Correspondence 1:174

Axiomatic Approach to Topological Quantum Field
Theory 1:232

BF Theories 1:257

Boundary Conformal Field Theory 1:333

Chern–Simons Models: Rigorous Results 1:496

Donaldson-Witten Theory 2:110 Duality in Topological Quantum Field Theory 2:118 Finite-Type Invariants 2:340 Four-Manifold Invariants and Physics 2:386 Gauge Theoretic Invariants of 4-Manifolds 2:457 h-Pseudodifferential Operators and Applications 2:701 The Jones Polynomial 3:179 Knot Theory and Physics 3:220 Kontsevich Integral 3:231 Large-N and Topological Strings 3:263 Mathai-Quillen Formalism 3:390 Mathematical Knot Theory 3:399 Operator Product Expansion in Quantum Field Theory 3:616 Schwarz-Type Topological Quantum Field Theory 4:494 Solitons and Other Extended Field Configurations 4:602 Topological Defects and Their Homotopy Classification 5:257 Topological Gravity, Two-Dimensional 5:264 Topological Knot Theory and Macroscopic Physics 5:271 Topological Sigma Models 5:290 Two-Dimensional Conformal Field Theory and Vertex Operator Algebras 5:317 WDVV Equations and Frobenius

## Condensed Matter and Optics

Manifolds 5:438

Optical Caustics 3:620
Quantum Phase Transitions 4:289
Quasiperiodic Systems 4:308
Renormalization: Statistical Mechanics and Condensed Matter 4:407
Short-Range Spin Glasses: The Metastate Approach 4:570
Topological Defects and Their Homotopy Classification 5:257

#### Disordered Systems

Cellular Automata 1:455
Lagrangian Dispersion (Passive Scalar) 3:255
Mean Field Spin Glasses and Neural
Networks 3:407
Percolation Theory 4:21
Random Matrix Theory in Physics 4:338
Random Walks in Random Environments 4:353
Short-Range Spin Glasses: The Metastate
Approach 4:570
Spin Glasses 4:655
Stochastic Loewner Evolutions 5:80
Two-Dimensional Ising Model 5:322
Wulff Droplets 5:462

### **Dynamical Systems**

Averaging Methods 1:226 Bifurcations of Periodic Orbits 1:285 Billiards in Bounded Convex Domains 1:296 Central Manifolds, Normal Forms 1:467 Cellular Automata 1:455 Chaos and Attractors 1:477 Cotangent Bundle Reduction 1:658 Diagrammatic Techniques in Perturbation Theory 2:54 Dissipative Dynamical Systems of Infinite Dimension 2:101 Dynamical Systems and Thermodynamics 2:125 Dynamical Systems in Mathematical Physics: An Illustration from Water Waves 2:133 Entropy and Quantitative Transversality 2:237 Ergodic Theory 2:250 Fractal Dimensions in Dynamics 2:394 Generic Properties of Dynamical Systems 2:494 Gravitational N-Body Problem (Classical) 2:575 Hamiltonian Fluid Dynamics 2:593 Hamiltonian Systems: Stability and Instability Theory 2:631 Holomorphic Dynamics 2:652 Homeomorphisms and Diffeomorphisms of the Circle 2:665 Homoclinic Phenomena 2:672 h-Pseudodifferential Operators and Applications 2:701 Hyperbolic Billiards 2:716 Hyperbolic Dynamical Systems 2:721 Isomonodromic Deformations 3:173

KAM Theory and Celestial Mechanics 3:189 Lyapunov Exponents and Strange Attractors 3:349 Multiscale Approaches 3:465 Normal Forms and Semiclassical Approximation 3:578 Point-Vortex Dynamics Poisson Reduction 4:79 Polygonal Billiards 4:84 Quasiperiodic Systems 4:308 Random Dynamical Systems 4:330 Regularization For Dynamical (-Functions 4:386 Resonances 4:415 Riemann-Hilbert Problem 4:436 Semiclassical Spectra and Closed Orbits 4:512 Separatrix Splitting 4:535 Stability Problems in Celestial Mechanics 5:20 Stability Theory and KAM 5:26 Symmetry and Symmetry Breaking in Dynamical Systems 5:184 Symmetry and Symplectic Reduction 5:190 Synchronization of Chaos 5:213 Universality and Renormalization 5:343 Weakly Coupled Oscillators 5:448

