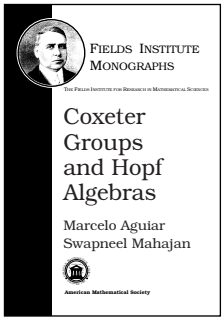
New Publications Offered by the AMS

Algebra and Algebraic Geometry



Coxeter Groups and Hopf Algebras

Marcelo Aguiar, *Texas A&M University, College Station, TX*, and **Swapneel Mahajan**, *Indian Institute of Technology, Powai, Mumbai, India*

An important idea in the work of G.-C. Rota is that certain combinatorial objects give rise to Hopf algebras that reflect the manner in which these objects compose and decompose. Recent work has seen the emergence of several interesting Hopf algebras of this kind, which connect diverse subjects such as combinatorics, algebra, geometry, and theoretical physics. This monograph presents a novel geometric approach using Coxeter complexes and the projection maps of Tits for constructing and studying many of these objects as well as new ones. The first three chapters introduce the necessary background ideas making this work accessible to advanced graduate students. The later chapters culminate in a unified and conceptual construction of several Hopf algebras based on combinatorial objects which emerge naturally from the geometric viewpoint. This work lays a foundation and provides new insights for further development of the subject.

To read more about Coxeter groups see *The Coxeter Legacy: Reflections and Projections*.

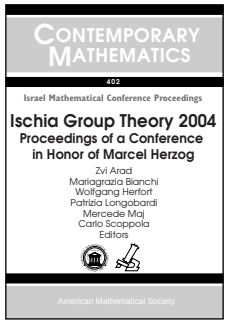
This item will also be of interest to those working in discrete mathematics and combinatorics.

Titles in this series are copublished with The Fields Institute for Research in Mathematical Sciences (Toronto, Ontario, Canada).

Contents: Coxeter groups; Left regular bands; Hopf algebras; A brief overview; The descent theory for Coxeter groups; The construction of Hopf algebras; The Hopf algebra of pairs of permutations; The Hopf algebra of pointed faces; Bibliography; Author index; Notation index; Subject index.

Fields Institute Monographs, Volume 23

July 2006, 181 pages, Hardcover, ISBN 0-8218-3907-1, LC 2006044456, 2000 *Mathematics Subject Classification*: 05E05, 06A07, 06A11, 16W30, 20F55, 51E24, **All AMS members US$47**, List US$59, Order code FIM/23



Ischia Group Theory 2004

Proceedings of a Conference in Honor of Marcel Herzog

Zvi Arad, *Bar-Ilan University, Ramat-Gan, Israel*, **Mariagrazia Bianchi**, *Università degli Studi di Milano, Italy*, **Wolfgang Herfort**, *University of Technology, Vienna, Austria*, **Patrizia Longobardi** and **Mercede Maj**, *Università di Salerno, Fisciano, (SA), Italy*, and **Carlo Scoppola**, Editors

Experts in the theory of finite groups and in representation theory provide insight into various aspects of group theory, such as the classification of finite simple groups, character theory, groups with special properties, table algebras, etc.

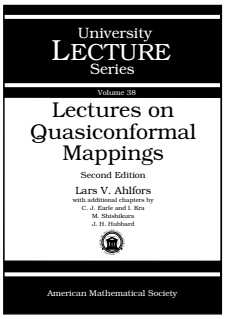
This book is copublished with Bar-Ilan University (Ramat-Gan, Israel).

