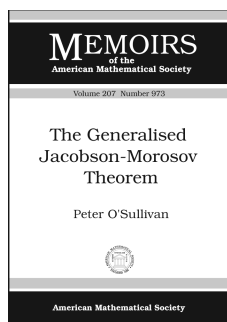


# New Publications Offered by the AMS

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## Algebra and Algebraic Geometry



### The Generalised Jacobson-Morosov Theorem

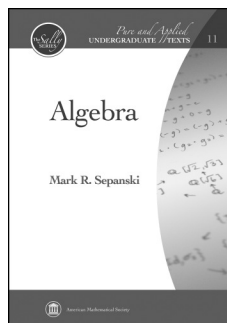
**Peter O'Sullivan**, *University of  
Sydney, NSW, Australia*

**Contents:** Introduction; Notation and terminology; Affine group schemes over a field of characteristic zero; Universal and minimal reductive homomorphisms; groups with action of a proreductive

group; Families of minimal reductive homomorphisms; Bibliography; Index.

**Memoirs of the American Mathematical Society**, Volume 207, Number 973

September 2010, 120 pages, Softcover, ISBN: 978-0-8218-4895-1, LC 2010022758, 2000 *Mathematics Subject Classification*: 20G15; 13A50, 14L30, **Individual member US\$41.40**, List US\$69, Institutional member US\$55.20, Order code MEMO/207/973



### Algebra

**Mark R. Sepanski**, *Baylor  
University, Waco, TX*

Mark Sepanski's *Algebra* is a readable introduction to the delightful world of modern algebra. Beginning with concrete examples from the study of integers and modular arithmetic, the text steadily familiarizes the reader with greater levels of abstraction as it moves through the study of groups, rings, and fields. The

book is equipped with over 750 exercises suitable for many levels of student ability. There are standard problems, as well as challenging exercises, that introduce students to topics not normally covered in a first course. Difficult problems are broken into manageable subproblems and come equipped with hints when

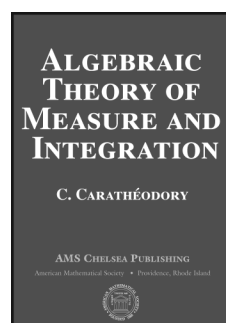
needed. Appropriate for both self-study and the classroom, the material is efficiently arranged so that milestones such as the Sylow theorems and Galois theory can be reached in one semester.

**Contents:** Arithmetic; Groups; Rings; Field theory; Index.

**Pure and Applied Undergraduate Texts**, Volume 11

November 2010, approximately 264 pages, Hardcover, ISBN: 978-0-8218-5294-1, LC 2010022789, 2000 *Mathematics Subject Classification*: 00-01; 20-01, 12-01, 13-01, 16-01, **AMS members US\$49.60**, List US\$62, Order code AMSTEXT/11

## Analysis



### Algebraic Theory of Measure and Integration

Second English Edition

**C. Carathéodory**

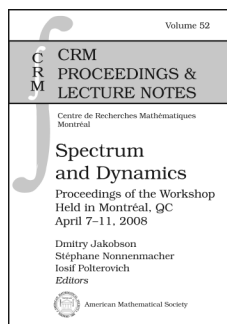
By generalizing the concept of point function to that of a function ("soma" function) over a Boolean ring, Carathéodory gives in this book an elegant algebraic treatment of measure and integration.

**Contents:** Somas: 1.1-2 The axiomatic method; 1.3-7 Elementary theory of somas; 1.8-13 Somas as elements of a Boolean algebra; 1.14-16 The main properties of the union; 1.17-22 The decomposability of somas; 1.23-24 The intersection of an infinite number of somas; 1.25-32 Limits and bounds; Sets of Somas: 2.33-40 Sets of somas closed under a binary operation; 2.41-46 Complete rings; 2.47-53 Ordinal numbers of the second class; 2.54-55 Hereditary sets of somas; 2.56-64 Homomorphisms of rings of somas; Place Functions: 3.65-68 Finitely-valued place functions; 3.69-75 Nests of somas; 3.76-79 Altering the domain of definition; 3.80-88 Principal properties of the soma functions  $\alpha(X)$  and  $\beta(X)$ ; Calculation with Place Functions: 4.89-94 Limit processes; 4.95-106 Elementary operations on place functions; 4.107-110 Uniform and absolute convergence; 4.111-117 Composition of place functions; 4.118-125 Homomorphisms of place functions; Measure Functions: 5.126-128 Additive and union-bounded soma functions; 5.129-130 Measurability; 5.131-135 Measure functions; 5.136-140

The measure function on its ring of measurability; 5.141-143 Sequences of measure functions and their limits; 5.144-147 Transformation of measure functions by homomorphisms; 5.148-153 The Borel-Lebesgue content; The Integral: 6.154 Fields of place functions; Measurable place functions; 6.155-162 The notion of the integral; 6.163-166 Linearity of the integral and the integration of place functions of arbitrary sign; 6.167-172 Comparable measure functions and the Lebesgue decomposition; 6.173-175 Abstract differentials; 6.176-177 The absolute continuity of two comparable measure functions; 6.178-180 Transformation of the integral by means of homomorphisms; Application of the Theory of Integration to Limit Processes: 7.181-183 The theorem of Egoroff; 7.184-189 Continuity of the integral as a functional; 7.190-197 Convergence in the mean; 7.198-205 Ergodic theory; The Computation of Measure Functions: 8.206-210 Maximal measure functions; 8.211-215 The bases of an arbitrary measure function; 8.216-221 Relative measurability; Regular Measure Functions: 9.222-224 The definition and principal properties of regular measure functions; 9.225-229 Inner measure; 9.230-235 Comparison of inner and outer measures; 9.236-240 The arithmetic mean of the inner and outer measures; Isotypic Regular Measure Functions: 10.241-244 The principal properties of isotypic measure functions; 10.245-248 The Jordan decomposition of completely additive soma functions; 10.249-255 The difference of two isotypic regular measure functions; 10.256-257 Comparable outer measures; Content Functions: 11.258-259 The definition of content functions; 11.260-267 Reduced content functions and their homomorphisms; 11.268-271 The Jessen infinite-dimensional torus; 11.272-278 The Vitali covering theorem; 11.279-282 The Lebesgue integral; 11.283-284 Comparable content functions; 11.285-289 Linear measure; Appendix: Somas as elements of partially ordered sets: 12.290-297 A new axiom system for somas; 12.298-302 The partitioning of a set into classes; 12.303-304 Partially ordered sets; 12.305-308 Applications to the theory of somas; 12.309-312 Systems of somas that are not isomorphic to systems of subsets of a set; Bibliography: Earlier publications by Constantin Carathéodory on the algebraization of measure and integral; List of symbols; Index.