## Equilibrium Statistical Mechanics

Bethe Ansatz 1:253 Cluster Expansion 1:531 Dimer Problems 2:61 Eight Vertex and Hard Hexagon Models 2:155 Falicov-Kimball Model 2:283 Fermionic Systems 2:300 Finitely Correlated States 2:334 Holonomic Quantum Fields 2:660 Hubbard Model 2:712 Large Deviations in Equilibrium Statistical Mechanics 3:261 Metastable States 3:417 Phase Transitions in Continuous Systems 4:53 Pirogov-Sinai Theory 4:60 Quantum Central-Limit Theorems 4:130 Quantum Phase Transitions 4:289 Quantum Spin Systems 4:295 Ouantum Statistical Mechanics: Overview 4:302 Reflection Positivity and Phase Transitions 4:376 Short-Range Spin Glasses: The Metastate Approach 4:570 Statistical Mechanics and Combinatorial Problems 5:50 Statistical Mechanics of Interfaces 5:55 Superfluids 5:115 Toeplitz Determinants and Statistical Mechanics 5:244 Two-Dimensional Ising Model 5:322 Wulff Droplets 5:462

#### Fluid Dynamics

Bifurcations in Fluid Dynamics 1:281 Breaking Water Waves 1:383

Capillary Surfaces 1:431 Cauchy Problem for Burgers-Type Equations 1:446 Compressible Flows: Mathematical Theory 1:595 Fluid Mechanics: Numerical Methods 2:365 Geophysical Dynamics 2:534 Hamiltonian Fluid Dynamics 2:593 Incompressible Euler Equations: Mathematical Theory 3:10 Interfaces and Multicomponent Fluids 3:135 Intermittency in Turbulence 3:144 Inviscid Flows 3:160 Korteweg-de Vries Equation and Other Modulation Equations 3:239 Lagrangian Dispersion (Passive Scalar) 3:255 Magnetohydrodynamics 3:375 Newtonian Fluids and Thermohydraulics 3:492 Non-Newtonian Fluids 3:560 Partial Differential Equations: Some Examples 4:6 Peakons 4:12 Stability of Flows 5:1 Superfluids 5:115 Turbulence Theories 5:295 Variational Methods in Turbulence 5:351 Viscous Incompressible Fluids: Mathematical Theory 5:369 Vortex Dynamics 5:390 Wavelets: Application to Turbulence 5:408

#### Gauge Theory

Tests 4:168

Abelian and Nonabelian Gauge Theories Using Differential Forms 1:141 Abelian Higgs Vortices 1:151 AdS/CFT Correspondence 1:174 Aharonov-Bohm Effect 1:191 Anomalies 1:205 BRST Quantization 1:386 Chern-Simons Models: Rigorous Results 1:496 Dirac Fields in Gravitation and Nonabelian Gauge Theory 2:67 Donaldson-Witten Theory 2:110 Effective Field Theories 2:139 Electric-Magnetic Duality 2:201 Electroweak Theory 2:209 Exact Renormalization Group 2:272 Gauge Theories from Strings 2:463 Gauge Theory: Mathematical Applications 2:468 Instantons: Topological Aspects 3:44 Large-N and Topological Strings 3:263 Lattice Gauge Theory 3:275 Measure on Loop Spaces 3:413 Noncommutative Geometry and the Standard Model 3:509 Nonperturbative and Topological Aspects of Gauge Theory 3:568 Perturbative Renormalization Theory and BRST 4:41 Quantum Chromodynamics 4:144 Quantum Electrodynamics and Its Precision