Contents: Z. Arad and **W. Herfort**, The history of the classification of finite groups with a CC-subgroup; **Y. Berkovich** and **Z. Janko**, Structure of finite p-groups with given subgroups; **E. A. Bertram**, Lower bounds for the number of conjugacy classes in finite groups; **M. Bianchi**, **A. Gillio**, and **L. Verardi**, Monounary simple algebras; **D. Chillag**, Algebras with positive bases, commutators and covering numbers; **C. Delizia** and **C. Nicotera**, On certain group theoretical properties generalizing commutativity; **E. Detomi** and **A. Lucchini**, Probabilistic non-generators in profinite groups; **M. Giudici**, **C. H. Li**, **C. E. Praeger**, **A. Seress**, and **V. Trofimov**, Limits of vertex-transitive graphs; **R. Göbel** and **O. H. Kegel**, Group rings with simple augmentation ideals; **M. Herzog**, **P. Longobardi**, and **M. Maj**, On the number of commutators in groups; **Z. Janko**, New results in the theory of finite 2-groups; **G. Kaplan**, The existence of normal and characteristic subgroups in finite groups; **A. Lev**, On the covering numbers of finite groups: Some old and new results; **M. Mainardis**, Normal subgroups in the subgroup lattices of finite p-groups; **A. Mann**, On characters-classes duality and orders of centralizers; **A. Regev**, Bijections for identities of multisets of hook numbers; **D. O. Revin** and **E. P. Vdovin**, Hall subgroups of finite groups.

Contemporary Mathematics, Volume 402

June 2006, 263 pages, Softcover, ISBN 0-8218-3711-7, LC 2006040728, 2000 *Mathematics Subject Classification*: 20C15, 20D15, 20D20, **All AMS members US$63**, List US$79, Order code CONM/402

Analysis



Lectures on Quasiconformal Mappings

Second edition

Lars V. Ahlfors

with additional chapters by C. J. Earle and I. Kra, M. Shishikura, J. H. Hubbard

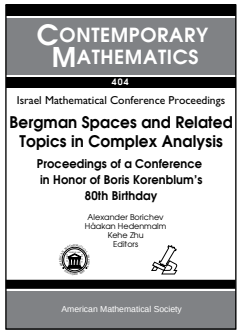
Lars Ahlfors's *Lectures on Quasiconformal Mappings*, based on a course he gave at Harvard University in the spring term of 1964, was first published in 1966 and was soon recognized as the classic it was shortly destined to become. These lectures develop the theory of quasiconformal mappings from scratch, give a self-contained treatment of the Beltrami equation, and cover the basic properties of Teichmüller spaces, including the Bers embedding and the Teichmüller curve. It is remarkable how Ahlfors goes straight to the heart of the matter, presenting major results with a minimum set of prerequisites. Many graduate students and other mathematicians have learned the foundations of the theories of quasiconformal mappings and Teichmüller spaces from these lecture notes.

This edition includes three new chapters. The first, written by Earle and Kra, describes further developments in the theory of Teichmüller spaces and provides many references to the vast literature on Teichmüller spaces and quasiconformal mappings. The second, by Shishikura, describes how quasiconformal mappings have revitalized the subject of complex dynamics. The third, by Hubbard, illustrates the role of these mappings in Thurston's theory of hyperbolic structures on 3-manifolds. Together, these three new chapters exhibit the continuing vitality and importance of the theory of quasiconformal mappings.

Contents: *Part 1*: Differentiable quasiconformal mappings; The general definition; Extremal geometric properties; Boundary correspondence; The mapping theorem; Teichmüller spaces; Editors' notes; *Part 2*: A supplement to Ahlfors's lectures; Complex dynamics and quasiconformal mappings; Hyperbolic structures on three-manifolds that fiber over the circle.

University Lecture Series, Volume 38

August 2006, approximately 156 pages, Softcover, ISBN 0-8218-3644-7, LC 2006040650, 2000 *Mathematics Subject Classification*: 30C62, 30Cxx, **All AMS members US$28**, List US$35, Order code ULECT/38



Bergman Spaces and Related Topics in Complex Analysis

Proceedings of a Conference in Honor of Boris Korenblum's 80th Birthday

Alexander Borichev, *Université Bordeaux I, Talence, Cedex, France*, **Håkan Hedenmalm**, *Royal Institute of Technology, Stockholm, Sweden*, and **Kehe Zhu**, *State University of New York at Albany, NY*, Editors

This volume grew out of a conference in honor of Boris Korenblum on the occasion of his 80th birthday, held in Barcelona, Spain, November 20–22, 2003. The book is of interest to researchers and graduate students working in the theory of spaces of analytic function, and, in particular, in the theory of Bergman spaces.