AMS Chelsea Publishing, Volume 161

November 2010, 378 pages, Hardcover, ISBN: 978-0-8218-5273-6, LC 63-13094, 2000 *Mathematics Subject Classification*: 28-01, **AMS members US\$45**, List US\$50, Order code CHEL/161.H



## Spectrum and Dynamics

Proceedings of the Workshop Held in Montréal, QC, April 7-11, 2008

**Dmitry Jakobson**, *McGill University, Montréal, QC, Canada*, **Stéphane Nonnenmacher**, *CEA-Saclay, Gif-sur-Yvette, France*, and **Iosif Polterovich**, *Université de Montréal, QC, Canada*, Editors

This volume contains a collection of papers presented at the workshop on Spectrum and Dynamics held at the CRM in April

2008. In recent years, many new exciting connections have been established between the spectral theory of elliptic operators and the theory of dynamical systems. A number of articles in the proceedings highlight these discoveries. The volume features a diversity of topics, such as quantum chaos, spectral geometry, semiclassical analysis, number theory and ergodic theory. Apart from the research papers aimed at the experts, this book includes several survey articles accessible to a broad mathematical audience.

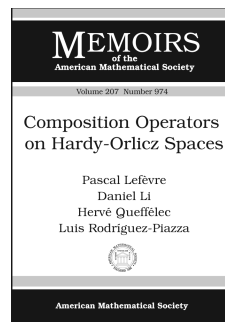
*This item will also be of interest to those working in differential equations.*

Titles in this series are co-published with the Centre de Recherches Mathématiques.

**Contents:** **S. Nonnenmacher**, Notes on the minicourse "Entropy of chaotic eigenstates"; **A. Strohmaier**, Geometry of the high energy limit on differential operators on vector bundles; **Y. A. Kordyukov**, Classical and quantum dynamics in transverse geometry of Riemannian foliations; **L. Hillairet**, Eigenvalue variations and semiclassical concentration; **H. Lapointe**, A remainder estimate for Weyl's law on Liouville tori; **H. Donnelly**, Embedding eigenvalues for Cartan-Hadamard manifolds; **B. Helffer** and **T. Hoffmann-Ostenhof**, On minimal partitions: New properties and applications to the disk; **M. Pollicott**, Asymptotic vertex growth for graphs; **D. Mayer** and **T. Mühlenbruch**, Nearest  $\lambda_q$ -multiple fractions; **R. Sharp**, Comparing length functions on free groups.

CRM Proceedings & Lecture Notes, Volume 52

August 2010, 207 pages, Softcover, ISBN: 978-0-8218-4778-7, LC 2010020469, 2000 *Mathematics Subject Classification*: 58Jxx, 37Dxx; 35Pxx, **AMS members US\$79.20**, List US\$99, Order code CRMP/52



## Composition Operators on Hardy-Orlicz Spaces

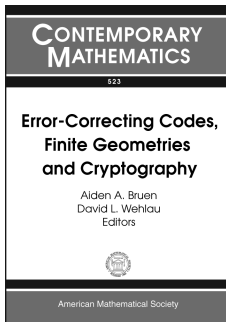
**Pascal Lefèvre** and **Daniel Li**, *Université d'Artois, Lens, France*, **Hervé Queffélec**, *Université des Sciences et Technologies de Lille, Villeneuve d'Ascq, France*, and **Luis Rodríguez-Piazza**, *Universidad de Sevilla, Spain*

**Contents:** Introduction; Notation; Composition operators on Hardy-Orlicz spaces; Carleson measures; Bergman spaces; References.

*Memoirs of the American Mathematical Society*, Volume 207, Number 974

September 2010, 74 pages, Softcover, ISBN: 978-0-8218-4637-7, LC 2010022778, 2000 *Mathematics Subject Classification*: 47B33, 46E30, **Individual member US\$38.40**, List US\$64, Institutional member US\$51.20, Order code MEMO/207/974

# Applications



## Error-Correcting Codes, Finite Geometries and Cryptography

**Aiden A. Bruen**, *University of Calgary, AB, Canada*, and **David L. Wehlau**, *Royal Military College of Canada, Kingston, ON, Canada*, Editors

This interdisciplinary volume contains papers from both a conference and special session on Error-Control Codes, Information Theory and Applied Cryptography. The conference was held at the Fields Institute in Toronto, ON, Canada from December 5–6, 2007, and the special session was held at the Canadian Mathematical Society's winter meeting in London, ON, Canada from December 8–10, 2007.

The volume features cutting-edge theoretical results on the Reed–Muller and Reed–Solomon codes, classical linear codes, codes from nets and block designs, LDPC codes, perfect quantum and orthogonal codes, iterative decoding, magnetic storage and digital memory devices, and MIMO channels. There are new contributions on privacy reconciliation, resilient functions, cryptographic hash functions, and new work on quantum coins. Related original work in finite geometries concerns two-weight codes coming from partial spreads,  $(0,1)$  matrices with forbidden configurations, André embeddings, and representations of projective spaces in affine planes.

Great care has been taken to ensure that high expository standards are met by the papers in this volume. Accordingly, the papers are written in a user-friendly format. The hope is that this volume will be of interest and of benefit both to the experienced and to newcomers alike.

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

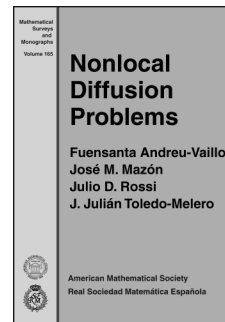
**Contents:** *Cryptography:* C. J. Colbourn and J. Torres-Jimenez, Heterogeneous hash families and covering arrays; W. J. Martin and B. Sunar, Resilient functions: Just how resilient are they?; M. Mosca and D. Stebila, Quantum coins; J. R. Oldford and D. L. Wehlau, Optimal block lengths for secret key distillation; *Finite geometries:* T. L. Alderson, Hyperconics and multiple weight codes for OCDMA; A. A. Bruen, Blocking sets and large transversal-free systems of mutually orthogonal Latin squares; A. A. Bruen, T. C. Bruen, and R. Silverman, Incidence matrices with forbidden configurations; M. Iurlo and S. Rajola, A new method to construct maximal partial spreads of smallest size in  $PG(3, q)$ ; M. S. Tallini, A representation of the projective space  $P(r, k)$  on the affine plane  $A(2, k)$  and the geometric equivalence between the Veblen configuration in  $P(3, k)$  and the Desargues configuration in  $A(2, k)$ ; J. A. Thas and H. Van Maldeghem, André embeddings of affine planes; *Codes:* A. Barg and P. Purkayastha, Near MDS poset codes and distributions; J. Bierbrauer, D. Bartoli, S. Marcugini, and F. Pambianco, Geometric constructions of quantum codes; A. Bogatyrev, M. Hassner, and D. Yarmolich, An exact analytical-expression for the read sensor signal in magnetic data storage channels; A. A. Bruen, Blocking sets and low-weight codewords in the