Renormalization: General Theory 4:399 Seiberg-Witten Theory 4:503 Standard Model of Particle Physics 5:32 Supergravity 5:122 Supersymmetric Particle Models 5:140 Symmetry Breaking in Field Theory 5:198 Twistor Theory: Some Applications 5:303 Two-Dimensional Models 5:328

#### General Relativity

General Relativity: Overview 2:487 Asymptotic Structure and Conformal Infinity 1:221 Black Hole Mechanics 1:300 Boundaries for Spacetimes 1:326 Brane Worlds 1:367 Canonical General Relativity 1:412 Critical Phenomena in Gravitational Collapse 1:668 Computational Methods in General Relativity: The Theory 1:604 Cosmology: Mathematical Aspects 1:653 Dirac Fields in Gravitation and Nonabelian Gauge Theory 2:67 Einstein-Cartan Theory 2:189 Einstein's Equations with Matter 2:195 Einstein Equations: Exact Solutions 2:165 Einstein Equations: Initial Value Formulation 2:173 General Relativity: Experimental Tests 2:481 Geometric Analysis and General Relativity 2:502 Geometric Flows and the Penrose Inequality 2:510 Gravitational Lensing 2:567 Gravitational Waves 2:582 Hamiltonian Reduction of Einstein's Equations 2:607 Minimal Submanifolds 3:420 Newtonian Limit of General Relativity 3:503 Quantum Field Theory in Curved Spacetime 4:202 Relativistic Wave Equations Including Higher Spin Fields 4:391 Shock Wave Refinement of the Friedman-Robertson-Walker Metric 4:559 Spacetime Topology, Causal Structure and Singularities 4:617 Spinors and Spin Coefficients 4:667 Stability of Minkowski Space 5:14 Stationary Black Holes 5:38 Twistors 5:311

#### Integrable Systems

Integrable Systems: Overview 3:106 Abelian Higgs Vortices 1:151 Affine Quantum Groups 1:183 Bäcklund Transformations 1:241

Bethe Ansatz 1:253 Bi-Hamiltonian Methods in Soliton Theory 1:290 Boundary-Value Problems For Integrable Equations 1:346 Calogero-Moser-Sutherland Systems of Nonrelativistic and Relativistic Type 1:403  $\bar{\delta}$ -Approach to Integrable Systems 2:34 Eigenfunctions of Quantum Completely Integrable Systems 2:148 Functional Equations and Integrable Systems 2:425 Holonomic Quantum Fields 2:660 Instantons: Topological Aspects 3:44 Integrability and Quantum Field Theory 3:50 Integrable Discrete Systems 3:59 Integrable Systems and Algebraic Geometry 3:65 Integrable Systems and Discrete Geometry 3:78 Integrable Systems and Recursion Operators on Symplectic and Jacobi Manifolds 3:87 Integrable Systems and the Inverse Scattering Method 3:93 Integrable Systems in Random Matrix Theory 3:102 Isochronous Systems 3:166 Nonlinear Schrödinger Equations 3:552 Painlevé Equations 4:1 Peakons 4:12 Quantum Calogero-Moser Systems 4:123 Riemann-Hilbert Methods in Integrable Systems 4:429 Sine-Gordon Equation 4:576 Solitons and Kac-Moody Lie Algebras 4:594 Toda Lattices 5:235 Twistor Theory: Some Applications 5:303

# M-Theory see String Theory and M-Theory

Yang-Baxter Equations 5:465

#### Nonequilibrium Statistical Mechanics

Nonequilibrium Statistical Mechanics (Stationary): Overview 3:530 Adiabatic Piston 1:160 Boltzmann Equation (Classical and Quantum) 1:306 Glassy Disordered Systems: Dynamical Evolution 2:553 Fourier Law 2:374 Interacting Particle Systems and Hydrodynamic Equations 3:123 Interacting Stochastic Particle Systems 3:130 Kinetic Equations 3:200 Macroscopic Fluctuations and Thermodynamic Functionals 3:357 Nonequilibrium Statistical Mechanics: Dynamical Systems Approach 3:540 Nonequilibrium Statistical Mechanics: Interaction between Theory and Numerical Simulations 3:544