This book is copublished with Bar-Ilan University (Ramat-Gan, Israel).

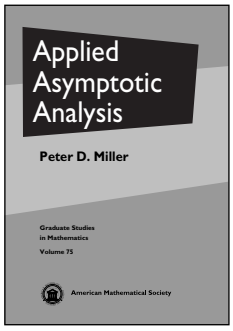
Contents: A. Aleman, **S. Richter**, and **C. Sundberg**, Invariant subspaces for the backward shift on Hilbert spaces of analytic functions with regular norm; **A. Atzmon** and **B. Brive**, Surjectivity and invariant subspaces of differential operators on weighted Bergman spaces of entire functions; **K. F. Barth** and **P. J. Rippon**, Exceptional values and the MacLane class $\mathcal{A}$; **O. Blasco**, Operators on weighted Bergman spaces; **A. Dahlner**, A Wiener Tauberian theorem for weighted convolution algebras of zonal functions on the automorphism group of the unit disc; **W. K. Hayman**, Domination on sets and in norm; **C. Horowitz** and **B. Pinchuk**, Extensions of the asymptotic maximum principle; **S. Jakobsson**, Singularity resolution of weighted Bergman kernels; **B. Korenblum**, Blaschke sets for Bergman spaces; **X. Massaneda** and **P. J. Thomas**, Phragmén-Lindelöf-type problems for $A^{-\alpha}$; **A. Olofsson**, A representation formula for reproducing subharmonic functions in the unit disc; **F. Pérez-González** and **J. C. Ramos**, On dominating sets for Bergman spaces; **S. Shimorin**, Trigonometric obstacle problem and weak factorization; **K. Zhu**, A sharp norm estimate of the Bergman projection on L^p spaces.

Contemporary Mathematics, Volume 404

July 2006, 205 pages, Softcover, ISBN 0-8218-3712-5, LC 2006040697, 2000 *Mathematics Subject Classification*: 30–06, 46E15, 32A36; 30D50, 30D55, **All AMS members US$55**, List US$69, Order code CONM/404

Differential Equations

COURSE ADOPTION



Applied Asymptotic Analysis

Peter D. Miller, *University of Michigan, Ann Arbor, MI*

This book is a survey of asymptotic methods set in the current applied research context of wave propagation. It stresses rigorous analysis in addition to formal manipulations. Asymptotic expansions developed in the text are justified rigorously, and students are shown how to obtain solid error estimates for asymptotic formulae. The book relates examples and exercises to subjects of current research interest, such as the problem of locating the zeros of Taylor polynomials of entire nonvanishing functions and the problem of counting integer lattice points in subsets of the plane with various geometrical properties of the boundary.

The book is intended for a beginning graduate course on asymptotic analysis in applied mathematics and is aimed at students of pure and applied mathematics as well as science and engineering. The basic prerequisite is a background in differential equations, linear algebra, advanced calculus, and complex variables at the level of introductory undergraduate courses on these subjects.

The book is ideally suited to the needs of a graduate student who, on the one hand, wants to learn basic applied mathematics, and on the other, wants to understand what is needed to make the various arguments rigorous. Down here in the Village, this is known as the Courant point of view!!

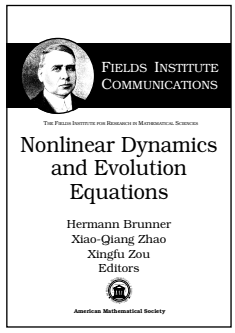
—***Percy Deift, Courant Institute, New York***

Peter D. Miller is an associate professor of mathematics at the University of Michigan at Ann Arbor. He earned a Ph.D. in Applied Mathematics from the University of Arizona and has held positions at the Australian National University (Canberra) and Monash University (Melbourne). His current research interests lie in singular limits for integrable systems.