generalized Reed–Muller codes; V. C. Gaudet, Low-power LDPC decoding by exploiting the fault-tolerance of the sum-product algorithm; O. Heden, On perfect codes over non prime power alphabets; M. Lavrauw, L. Storme, and G. Van de Voorde, Linear codes from projective spaces; T. P. McDonough and V. C. Mavron, The dimension of the code of a strongly resolvable design; G. E. Moorhouse, Codes of nets and projective planes; C. Schlegel, Minimum output symbol error variance of forward error control codes; D. Truhachev and M. Rahbari, Multi-stream information transmission in random power attenuation environments.

**Contemporary Mathematics**, Volume 523

October 2010, 244 pages, Softcover, ISBN: 978-0-8218-4956-9, LC 2010013261, 2000 *Mathematics Subject Classification:* 05B25, 94B05, 94A60, 94B25, 05B15, 51E14, 81P94, 68W35, 94B35, 94A05, **AMS members US\$63.20**, List US\$79, Order code CONM/523

# Differential Equations



## Nonlocal Diffusion Problems

**Fuensanta Andreu-Vaillo**, **José M. Mazón**, *Universitat de València, Spain*, **Julio D. Rossi**, *Universidad de Alicante, Spain*, and **J. Julián Toledo-Melero**, *Universitat de València, Spain*

Nonlocal diffusion problems arise in a wide variety of applications, including biology, image processing, particle systems, coagulation models, and mathematical finance. These types of problems are also of great interest for their purely mathematical content.

This book presents recent results on nonlocal evolution equations with different boundary conditions, starting with the linear theory and moving to nonlinear cases, including two nonlocal models for the evolution of sandpiles. Both existence and uniqueness of solutions are considered, as well as their asymptotic behaviour. Moreover, the authors present results concerning limits of solutions of the nonlocal equations as a rescaling parameter tends to zero. With these limit procedures the most frequently used diffusion models are recovered: the heat equation, the  $p$ -Laplacian evolution equation, the porous media equation, the total variation flow, a convection-diffusion equation and the local models for the evolution of sandpiles due to Aronsson-Evans-Wu and Prigozhin.

Readers are assumed to be familiar with the basic concepts and techniques of functional analysis and partial differential equations. The text is otherwise self-contained, with the exposition emphasizing an intuitive understanding and results given with full proofs. It is suitable for graduate students or researchers.

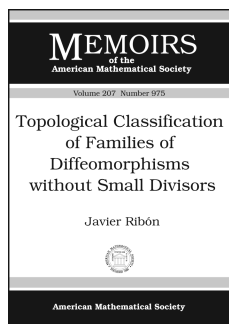
The authors cover a subject that has received a great deal of attention in recent years. The book is intended as a reference tool for a general audience in analysis and PDEs, including mathematicians, engineers, physicists, biologists, and others interested in nonlocal diffusion problems.

**Contents:** The Cauchy problem for linear nonlocal diffusion; The Dirichlet problem for linear nonlocal diffusion; The Neumann problem for linear nonlocal diffusion; A nonlocal convection

diffusion problem; The Neumann problem for a nonlocal nonlinear diffusion equation; Nonlocal  $p$ -Laplacian evolution problems; The nonlocal total variation flow; Nonlocal models for sandpiles; Nonlinear semigroups; Bibliography; Index.

**Mathematical Surveys and Monographs, Volume 165**

October 2010, approximately 264 pages, Hardcover, ISBN: 978-0-8218-5230-9, LC 2010020473, 2000 *Mathematics Subject Classification*: 45E10, 45A05, 45G10, 47H20, 45M05, 35K05, 35K55, 35K57, 35K92, **AMS members US\$65.60**, List US\$82, Order code SURV/165



## Topological Classification of Families of Diffeomorphisms without Small Divisors

**Javier Ribón**, *University Federal Fluminense, Centro, Niterói, Brazil*

**Contents:** Outline of the monograph; Flower type vector fields; A clockwork orange; The T-sets; The long limits; Topological conjugation of (NSD) vector fields; Families of diffeomorphisms without small divisors; Topological invariants of (NSD) diffeomorphisms; Tangential conjugations; List of notations; Bibliography; Index.

**Memoirs of the American Mathematical Society**, Volume 207, Number 975

September 2010, 166 pages, Softcover, ISBN: 978-0-8218-4748-0, LC 2010022791, 2000 *Mathematics Subject Classification*: 37C15, 37F45, 37G10; 37F75, 37G05, **Individual member US\$46.20**, List US\$77, Institutional member US\$61.60, Order code MEMO/207/975

pure and applied mathematics. Approximately fifteen hundred mathematicians participated in the Congress.

Included in this volume are the complete Morningside Lectures, the complete plenary lectures, and selected invited lectures.

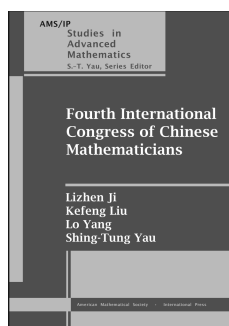
Titles in this series are co-published with International Press, Cambridge, MA.

**Contents:** *Morningside lectures:* **J. Coates**, Number theory, ancient and modern; **C. Procesi**, Partition functions and box-spline; **C. Voisin**, Cohomology algebras in symplectic, Kähler and algebraic geometry; *Plenary lectures:* **R. Bhatia**, Calculus of operator functions; **I. Biswas**, Torelli for some moduli spaces; **Z. Chen** and **X. Wu**, The adaptive PML method for acoustic wave scattering problems; **A. Futaki**, Toric Sasaki-Einstein geometry; **L. Ji**, Arithmetic groups, mapping class groups, related groups, and their associated spaces; **D. Jiang**, On some topics in automorphic representations; **F. Luo**, Rigidity of polyhedral surfaces; **T. Mabuchi**, An affine sphere equation associated to Einstein toric surfaces; **G. Prasad** and **A.S. Rapinchuk**, Number-theoretic techniques in the theory of Lie groups and differential geometry; **R. Sujatha**, Local-global principles; **R. G. Swan**, The flabby class group of a finite cyclic group; **J. Xiao** and **F. Xu**, Green's formula in Hall algebras and cluster algebras; **X.-P. Zhu**, The Ricci flow and geometrization of three-manifolds; *Three lectures by Chinese women mathematicians:* **F. Chung**, Four proofs for the Cheeger inequality and graph partition algorithms; **W.-C. W. Li**, Zeta functions in combinatorics and number theory; **C.-L. Terng**, Soliton hierarchies constructed from involutions.