Phase Transition Dynamics 4:47 Stochastic Resonance 5:86

#### Quantum Field Theory

Quantum Field Theory: A Brief Introduction 4:212 AdS/CFT Correspondence 1:174 Algebraic Approach to Quantum Field Theory 1:198 Anomalies 1:205 Axiomatic Quantum Field Theory 1:234 Batalin-Vilkovisky Quantization 1:247 Bosons and Fermions in External Fields 1:318 BRST Quantization 1:386 Constrained Systems 1:611 Constructive Quantum Field Theory 1:617 Current Algebra 1:674 Dirac Operator and Dirac Field 2:74 Dispersion Relations 2:87 Effective Field Theories 2:139 Electroweak Theory 2:209 Euclidean Field Theory 2:256 Exact Renormalization Group 2:272 Gerbes in Quantum Field Theory 2:539 Holonomic Quantum Fields 2:660 Hopf Algebra Structure of Renormalizable Quantum Field Theory 2:678 Indefinite Metric 3:17 Integrability and Quantum Field Theory 3:50 Large-N and Topological Strings 3:263 Nonperturbative and Topological Aspects of Gauge Theory 3:568 Operator Product Expansion in Quantum Field Theory 3:616 Quantum Fields with Indefinite Metric: Non-Trivial Models 4:216 Perturbation Theory and Its Techniques 4:28 Perturbative Renormalization Theory and BRST 4:41 Quantum Electrodynamics and Its Precision Tests 4:168 Quantum Fields with Topological Defects 4:221 Quantum Field Theory in Curved Spacetime 4:202 Quantum Phase Transitions 4:289 Renormalization: General Theory 4:399 Renormalization: Statistical Mechanics and

Condensed Matter 4:407 Scattering, Asymptotic Completeness and Bound States 4:475

Scattering in Relativistic Quantum Field Theory: Fundamental Concepts and Tools 4:456 Scattering in Relativistic Quantum Field Theory:

The Analytic Program 4:465 Seiberg-Witten Theory 4:503

Standard Model of Particle Physics 5:32

Supergravity 5:122

Supersymmetric Particle Models 5:140 Symmetries and Conservation Laws 5:166 Symmetries in Quantum Field Theory: Algebraic Aspects 5:179 Symmetries in Quantum Field Theory of Lower Spacetime Dimensions 5:172 Symmetry Breaking in Field Theory 5:198 Two-Dimensional Models 5:328 Thermal Quantum Field Theory 5:227 Tomita-Takesaki Modular Theory 5:251 Topological Defects and Their Homotopy Classification 5:257 Twistor Theory: Some Applications 5:303

#### Quantum Gravity

Knot Invariants and Quantum Gravity 3:215 Knot Theory and Physics 3:220 Loop Quantum Gravity 3:339 Quantum Cosmology 4:153 Quantum Dynamics in Loop Quantum Gravity 4:165 Quantum Field Theory in Curved Spacetime 4:202 Quantum Geometry and Its Applications 4:230 Spin Foams 4:645 Wheeler-De Witt Theory 5:453

#### Quantum Information and Computation

Capacities Enhanced By Entanglement 1:418 Capacity for Quantum Information 1:424 Channels in Quantum Information Theory 1:472 Entanglement 2:228 Entanglement Measures 2:233 Finite Weyl Systems 2:328 Optimal Cloning of Quantum States 3:628 Quantum Channels: Classical Capacity 4:142 Quantum Entropy 4:177 Quantum Error Correction and Fault Tolerance 4:196 Source Coding in Quantum Information Theory 4:609