Contents: *Fundamentals:* Themes of asymptotic analysis; The nature of asymptotic approximations; *Asymptotic analysis of exponential integrals:* Fundamental techniques for integrals; Laplace's method for asymptotic expansions of integrals; The method of steepest descents for asymptotic expansions of integrals; The method of stationary phase for asymptotic analysis of oscillatory integrals; *Asymptotic analysis of differential equations:* Asymptotic behavior of solutions of linear second-order differential equations in the complex plane; Introduction to asymptotics of solutions of ordinary differential equations with respect to parameters; Asymptotics of linear boundary-value problems; Asymptotics of oscillatory phenomena; Weakly nonlinear waves; Appendix: Fundamental inequalities; Bibliography; Index of names; Subject index.

Graduate Studies in Mathematics, Volume 75

July 2006, approximately 475 pages, Hardcover, ISBN 0-8218-4078-9, LC 2006040794, 2000 *Mathematics Subject Classification*: 34E05, 34E10, 34E13, 34E15, 34E20, 41A60, 74J30, 33–01, 81Q20, **All AMS members US$55**, List US$69, Order code GSM/75



Nonlinear Dynamics and Evolution Equations

Hermann Brunner and **Xiao-Qiang Zhao**, *Memorial University of Newfoundland, St. John's, NL, Canada*, and **Xingfu Zou**, *University of Western Ontario, London, ON, Canada*, Editors

The papers in this volume reflect a broad spectrum of current research activities on the theory and applications of nonlinear dynamics and evolution equations. They are based on lectures given during the International Conference on Nonlinear Dynamics and Evolution Equations at Memorial University of Newfoundland, St. John's, NL, Canada, July 6–10, 2004. This volume contains thirteen invited and refereed papers. Nine of these are survey papers, introducing the reader to, and describing the current state of the art in major areas of dynamical systems, ordinary, functional and partial differential equations, and applications of such equations in the mathematical modelling of various biological and physical phenomena. These papers are complemented by four research papers that examine particular problems in the theory and applications of dynamical systems.

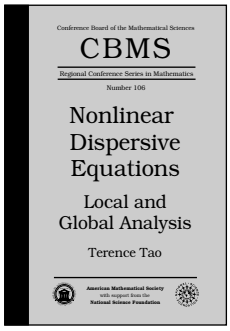
This item will also be of interest to those working in applications and geometry and topology.

Titles in this series are copublished with the Fields Institute for Research in Mathematical Sciences (Toronto, Ontario, Canada).

Contents: J. Arino and **P. van den Driessche**, Disease spread in metapopulations; **P. W. Bates**, On some nonlocal evolution equations arising in materials science; **W. Craig**, Invariant tori for Hamiltonian PDE; **N. Dancer**, Stable and not too unstable solutions on R^n for small diffusion; **Y. Du** and **J. Shi**, Some recent results on diffusive predator-prey models in spatially heterogeneous environment; **S. A. Gourley** and **J. Wu**, Delayed non-local diffusive systems in biological invasion and disease spread; **J. Jiang**, Asymptotic behavior for systems comparable to quasimonotone systems; **T. Krisztin**, C^1-smoothness of center manifolds for differential equations with state-dependent delay; **C. Rousseau**, Normal forms for germs of analytic families of planar vector fields unfolding a generic saddle-node or resonant saddle; **R. Saghin** and **Z. Xia**, Generic properties of symplectic diffeomorphisms; **B. D. Sleeman**, Mathematical aspects of modelling tumour angiogenesis; **G. S. K. Wolkowicz**, Interpretation of the generalized asymmetric May-Leonard model of three species competition as a food web in a chemostat; **Y. Yi** and **X. Zhang**, On exact Poisson structures.