**AMS/IP Studies in Advanced Mathematics, Volume 48**

September 2010, 381 pages, Softcover, ISBN: 978-0-8218-5021-3, LC 2010019768, 2000 *Mathematics Subject Classification*: 00Bxx, 05-XX, 08-XX, 11-XX, 14-XX, 22-XX, 35-XX, 37-XX, 80-XX, **AMS members US\$88**, List US\$110, Order code AMSIP/48

## General Interest



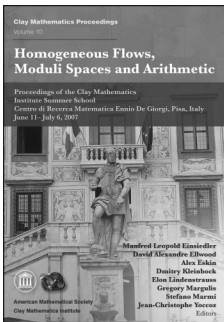
## Fourth International Congress of Chinese Mathematicians

**Lizhen Ji**, *University of Michigan, Ann Arbor, MI*, **Kefeng Liu**, *University of California, Los Angeles, CA*, **Lo Yang**, *Chinese Academy of Sciences, Beijing, China*, and **Shing-Tung Yau**, *Harvard University, Cambridge, MA*, Editors

This volume represents selected proceedings of the Fourth International Congress of Chinese Mathematicians, held in Hangzhou, China. The Congress brought together eminent Chinese and overseas mathematicians to discuss the latest developments in



# Geometry and Topology



## Homogeneous Flows, Moduli Spaces and Arithmetic

**Manfred Leopold Einsiedler**, *ETH, Zurich, Switzerland*,  
**David Alexandre Ellwood**, *Clay Mathematics Institute, Cambridge, MA*,  
**Alex Eskin**, *University of Chicago, IL*,  
**Dmitry Kleinbock**, *Brandeis University, Waltham, MA*,  
**Elon Lindenstrauss**, *The Hebrew University of Jerusalem, Israel*,  
**Gregory Margulis**, *Yale University, New Haven, CT*,  
**Stefano Marmi**, *Scuola Normale Superiore di Pisa, Italy*, and  
**Jean-Christophe Yoccoz**, *College de France, Paris, France*, Editors

This book contains a wealth of material concerning two very active and interconnected directions of current research at the interface of dynamics, number theory and geometry. Examples of the dynamics considered are the action of subgroups of  $SL(n, \mathbb{R})$  on the space of unit volume lattices in  $\mathbb{R}^n$  and the action of  $SL(2, \mathbb{R})$  or its subgroups on moduli spaces of flat structures with prescribed singularities on a surface of genus  $\geq 2$ .

Topics covered include the following:

- (a) Unipotent flows: non-divergence, the classification of invariant measures, equidistribution, orbit closures.
- (b) Actions of higher rank diagonalizable groups and their invariant measures, including entropy theory for such actions.
- (c) Interval exchange maps and their connections to translation surfaces, ergodicity and mixing of the Teichmüller geodesic flow, dynamics of rational billiards.
- (d) Application of homogeneous flows to arithmetic, including applications to the distribution of values of indefinite quadratic forms at integral points, metric Diophantine approximation, simultaneous Diophantine approximations, counting of integral and rational points on homogeneous varieties.
- (e) Eigenfunctions of the Laplacian, entropy of quantum limits, and arithmetic quantum unique ergodicity.
- (f) Connections between equidistribution and automorphic forms and their  $L$ -functions.

The text includes comprehensive introductions to the state-of-the-art in these important areas and several surveys of more advanced topics, including complete proofs of many of the fundamental theorems on the subject. It is intended for graduate students and researchers wishing to study these fields either for their own sake or as tools to be applied in a variety of fields such as arithmetic, Diophantine approximations, billiards, etc.

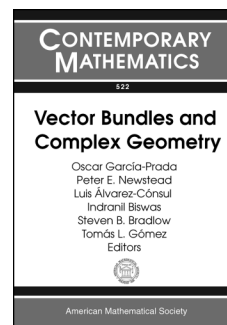
*This item will also be of interest to those working in number theory.*

Titles in this series are co-published with the Clay Mathematics Institute (Cambridge, MA).

**Contents:** J.-C. Yoccoz, Interval exchange maps and translation surfaces; A. Eskin, Unipotent flows and applications; D. Kleinbock, Quantitative nondivergence and its Diophantine applications; M. Einsiedler and E. Lindenstrauss, Diagonal actions on locally homogeneous spaces; S. Katok, Fuchsian groups, geodesic flows on surfaces of constant negative curvature and symbolic coding of geodesics; A. Avila, Chaoticity of the Teichmüller flow; H. Oh, Orbital counting via mixing and unipotent flows; G. Harcos, Equidistribution on the modular surface and  $L$ -functions; N. Anantharaman, Eigenfunctions of the Laplacian on negatively curved manifolds: A semiclassical approach.

**Clay Mathematics Proceedings, Volume 10**

September 2010, approximately 440 pages, Softcover, ISBN: 978-0-8218-4742-8, LC 2010021098, 2000 *Mathematics Subject Classification*: 37A17, 37A45, 37A35, 37C85, 37D40, 37E05, 11J13, 11J83, 58J51, 81Q50, **AMS members US\$79.20**, List US\$99, Order code CMIP/10



## Vector Bundles and Complex Geometry

**Oscar García-Prada**, *Consejo Superior de Investigaciones Científicas, Madrid, Spain*,  
**Peter E. Newstead**, *University of Liverpool, United Kingdom*,  
**Luis Álvarez-Cónsul**, *Consejo Superior de Investigaciones Científicas, Madrid, Spain*,  
**Indranil Biswas**, *Tata Institute of Fundamental Research, Mumbai, India*,  
**Steven B. Bradlow**, *University of Illinois at Urbana-Champaign, IL*, and  
**Tomás L. Gómez**, *Consejo Superior de Investigaciones Científicas, Madrid, Spain*, Editors

This volume contains a collection of papers from the Conference on Vector Bundles held at Miraflores de la Sierra, Madrid, Spain on June 16–20, 2008, which honored S. Ramanan on his 70th birthday.