#### Quantum Mechanics

Aharonov-Bohm Effect 1:191 Arithmetic Quantum Chaos 1:212 Coherent States 1:537 Geometric Phases 2:528 h-Pseudodifferential Operators and Applications 2:701 N-particle Quantum Scattering 3:585 Normal Forms and Semiclassical Approximation 3:578 Quantum Entropy 4:177 Quantum Ergodicity and Mixing of Eigenfunctions 4:183 Quantum Mechanical Scattering Theory 4:251 Quantum Mechanics: Foundations 4:260 Quantum Mechanics: Generalizations 4:265 Quantum Mechanics: Weak Measurements 4:276 Quantum n-Body Problem 4:283 Quantum Spin Systems 4:295 Quasiperiodic Systems 4:308 Schrödinger Operators 4:487 Stability of Matter 5:8 Stationary Phase Approximation 5:44 Supersymmetric Quantum Mechanics 5:145 Topological Defects and Their Homotopy Classification 5:257

#### String Theory and *M*-Theory

AdS/CFT Correspondence 1:174 Brane Construction of Gauge Theories 1:360 Branes and Black Hole Statistical Mechanics 1:373 Brane Worlds 1:367 Calibrated Geometry and Special Lagrangian Submanifolds 1:398 Compactification of Superstring Theory 1:586 Derived Categories 2:41 Fourier-Mukai Transform in String Theory 2:379 Gauge Theories from Strings 2:463 Large-N and Topological Strings 3:263 Large-N Dualities 3:269 Mirror Symmetry: A Geometric Survey 3:439 Noncommutative Geometry from Strings 3:515 Random Algebraic Geometry, Attractors and Flux Vacua 4:323 Riemannian Holonomy Groups and Exceptional Holonomy 4:441 String Field Theory 5:94 String Theory: Phenomenology 5:103 String Topology: Homotopy and Geometric Perspectives 5:111 Superstring Theories 5:133 Twistor Theory: Some Applications 5:303 Two-Dimensional Conformal Field Theory and Vertex Operator Algebras 5:317

#### Yang-Mills Theory see Gauge Theory

# RELATED MATHEMATICS SUBJECTS

### Algebraic Techniques

Affine Quantum Groups 1:183 Braided and Modular Tensor Categories 1:351 Clifford Algebras and Their Representations 1:518 Derived Categories 2:41 Finite-Dimensional Algebras and Quivers 2:313 Finite Group Symmetry Breaking 2:322 Hopf Algebras and Q-Deformation Quantum Groups 2:687 Operads 3:609

## Algebraic Topology

Characteristic Classes 1:488
Cohomology Theories 1:545
Derived Categories 2:41
Equivariant Cohomology and the Cartan
Model 2:242
Fourier–Mukai Transform in String
Theory 2:379
Index Theorems 3:23
Intersection Theory 3:151
K-theory 3:246
Mathai–Quillen Formalism 3:390
Operads 3:609
Spectral Sequences 4:623
String Topology: Homotopy and Geometric
Perspectives 5:111

#### Complex Geometry

Derived Categories 2:41
Gauge Theory: Mathematical Applications 2:468
Fourier–Mukai Transform in String Theory 2:379
Knot Homologies 3:208
Mirror Symmetry: A Geometric Survey 3:439
Moduli Spaces: An Introduction 3:449
Quillen Determinant 4:315
Riemann Surfaces 4:419
Riemann–Hilbert Problem 4:436
Several Complex Variables: Basic Geometric
Theory 4:540
Several Complex Variables: Compact
Manifolds 4:551
Twistor Theory: Some Applications 5:303