Fields Institute Communications, Volume 48

June 2006, 311 pages, Hardcover, ISBN 0-8218-3721-4, LC 2006042831, 2000 *Mathematics Subject Classification*: 34C20, 34K05, 35B40, 35J55, 37C05, 37C65, 37K55, 53D17, 92D25, 92D30, **All AMS members US$87**, List US$109, Order code FIC/48



Nonlinear Dispersive Equations

Local and Global Analysis

Terence Tao, *University of California, Los Angeles, CA*

Among nonlinear PDEs, dispersive and wave equations form an important class of equations. These include the nonlinear Schrödinger equation, the nonlinear wave equation, the Korteweg de Vries equation, and the wave maps equation. This book is an introduction to the methods and results used in the modern analysis (both locally and globally in time) of the Cauchy problem for such equations.

Starting only with a basic knowledge of graduate real analysis and Fourier analysis, the text first presents basic nonlinear tools such as the bootstrap method and perturbation theory in the simpler context of nonlinear ODE, then introduces the harmonic analysis and geometric tools used to control linear dispersive PDE. These methods are then combined to study four model nonlinear dispersive equations. Through extensive exercises, diagrams, and informal discussion, the book gives a rigorous theoretical treatment of the material, the real-world intuition and heuristics that underlie the subject, as well as mentioning connections with other areas of PDE, harmonic analysis, and dynamical systems.

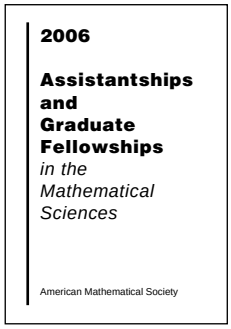
As the subject is vast, the book does not attempt to give a comprehensive survey of the field, but instead concentrates on a representative sample of results for a selected set of equations, ranging from the fundamental local and global existence theorems to very recent results, particularly focusing on the recent progress in understanding the evolution of energy-critical dispersive equations from large data. The book is suitable for a graduate course on nonlinear PDE.

Contents: Ordinary differential equations; Constant coefficient linear dispersive equations; Semilinear dispersive equations; The Korteweg de Vries equation; Energy-critical semilinear dispersive equations; Wave maps; Tools from harmonic analysis; Construction of ground states; Bibliography.

CBMS Regional Conference Series in Mathematics, Number 106

July 2006, 373 pages, Softcover, ISBN 0-8218-4143-2, LC 2006042820, 2000 *Mathematics Subject Classification*: 35Q53, 35Q55, 35L15, **All Individuals US$44**, List US$55, Order code CBMS/106

General and Interdisciplinary



Assistantships and Graduate Fellowships in the Mathematical Sciences 2006

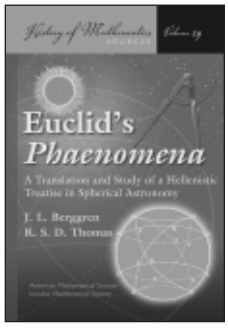
From a review of a previous edition:

This directory is a tool for undergraduate mathematics majors seeking information about graduate programs in mathematics. Although most of the information can be gleaned from the Internet, the usefulness of this directory for the prospective graduate student is the consistent format for comparing different mathematics graduate programs without the hype. Published annually, the information is up-to-date, which is more than can be said of some Websites. Support for graduate students in mathematics is a high priority of the American Mathematical Society, which also provides information for fellowships and grants they offer as well as support from other societies and foundations. The book is highly recommended for academic and public libraries.

—American Reference Books Annual

This valuable reference source brings together a wealth of information about resources available for graduate study in mathematical sciences departments in the U.S. and Canada.