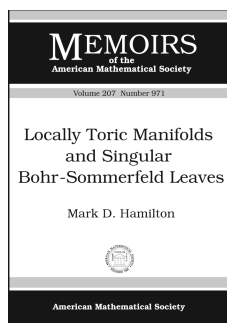
The main areas covered in this volume are vector bundles, parabolic bundles, abelian varieties, Hilbert schemes, contact structures, index theory, Hodge theory, and geometric invariant theory. Professor Ramanan has made important contributions in all of these areas.

**Contents:** M. S. Narasimhan, The work of S. Ramanan; V. Balaji and A. Dey, Parabolic bundles on algebraic surfaces II—Irreducibility of the moduli space; A. Beauville, Finite subgroups of  $PGL_2(K)$ ; U. N. Bhosle, Picard groups of moduli spaces of torsionfree sheaves on curves; U. N. Bhosle, On the moduli of orthogonal bundles on a nodal hyperelliptic curve; A. Hirschowitz and J. NN Iyer, Hilbert schemes of fat  $r$ -planes and the triviality of Chow groups of complete intersections; N. Hitchin, Vector bundles and the icosahedron; K. Hulek and O. Tommasi, Cohomology of the

toroidal compactification of  $\mathcal{A}_3$ ; **J.-M. Hwang** and **L. Manivel**, Quasi-complete homogeneous contact manifold associated to a cubic form; **I. Mundet i Riera** and **A. Schmitt**, Maximal weights in Kähler geometry: Flag manifolds and Tits distance (with an Appendix by A. Schmitt); **C. Pauly**, Orthogonal bundles over curves in characteristic two; **M. S. Raghunathan**, The Atiyah-Singer index theorem; **T. R. Ramadas**, Spin(7) instantons and the Hodge conjecture for certain abelian four-folds: A modest proposal; **C. S. Seshadri**, Remarks on parabolic structures; **C. Simpson**, Iterated destabilizing modifications for vector bundles with connection.

**Contemporary Mathematics**, Volume 522

October 2010, 206 pages, Softcover, ISBN: 978-0-8218-4750-3, LC 2010011114, 2000 *Mathematics Subject Classification*: 14H60, 14D20, 20G15, 14D07, 14D22, 58J20, 14C30, 14J60, **AMS members US\$55.20**, List US\$69, Order code CONM/522



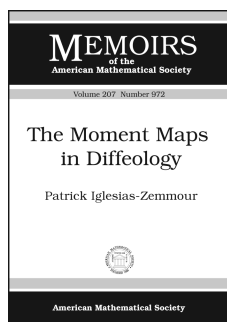
## Locally Toric Manifolds and Singular Bohr-Sommerfeld Leaves

**Mark D. Hamilton**, *University of Toronto, ON, Canada*

**Contents:** Introduction; Background; The cylinder; The complex plane; Example:  $S^2$ ; The multidimensional case; A better way to calculate cohomology; Piecing and glueing; Real and Kähler polarizations compared; Bibliography.

**Memoirs of the American Mathematical Society**, Volume 207, Number 971

September 2010, 60 pages, Softcover, ISBN: 978-0-8218-4714-5, LC 2010022712, 2000 *Mathematics Subject Classification*: 53D50, **Individual member US\$34.80**, List US\$58, Institutional member US\$46.40, Order code MEMO/207/971



## The Moment Maps in Diffeology

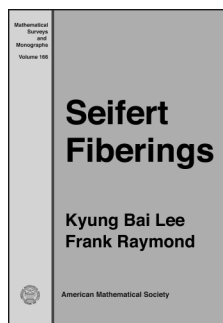
**Patrick Iglesias-Zemmour**, *CNRS, Marseille, France*

**Contents:** Introduction; Few words about diffeology; Diffeological groups and momenta; The paths moment map; The 2-points moment map; The moment maps; The moment maps for exact 2-forms; Functoriality of the moment maps; The

universal moment maps; About symplectic manifolds; The homogeneous case; Examples of moment maps in diffeology; Bibliography.

**Memoirs of the American Mathematical Society**, Volume 207, Number 972

September 2010, 72 pages, Softcover, ISBN: 978-0-8218-4709-1, LC 2010022756, 2000 *Mathematics Subject Classification*: 53C99, 53D30, 53D20, **Individual member US\$38.40**, List US\$64, Institutional member US\$51.20, Order code MEMO/207/972



## Seifert Fiberings

**Kyung Bai Lee**, *University of Oklahoma, Norman, OK*, and **Frank Raymond**, *University of Michigan, Ann Arbor, MI*

Seifert fiberings extend the notion of fiber bundle mappings by allowing some of the fibers to be singular. Away from the singular fibers, the fibering is an ordinary bundle with fiber a fixed homogeneous

space. The singular fibers are quotients of this homogeneous space by distinguished groups of homeomorphisms. These fiberings are ubiquitous and important in mathematics. This book describes in a unified way their structure, how they arise, and how they are classified and used in applications. Manifolds possessing such fiber structures are discussed and range from the classical three-dimensional Seifert manifolds to higher dimensional analogues encompassing, for example, flat manifolds, infra-nil-manifolds, space forms, and their moduli spaces. The necessary tools not covered in basic graduate courses are treated in considerable detail. These include transformation groups, cohomology of groups, and needed Lie theory. Inclusion of the Bieberbach theorems, existence, uniqueness, and rigidity of Seifert fiberings, aspherical manifolds, symmetric spaces, toral rank of spherical space forms, equivariant cohomology, polynomial structures on solv-manifolds, fixed point theory, and other examples, exercises and applications attest to the breadth of these fiberings. This is the first time the scattered literature on singular fiberings is brought together in a unified approach. The new methods and tools employed should be valuable to researchers and students interested in geometry and topology.

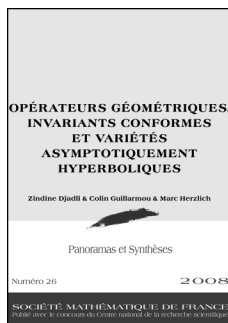
**Contents:** Introduction; Transformation groups; Group actions and the fundamental group; Actions of compact Lie groups on manifolds; Definition of Seifert fibering; Group cohomology; Lie groups; Seifert fiber space construction for  $G \times W$ ; Generalization of Bieberbach's theorems; Seifert manifolds with  $\Gamma \backslash G/K$ -fiber; Locally injective Seifert fiberings with torus fibers; Applications; Seifert fiberings with compact connected  $Q$ ; Deformation spaces;  $S^1$ -actions on 3-dimensional manifolds; Classification of Seifert 3-manifolds via equivariant cohomology; Bibliography; Index.