#### **Differential Geometry**

Calibrated Geometry and Special Lagrangian Submanifolds 1:398 Capillary Surfaces 1:431 Characteristic Classes 1:488 Derived Categories 2:41 Einstein Manifolds 2:182 Fourier-Mukai Transform in String Theory 2:379 Gauge Theory: Mathematical Applications 2:468 Index Theorems 3:23 Intersection Theory 3:151 K-Theory 3:246 Lorentzian Geometry 3:343 Mathai-Quillen Formalism 3:390 Moduli Spaces: An Introduction 3:449 Quillen Determinant 4:315 Pseudo-Riemannian Nilpotent Lie Groups 4:94 Riemann-Hilbert Problem 4:436 Riemannian Holonomy Groups and Exceptional Holonomy 4:441 Singularity and Bifurcation Theory 4:588 Supermanifolds 5:128 Twistor Theory: Some Applications 5:303

#### **Discrete Mathematics**

Arithmetic Quantum Chaos 1:212 Combinatorics: Overview 1:553 Number Theory in Physics 3:600 Quasiperiodic Systems 4:308

# Functional Analysis and Operator Algebras

Bäcklund Transformations 1:241 C\*-Algebras and their Classification 1:393 Coherent States 1:537 Free Probability Theory 2:417 Functional Integration in Quantum Physics 2:434 Gauge Theory: Mathematical Applications 2:468 h-Pseudodifferential Operators and Applications 2:701 The Jones Polynomial 3:179 K-Theory 3:246 Leray-Schauder Theory and Mapping Degree 3:281 Ljusternik-Schnirelman Theory 3:328 Ordinary Special Functions 3:637 Positive Maps on C\*-Algebras 4:88 Quantum Dynamical Semigroups 4:159 Saddle Point Problems 4:447 Spectral Theory of Linear Operators 4:633 Tomita-Takesaki Modular Theory 5:251 von Neumann Algebras: Introduction, Modular Theory, and Classification Theory 5:379 von Neumann Algebras: Subfactor Theory 5:385 Wavelets: Applications 5:420 Wavelets: Mathematical Theory 5:426

# Lie Groups and Lie Algebras

Classical Groups and Homogeneous Spaces 1:500
Compact Groups and Their
Representations 1:576
Finite-Dimensional Algebras and Quivers 2:313
Lie Groups: General Theory 3:286
Lie Superalgebras and Their
Representations 3:305
Lie, Symplectic, and Poisson Groupoids and Their
Lie Algebroids 3:312
Pseudo-Riemannian Nilpotent Lie Groups 4:94
Riemann-Hilbert Problem 4:436
Solitons and Kac-Moody Lie Algebras 4:594

# Low Dimensional Geometry

Finite-type Invariants of 3-Manifolds 2:348
Floer Homology 2:356
Four-manifold Invariants and Physics 2:386
Gauge Theoretic Invariants of 4-Manifolds 2:457
Gauge Theory: Mathematical Applications 2:468
The Jones Polynomial 3:179
Knot Invariants and Quantum Gravity 3:215
Large-N and Topological Strings 3:263

Quantum 3-Manifold Invariants 4:117 Singularities of the Ricci Flow 4:584 Twistor Theory: Some Applications 5:303

#### Noncommutative Geometry

Hopf Algebra Structure of Renormalizable Quantum Field Theory 2:678 Noncommutative Geometry and the Standard Model 3:509 Noncommutative Geometry from Strings 3:515 Noncommutative Tori, Yang-Mills, and String Path Integrals in Noncommutative Geometry 4:8 Quantum Group Differentials, Bundles and Gauge Theory 4:236 Quantum Hall Effect 4:244 Riemann-Hilbert Problem 4:436