November 2006, approximately 112 pages, Softcover, ISBN 0-8218-4152-1, **Individual member US$18**, List US$23, Order code ASST/2006



Euclid's *Phaenomena*

A Translation and Study of a Hellenistic Treatise in Spherical Astronomy

J. L. Berggren, *Simon Fraser University, Burnaby, BC, Canada*, and **R. S. D. Thomas**, *University of Manitoba, Winnipeg, Manitoba, Canada*

The book contains a translation and study of Euclid's *Phaenomena*, a work which once formed part of the mathematical training of astronomers from Central Asia to Western Europe. Included is an introduction that sets Euclid's geometry of the celestial sphere, and its application to the astronomy of his day, into its historical context for readers not already familiar with it. So no knowledge of astronomy or advanced mathematics is necessary for an understanding of the work. The book shows mathematical astronomy shortly before the invention of trigonometry, which allowed the calculation of exact results and the subsequent composition of Ptolemy's *Almagest*.

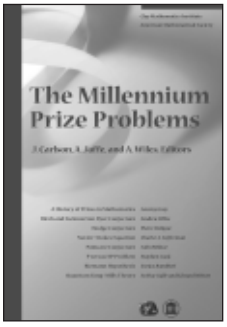
The *Phaenomena* itself begins with an introduction (possibly not by Euclid) followed by eighteen propositions set out in geometrical style about how arcs of the zodiacal circle move across the sky. The astronomical application is to the small arc of that circle occupied by the Sun, but the Sun is not mentioned. This work and the (roughly) contemporaneous treatises of Autolycus and Aristarchos form a corpus of the oldest extant works on mathematical astronomy. Together with Euclid's *Optics* one has the beginnings of the history of science as an application of mathematics.

Copublished with the London Mathematical Society beginning with Volume 4. Members of the LMS may order directly from the AMS at the AMS member price. The LMS is registered with the Charity Commissioners.

Contents: Introduction; Euclid's presuppositions; Notes on the translation; Sigla; *Euclid's* Phaenomena *translated with commentary:* Euclid's *Phaenomena*; English glossary of selected technical terms and phrases; Greek glossary of selected technical terms and phrases; Bibliography; Index of names; Index of subjects; Index of subjects (Greek).

History of Mathematics, Volume 29

June 2006, 132 pages, Softcover, ISBN 0-8218-4072-X, 2000 *Mathematics Subject Classification*: 01A20; 01A75, **All AMS members US$23**, List US$29, Order code HMATH/29



The Millennium Prize Problems

James Carlson, *Clay Mathematics Institute, Cambridge, MA*, **Arthur Jaffe**, *Harvard University, Cambridge, MA*, and **Andrew Wiles**, *Institute for Advanced Study, Princeton, NJ*, Editors

Guided by the premise that solving some of the world's most important mathematical problems will advance the field, this book offers a fascinating look at the seven unsolved Millennium Prize problems. This work takes the unprecedented approach of describing these important and difficult problems at the professional level.

In announcing the seven problems and a US$7 million prize fund in 2000, the Clay Mathematics Institute emphasized that mathematics still constitutes an open frontier with important unsolved problems. The descriptions in this book serve the Institute's mission to "further the beauty, power and universality of mathematical thinking."

Separate chapters are devoted to each of the seven problems: the Birch and Swinnerton-Dyer Conjecture, the Hodge Conjecture, the Navier–Stokes Equation, the **P** versus **NP** Problem, the Poincaré Conjecture, the Riemann Hypothesis, and Quantum Yang–Mills Theory.

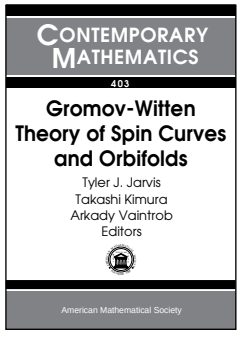
An essay by Jeremy Gray, a well-known expert in the history of mathematics, outlines the history of prize problems in mathematics and shows how some of mathematics' most important discoveries were first revealed in papers submitted for prizes. Numerous photographs of mathematicians who shaped mathematics as it is known today give the text a broad historical appeal. Anyone interested in mathematicians' continued efforts to solve important problems will be fascinated with this text, which places into context the historical dimension of important achievements.