**Mathematical Surveys and Monographs**, Volume 166

October 2010, approximately 411 pages, Hardcover, ISBN: 978-0-8218-5231-6, 2000 *Mathematics Subject Classification*: 55R55, 57S30, 57-XX; 53C30, 55R91, 58E40, 58D19, 57N16, **AMS members US\$79.20**, List US\$99, Order code SURV/166

# New AMS-Distributed Publications

## Algebra and Algebraic Geometry



### Opérateurs Géométriques, Invariants Conformes et Variétés Asymptotiquement Hyperboliques

**Zindine Djadli**, *Université Grenoble I, St. Martin d'Herès, France*, **Colin Guillarmou**, *Université de Nice-Sophia Antipolis, France*, and **Marc Herzlich**, *Université Montpellier II, France*

In 1985, Fefferman and Graham initiated an ambitious program of study of conformal geometry known as the “ambient metric” method. This program has developed tremendously in the last few years, leading to the definition of a number of new invariants: Graham-Jenne-Mason-Sparling (GJMS) operators generalizing the Yamabe and Paneitz operators, Branson  $Q$ -curvatures ... and to remarkable applications to conformally flat manifolds of dimension 4 and nonnegative Euler characteristic, or to conformally invariant pinching theorems. An essential role is played in the theory by asymptotically hyperbolic Einstein metrics (or Poincaré-Einstein metrics) associated to a conformal class.

This book is devoted to a presentation of the theory together with a description of the latest developments. It should be accessible to all readers having a basic knowledge of Riemannian geometry.

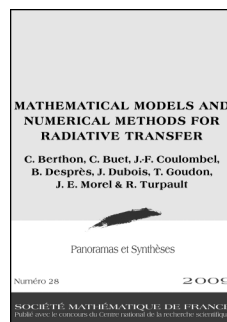
A publication of the Société Mathématique de France, Marseilles (SMF), distributed by the AMS in the U.S., Canada, and Mexico. Orders from other countries should be sent to the SMF. Members of the SMF receive a 30% discount from list.

**Contents:** Introduction; Métriques AHE et ambiantes; Premières applications; Intégrales renormalisées; Théorie de la diffusion; Laplaciens conformes et  $Q$ -courbure; Fonctionnelle log-déterminant,  $Q$ -courbure et applications en dimension 4; Variétés riemanniennes mesurées; La métrique ambiante et le fibré de Cartan; Déterminants des opérateurs GJMS et fonctions Zêta; Bibliographie.

**Panoramas et Synthèses**, Number 26

May 2010, 171 pages, Softcover, ISBN: 978-2-85629-260-0, 2000 *Mathematics Subject Classification*: 58J05, 58J50, **Individual member US\$49.50**, List US\$55, Order code PASY/26

## Differential Equations



### Mathematical Models and Numerical Methods for Radiative Transfer

**C. Berthon**, *Université de Nantes, France*, **C. Buet**, *CEA/DAM Ile de France, Bruyères-Le-Châtel, France*, **J.-F. Coulombel**, *CNRS, Villeneuve d'Ascq, France*, **B. Després**, *Université Paris VI, France*, **J. Dubois**, *CEA-CESTA, Le Barp, France*, **T. Goudon**, *INRIA Lille Nord Europe, Villeneuve d'Ascq, France*, **J. E. Morel**, *Texas A & M University, College Station, TX*, and **R. Turpault**, *Université de Nantes, France*

Radiative transfer phenomena arise in many applications ranging from astrophysics to photon beam radiotherapy. This volume describes some aspects of modern radiative transfer theory, dealing with models where the transport equation for the radiative energy is coupled to hydrodynamic systems. The discussion is specifically oriented to the design of dedicated efficient numerical methods. In particular, details are given on asymptotic regimes and asymptotic models that lead to diffusion approximations, intermediate models such as the  $M_1$  model based on an entropy minimization closure, and the analysis of shock profiles in radiative hydrodynamics.

*This item will also be of interest to those working in applications.*

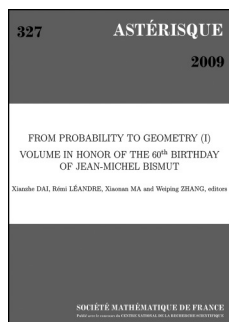
A publication of the Société Mathématique de France, Marseilles (SMF), distributed by the AMS in the U.S., Canada, and Mexico. Orders from other countries should be sent to the SMF. Members of the SMF receive a 30% discount from list.

**Contents:** **B. Després** and **C. Buet**, Grey radiative hydrodynamics—Hierarchy of models and numerical approximation; **J. E. Morel**, Discrete-ordinates transport methods for non-relativistic radiation-hydrodynamics; **C. Berthon**, **J. Dubois**, and **R. Turpault**, Numerical approximation of the  $M_1$ -model; **J.-F. Coulombel** and **T. Goudon**, Shock profiles in radiative hydrodynamics.

**Panoramas et Synthèses**, Number 28

May 2010, 108 pages, Softcover, ISBN: 978-2-85629-274-7, 2000 *Mathematics Subject Classification*: 35B35, 35L67, 65M06, 65M12, 65M60, 65N06, 76L05, 78A40, 85A15, 85A25, **Individual member US\$37.80**, List US\$42, Order code PASY/28

## General Interest



### From Probability to Geometry (I)

Volume in Honor of the 60th Birthday of Jean-Michel Bismut

**Xianzhe Dai**, *University of California, Santa Barbara, CA*, **Rémi Léandre**, *Université de Bourgogne, Dijon, France*, **Xiaonan Ma**, *Université Paris 7, France*, and **Weiping Zhang**, *Nankai University, Tianjin, China*, Editors

This is the first of two volumes that contain original research articles submitted by colleagues and friends to celebrate the 60th birthday of Jean-Michel Bismut.

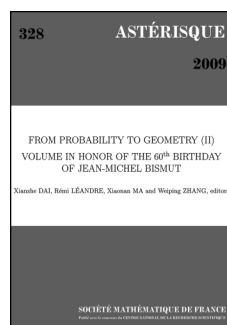
These articles cover a wide range of subjects in probability theory, global analysis, and arithmetic geometry to which Jean-Michel Bismut has made fundamental contributions.

A publication of the Société Mathématique de France, Marseilles (SMF), distributed by the AMS in the U.S., Canada, and Mexico. Orders from other countries should be sent to the SMF. Members of the SMF receive a 30% discount from list.