## Ordinary and Partial Differential **Equations**

Bifurcation Theory 1:275 Boltzmann Equation (Classical and Quantum) 1:306 Boundary Control Method and Inverse Problems of Wave Propagation 1:340 Capillary Surfaces 1:431 Cauchy Problem for Burgers-Type Equations 1:446 Elliptic Differential Equations: Linear Theory 2:216 Evolution Equations: Linear and Nonlinear 2:265 Fluid Mechanics: Numerical Methods 2:365 Ginzburg-Landau Equation 2:547 Image Processing: Mathematics 3:1 Inequalities in Sobolev Spaces 3:32 Isomonodromic Deformations 3:173 Kinetic Equations 3:200 Localization For Quasiperiodic Potentials 3:333 Magnetic Resonance Imaging 3:367 Minimal Submanifolds 3:420 Painlevé Equations 4:1 Partial Differential Equations: Some Examples 4:6 Relativistic Wave Equations Including Higher Spin Fields 4:391 Riemann-Hilbert Problem 4:436 Semilinear Wave Equations 4:518 Separation of Variables for Differential Equations 4:526 Stationary Phase Approximation 5:44 Symmetric Hyperbolic Systems and Shock Waves 5:160

## Quantization Methods and Path Integration

Wave Equations and Diffraction 5:401

Coherent States 1:537 Deformation Quantization 2:1 Deformation Quantization and Representation Theory 2:9 Deformation Theory 2:16 Deformations of the Poisson Bracket on a Symplectic Manifold 2:24 Fedosov Quantization 2:291 Feynman Path Integrals 2:307 Functional Integration in Quantum Physics 2:434 Path Integrals in Noncommutative Geometry 4:8 Regularization for Dynamical C-Functions 4:386

#### Quantum Groups

Affine Quantum Groups 1:183 Bicrossproduct Hopf Algebras and Noncommutative Spacetime 1:265 Braided and Modular Tensor Categories 1:351 Classical r-Matrices, Lie Bialgebras, and Poisson Lie Groups 1:511 Hopf Algebras and q-Deformation Quantum Groups 2:687 Hopf Algebra Structure of Renormalizable Quantum Field Theory 2:678 q-Special Functions 4:105 Quantum Group Differentials, Bundles and Gauge Theory 4:236 Yang-Baxter Equations 5:465

#### Stochastic Methods

Determinantal Random Fields 2:47 Free Probability Theory 2:417 Growth Processes in Random Matrix Theory 2:586 Integrable Systems in Random Matrix Theory 3:102 Lagrangian Dispersion (Passive Scalar) 3:255 Malliavin Calculus 3:383 Measure on Loop Spaces 3:413 Random Matrix Theory in Physics 4:338 Random Partitions 4:347 Random Walks in Random Environments 4:353 Stochastic Differential Equations 5:63 Stochastic Hydrodynamics 5:71 Stochastic Loewner Evolutions 5:80 Supersymmetry Methods in Random Matrix Theory 5:151 Symmetry Classes in Random Matrix Theory 5:204

#### Symplectic Geometry and Topology

Classical r-Matrices, Lie Bialgebras, and Poisson Lie Groups 1:511 Contact Manifolds 1:631 Deformations of the Poisson Bracket on a Symplectic Manifold 2:24 Fedosov Quantization 2:291 Floer Homology 2:356 Graded Poisson Algebras 2:560

Hamiltonian Group Actions 2:600 Mirror Symmetry: A Geometric Survey 3:439 Multi-Hamiltonian Systems 3:459 Recursion Operators in Classical Mechanics 4:371 Singularity and Bifurcation Theory 4:588 Stationary Phase Approximation 5:44

#### Variational Techniques

Capillary Surfaces 1:431 Control Problems in Mathematical Physics 1:636 Convex Analysis and Duality Methods 1:642 Free Interfaces and Free Discontinuities: Variational Problems 2:411
Γ-Convergence and Homogenization 2:449
Gauge Theory: Mathematical Applications 2:468
Geometric Measure Theory 2:520
Hamilton–Jacobi Equations and Dynamical Systems: Variational Aspects 2:636
Minimax Principle in the Calculus of Variations 3:432
Optimal Transportation 3:632
Variational Techniques for Ginzburg–Landau Energies 5:355
Variational Techniques for Microstructures 5:363