A co-publication of the AMS and the Clay Mathematics Institute (Cambridge, MA).

Contents: J. Gray, A history of prizes in mathematics; **A. Wiles**, The Birch and Swinnerton-Dyer conjecture; **P. Deligne**, The Hodge conjecture; **C. L. Fefferman**, Existence and smoothness of the Navier–Stokes equation; **J. Milnor**, The Poincaré conjecture; **S. Cook**, The **P** versus **NP** problem; **E. Bombieri**, The Riemann hypothesis; **A. Jaffe** and **E. Witten**, Quantum Yang–Mills theory; Rules for the Millennium Prizes; Authors' biographies.

June 2006, 165 pages, Hardcover, ISBN 0-8218-3679-X, LC 2006044570, 2000 *Mathematics Subject Classification*: 00Bxx; 01Axx, 11G05, 14C30, 35Q30, 57R60, 03D15, 11M26, 81T13, **All AMS members US$23**, List US$29, Order code MPRIZE

Geometry and Topology



Gromov-Witten Theory of Spin Curves and Orbifolds

Tyler J. Jarvis, *Brigham Young University, Provo, UT*, **Takashi Kimura**, *Boston University, MA*, and **Arkady Vaintrob**, *University of Oregon, Eugene, OR*, Editors

This volume is a collection of articles on orbifolds, algebraic curves with higher spin structures, and related invariants of Gromov-Witten type. Orbifold Gromov-Witten theory generalizes quantum cohomology for orbifolds, whereas spin cohomological field theory is based on the moduli spaces of higher spin curves and is related by Witten's conjecture to the Gelfand-Dickey integrable hierarchies.

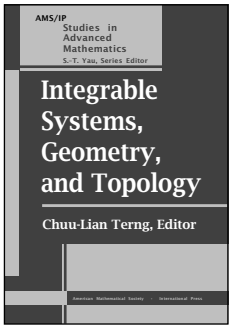
A common feature of these two very different looking theories is the central role played by orbicurves in both of them. Insights in one theory can often yield insights into the other. This book brings together for the first time papers related to both sides of this interaction. The articles in the collection cover diverse topics, such as geometry and topology of orbifolds, cohomological field theories, orbifold Gromov-Witten theory, G-Frobenius algebra and singularities, Frobenius manifolds and Givental's quantization formalism, moduli of higher spin curves and spin cohomological field theory.

Contents: A. Polishchuk, Moduli spaces of curves with effective r-spin structures; **A. Chiodo**, A construction of Witten's top Chern class in K-theory; **Y.-P. Lee**, Witten's conjecture and the Virasoro conjecture for genus up to two; **X. Liu**, Idempotents on the big phase space; **R. M. Kaufmann**, Singularities with symmetries, orbifold Frobenius algebras and mirror symmetry; **Y. Ruan**, The cohomology ring of crepant

resolutions of orbifolds; **E. Lupercio** and **B. Uribe**, Differential characters on orbifolds and string connections I: Global quotients; **J. Morava**, HKR characters and higher twisted sectors; **S. V. Shadrin**, Combinatorics of binomial decompositions of the simplest Hodge integrals; **J. Spencer**, The orbifold cohomology of the moduli of genus-two curves; List of participants and abstracts.

Contemporary Mathematics, Volume 403

July 2006, 189 pages, Softcover, ISBN 0-8218-3534-3, LC 2005057126, 2000 *Mathematics Subject Classification*: 14N35, 53D45, **All AMS members US$47**, List US$59, Order code CONM/403



Integrable Systems, Geometry, and Topology

Chuu-Lian Terng, Editor

The articles in this volume are based on lectures from a program on integrable systems and differential geometry held at Taiwan's National Center for Theoretical Sciences. As is well-known, for many soliton equations, the solutions have interpretations as differential geometric objects, and thereby techniques of soliton equations have been successfully applied to the study of geometric problems.