**Contents:** **S. Aida**, Semi-classical limit of the lowest eigenvalue of a Schrödinger operator on a Wiener space: I. Unbounded one particle Hamiltonians; **S. Albeverio** and **S. Mazzucchi**, Infinite dimensional oscillatory integrals with polynomial phase function and the trace formula for the heat semigroup; **R. F. Bass** and **E. Perkins**, A new technique for proving uniqueness for martingale problems; **M. Grothaus**, **L. Streit**, and **A. Vogel**, Feynman integrals as Hida distributions: the case of non-perturbative potentials; **H. Kunita**, Smooth density of canonical stochastic differential equations with jumps; **J. R. Norris**, Two-parameter stochastic calculus and Malliavin's integration-by-parts formula on Wiener space; **I. Shigekawa**, Witten Laplacian on a lattice spin system; **A. Alekseev**, **H. Bursztyn**, and **E. Meinrenken**, Pure spinors on Lie groups; **M.-T. Benaméur** and **P. Piazza**, Index, eta and rho invariants on foliated bundles; **A. Berthomieu**, Direct image for some secondary  $K$ -theories; **J.-B. Bost** and **K. Künnemann**, Hermitian vector bundles and extension groups on arithmetic schemes II. The arithmetic Atiyah extension.

Astérisque, Number 327

May 2010, 420 pages, Softcover, ISBN: 978-2-85629-288-4, 2000 *Mathematics Subject Classification*: 11J95, 14F05, 14F40, 14G40, 15A66, 19D55, 19E20, 19K56, 28C20, 32L10, 34E05, 35C15, 35C20, 35J10, 35K05, 35P15, 47A10, 47D08, 58J28, 53C05, 53D17, 53D20, 55R50, 57R20, 58J42, 60H07, 60H15, 60H40, 60J60, 60J75, 81Q20, 81S40, **Individual member US\$121.50**, List US\$135, Order code AST/327



### From Probability to Geometry (II)

Volume in Honor of the 60th Birthday of Jean-Michel Bismut

**Xianzhe Dai**, *University of California, Santa Barbara, CA*, **Rémi Léandre**, *Université de Bourgogne, Paris, France*, **Xiaonan Ma**, *Université Paris 7, France*, and **Weiping Zhang**, *Nankai University, Tianjin, China*, Editors

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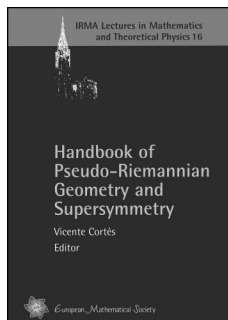
**Contents:** **J. Brüning**, The signature operator on manifolds with a conical singular stratum; **U. Bunke** and **T. Schick**, Smooth  $K$ -theory; **H. Gillet** and **F. M. Ünlü**, An explicit proof of the generalized Gauss-Bonnet formula; **S. Goette**, Torsion invariants for families; **F. R. Harvey** and **H. B. Lawson, Jr.**, Boundaries of positive holomorphic chains and the relative Hodge question; **K. Liu** and **H. Xu**, Mirzakhani's recursion formula is equivalent to the Witten-Kontsevich theorem; **V. Maillot** and **D. Rösslér**, Formes automorphes et théorèmes de Riemann-Roch arithmétiques; **V. Mathai**, **R. B. Melrose**, and **I. M. Singer**, The index of projective families of elliptic operators: the decomposable case; **P.-É. Paradan** and **M. Vergne**, Index of transversally elliptic operators; **S. T. Paul** and **G. Tian**, CM stability and the generalized Futaki invariant II; **K.-i. Yoshikawa**, Calabi-Yau threefolds of Borcea-Voisin, analytic torsion, and Borchers products.

Astérisque, Number 328

May 2010, 420 pages, Softcover, ISBN: 978-2-85629-289-1, 2000 *Mathematics Subject Classification*: 11J95, 14F05, 14F40, 14G40, 15A66, 19D55, 19E20, 19K56, 28C20, 32L10, 34E05, 35C15, 35C20, 35J10, 35K05, 35P15, 47A10, 47D08, 53C05, 53D17, 53D20, 55R50, 57R20, 58J28, 58J42, 60H07, 60H10, 60H15, 60H40, 60J60, 60J75, 81Q20, 81S40, **Individual member US\$121.50**, List US\$135, Order code AST/328



# Geometry and Topology



## Handbook of Pseudo-Riemannian Geometry and Supersymmetry

**Vicente Cortés**, *University of Hamburg, Germany*, Editor

The purpose of this handbook is to give an overview of some recent developments in differential geometry related to supersymmetric field theories. The main themes covered are:

- Special geometry and supersymmetry
- Generalized geometry
- Geometries with torsion
- Para-geometries
- Holonomy theory
- Symmetric spaces and spaces of constant curvature
- Conformal geometry
- Wave equations on Lorentzian manifolds
- D-branes and K-theory

The intended audience consists of advanced students and researchers working in differential geometry, string theory, and related areas. The emphasis is on geometrical structures occurring on target spaces of supersymmetric field theories. Some of these structures can be fully described in the classical framework of pseudo-Riemannian geometry. Others lead to new concepts relating various fields of research, such as special Kähler geometry or generalized geometry.

*This item will also be of interest to those working in mathematical physics.*

A publication of the European Mathematical Society. Distributed within the Americas by the American Mathematical Society.

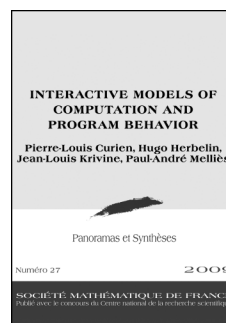
**Contents:** *Part A. Special geometry and supersymmetry:* **M. Roček**, **C. Vafa**, and **S. Vandoren**, Quaternion-Kähler spaces, hyper-Kähler cones, and the c-map geometry; **G. Weingart**, Differential forms on quaternionic Kähler manifolds; **C. P. Boyer** and **K. Galicki**, Sasakian geometry, holonomy, and supersymmetry; **M. A. Lledó**, **O. Maciá**, **A. Van Proeyen**, and **V. S. Varadarajan**, Special geometry for arbitrary signatures; **T. Mohaupt**, Special geometry, black holes and Euclidean supersymmetry; *Part B. Generalized geometry:* **N. Hitchin**, Generalized geometry—an introduction; **A. Kotov** and **T. Strobl**, Generalizing geometry—algebroids and sigma models; **U. Lindström**, **M. Roček**, **R. von Unge**, and **M. Zabzine**, A potential for generalized Kähler geometry; *Part C. Geometries with torsion:* **I. Agricola**, Non-integrable geometries, torsion, and holonomy; **P.-A. Nagy**, Totally skew-symmetric torsion and nearly-Kähler geometry; **J.-B. Butruille**, Homogeneous nearly Kähler manifolds; **L. Schäfer** and **F. Schulte-Hengesbach**, Nearly pseudo-Kähler and nearly para-Kähler six-manifolds; **A. Swann**, Quaternionic geometries from superconformal symmetry; *Part D. Para-geometries:* **S. Ivanov**, **I. Minchev**, and **S. Zamkovoy**, Twistor and reflector spaces of almost para-quaternionic manifolds; **M. Krahe**, Para-pluriharmonic maps and twistor spaces; **D. V. Alekseevsky**, **C. Medori**, and **A. Tomassini**, Maximally homogeneous para-CR manifolds of semisimple type; *Part E. Holonomy theory:* **A. Galaev** and **T. Leistner**, Recent developments in pseudo-Riemannian holonomy theory; **A. J. Di Scala**, **T. Leistner**,