The article by Burstall gives a beautiful exposition on isothermic surfaces and their relations to integrable systems, and the two articles by Guest give an introduction to quantum cohomology, carry out explicit computations of the quantum cohomology of flag manifolds and Hirzebruch surfaces, and give a survey of Givental's quantum differential equations. The article by Heintze, Liu, and Olmos is on the theory of isoparametric submanifolds in an arbitrary Riemannian manifold, which is related to the n-wave equation when the ambient manifold is Euclidean. Mukai-Hidano and Ohnita present a survey on the moduli space of Yang-Mills-Higgs equations on Riemann surfaces. The article by Terng and Uhlenbeck explains the gauge equivalence of the matrix nonlinear Schrödinger equation, the Schrödinger flow on Grassmanian, and the Heisenberg Feromagnetic model.

The book provides an introduction to integrable systems and their relation to differential geometry. It is suitable for advanced graduate students and research mathematicians.

Titles in this series are copublished with International Press, Cambridge, MA.

This item will also be of interest to those working in discrete mathematics and combinatorics.

Contents: F. E. Burstall, Isothermic surfaces: Conformal geometry, Clifford algebras and integrable systems; **M. A. Guest**, Introduction to homological geometry: part I; **M. A. Guest**, Introduction to homological geometry: part II; **E. Heintze**, **X. Liu**, and **C. Olmos**, Isoparametric submanifolds and a Chevalley-type restriction theorem; **M. Mukai-Hidano** and **Y. Ohnita**, Gauge-Theoretic approach to harmonic maps and subspaces in moduli spaces; **C.-L. Terng** and **K. Uhlenbeck**, Schrödinger flows on Grassmannians.

AMS/IP Studies in Advanced Mathematics, Volume 36

May 2006, 256 pages, Softcover, ISBN 0-8218-4048-7, LC 2006040699, 2000 *Mathematics Subject Classification*: 14N35, 35Q58, 37K05, 37K25, 37K35, 53A05, 53C40, 53C43, 53D45, 58E20, **All AMS members US$47**, List US$59, Order code AMSIP/36

New AMS-Distributed Publications

Geometry and Topology

Feuilletages et actions de groupes sur les espaces projectifs

Julie Déserti and **Dominique Cerveau**, *Université de Rennes I, France*

A holomorphic foliation $\mathcal{F}$ on a compact complex manifold M is said to be an $\mathcal{L}$-foliation if there exists an action of a complex Lie group G such that the generic leaf of $\mathcal{F}$ coincides with the generic orbit of G. The book studies $\mathcal{L}$-foliations of codimension one, in particular in projective space, in the spirit of classical invariant theory, but here the invariants are sometimes transcendental ones. The book gives a list of examples and general properties. Some classification results are obtained in low dimensions.

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Contents: Introduction; L-feuilletages; Exemples de L-feuilletages; L-feuilletages de petits degrés sur C**P**(n) et compléments; L-feuilletages en dimension 3; L-feuilletages quadratiques; L-feuilletages de degré 3 en dimension 4; Bibliographie.

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La théorie de l'homotopie de Grothendieck

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The aim of this book is to explain the very beautiful homotopy theory developed by Grothendieck in "Pursuing Stacks". The question is to characterize categories of presheaves that modelize homotopy types, thus generalizing the theory of simplicial sets. The criteria discovered by Grothendieck show that there are pretty many such categories, called *elementary modelizers*. The book describes a categorical construction of left homotopy Kan extensions, generalizing a construction of homotopy colimits by Thomason. The book studies two remarkable classes of functors, *proper and smooth* functors, these two notions being mutually dual. These functors are characterized by cohomological properties inspired by the proper or smooth base change theorem in algebraic geometry.

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