and **T. Neukirchner**, Geometric applications of irreducible representations of Lie groups; **K. Waldorf**, Surface holonomy; *Part F. Symmetric spaces and spaces of constant curvature theory:* **I. Kath**, Classification results for pseudo-Riemannian symmetric spaces; **D. V. Alekseevsky**, Pseudo-Kähler and para-Kähler symmetric spaces; **O. Baues**, Prehomogeneous affine representations and flat pseudo-Riemannian manifolds; *Part G. Conformal geometry:* **H. Baum**, The conformal analog of Calabi-Yau manifolds; **Y. Kamishima**, Nondegenerate conformal structures, CR structures and quaternionic CR structures on manifolds; *Part H. Other topics of recent interest:* **C. Bär**, Linear wave equations on Lorentzian manifolds; **D. S. Freed**, Survey of D-branes and K-theory; List of contributors; Index.

**IRMA Lectures in Mathematics and Theoretical Physics**, Volume 16

June 2010, 964 pages, Hardcover, ISBN: 978-3-03719-079-1, 2000 *Mathematics Subject Classification:* 53-00, 53C26, 53C50, 81T60, 83E30, 83E50, 53C25, 53C29, 53C35, 53C10, **AMS members US\$110.40**, List US\$138, Order code EMSILMTP/16

# Logic and Foundations



## Interactive Models of Computation and Program Behavior

**Pierre-Louis Curien**, **Hugo Herbelin**, and **Jean-Louis Krivine**, *Université Paris VII, France*, and **Paul-André Melliès**, *Université Paris Diderot, France*

This volume contains three contributions in the field of logic and computation that reflect current trends towards an interactive account of the meaning of proofs and programs. The contributions can be read independently and use or introduce fundamental tools in the field: categories, realizability, abstract machines. Throughout the volume, a unifying theme is that of games and strategies, which turns the correspondence between proofs and programs (the so-called Curry-Howard isomorphism) into a triangle whose third corner emphasizes interaction and duality between a program and its environment or between a proof and counter-proofs. The introduction to the volume places the contributions in perspective and provides a gentle beginner's introduction to the lambda-calculus, which is and remains the backbone of the whole field.

A publication of the Société Mathématique de France, Marseilles (SMF), distributed by the AMS in the U.S., Canada, and Mexico. Orders from other countries should be sent to the SMF. Members of the SMF receive a 30% discount from list.

**Contents:** **P.-A. Melliès**, Categorical semantics of linear logic; **J.-L. Krivine**, Realizability in classical logic; **P.-L. Curien** and **H. Herbelin**, Abstract machines for dialogue games.

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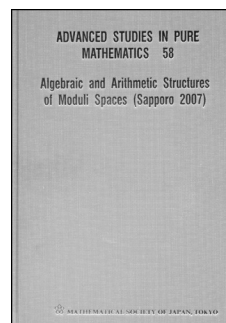
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## Panoramas et Synthèses, Number 27

May 2010, 275 pages, Softcover, ISBN: 978-2-85629-273-0, 2000  
*Mathematics Subject Classification*: 03F05, 03F52, 68Q55, 03B40, 03B70, 03G30, 68N18, 68N20, **Individual member US\$64.80**, List US\$72, Order code PASY/27

## Number Theory



## Algebraic and Arithmetic Structures of Moduli Spaces (Sapporo 2007)

Iku Nakamura, *Hokkaido University, Sapporo, Japan*, and  
Lin Weng, *Kyushu University, Fukuoka, Japan*, Editors

The conference on Algebraic and Arithmetic Structures of Moduli Spaces was held at Hokkaido University in Sapporo, Japan in September 2007. Twenty talks were delivered by invited speakers on arithmetic geometry, algebraic geometry and complex geometry. This volume is the proceedings of the conference—a collection of eleven papers contributed by some of the speakers. The papers have undergone rigorous refereeing.

The articles cover a diverse range of topics such as class field theory, zeta functions, moduli of arithmetic vector bundles, moduli of complex vector bundles, moduli of abelian varieties and theory of display, moduli of Fermat varieties and some topics on cubic threefolds. Among others, the papers by Pappas and Rapoport, Rajan, and Weng address many new interesting questions in the related fields and will be worthy reading for young researchers.

*This item will also be of interest to those working in algebra and algebraic geometry.*

Published for the Mathematical Society of Japan by Kinokuniya, Tokyo, and distributed worldwide, except in Japan, by the AMS.

**Contents:** C. Deninger and A. Werner, Vector bundles on  $p$ -adic curves and parallel transport II; G. van der Geer and A. Kouvidakis, A note on Fano surfaces of nodal cubic threefolds; E. Looijenga, Fermat varieties and the periods of some hypersurfaces; I. Nakamura, Another canonical compactification of the moduli space of abelian varieties; C. S. Rajan, Some questions on spectrum and arithmetic of locally symmetric spaces; G. Pappas and M. Rapoport, Some questions about  $G$ -bundles on curves; L. Weng, Symmetries and the Riemann Hypothesis; L. Weng, Stability and arithmetic; T. Yoshida, On non-abelian Lubin–Tate theory via vanishing cycles; K. Yoshioka, An action of a Lie algebra on the homology groups of moduli spaces of stable sheaves; A. Vasiu and T. Zink, Breuil’s classification of  $p$ -divisible groups over regular local rings of arbitrary dimension.

## Advanced Studies in Pure Mathematics, Volume 58

June 2010, 479 pages, Hardcover, ISBN: 978-4-931469-59-4, 2000  
*Mathematics Subject Classification*: 11Gxx, 11Mxx, 11Sxx, 14D20, 14Jxx, 14Kxx, 14Mxx, **AMS members US\$67.20**, List US\$84, Order code ASPM/58