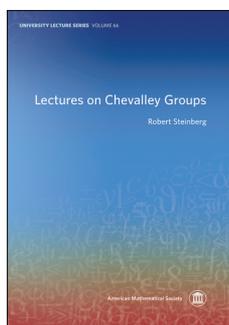


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Algebra and Algebraic Geometry



Lectures on Chevalley Groups

Robert Steinberg

Robert Steinberg's *Lectures on Chevalley Groups* were delivered and written during the author's sabbatical visit to Yale University in the 1967–1968 academic year. The work presents the status of the theory of Chevalley groups as it was in the mid-1960s. Much of this material was instrumental in many areas of

mathematics, in particular in the theory of algebraic groups and in the subsequent classification of finite groups. This posthumous edition incorporates additions and corrections prepared by the author during his retirement, including a new introductory chapter. A bibliography and editorial notes have also been added.

This is a great unsurpassed introduction to the subject of Chevalley groups that influenced generations of mathematicians. I would recommend it to anybody whose interests include group theory.

—*Efim Zelmanov, University of California, San Diego*

Robert Steinberg's lectures on Chevalley groups were given at Yale University in 1967. The notes for the lectures contain a wonderful exposition of the work of Chevalley, as well as important additions to that work due to Steinberg himself. The theory of Chevalley groups is of central importance not only for group theory, but also for number theory and theoretical physics, and is as relevant today as it was in 1967. The publication of these lecture notes in book form is a very welcome addition to the literature.

—*George Lusztig, Massachusetts Institute of Technology*

Robert Steinberg gave a course at Yale University in 1967 and the mimeographed notes of that course have been read by essentially anyone interested in Chevalley groups. In this course, Steinberg presents the basic constructions of the Chevalley groups over arbitrary fields. He also presents fundamental material about generators and relations for these groups and automorphism groups. Twisted variations on the Chevalley groups are also introduced. There are several chapters on the representation theory of the Chevalley groups (over an arbitrary field) and for

many of the finite twisted groups. Even 50 years later, this book is still one of the best introductions to the theory of Chevalley groups and should be read by anyone interested in the field.

—*Robert Guralnick, University of Southern California*

A Russian translation of this lecture course by Robert Steinberg was published in Russia more than 40 years ago, but for some mysterious reason has never been published in the original language. This book is very dear to me. It is not only an important advance in the theory of algebraic groups, but it has also played a key role in more recent developments of the theory of Kac-Moody groups. The very different approaches, one by Tits and another by Peterson and myself, borrowed heavily from this remarkable book.

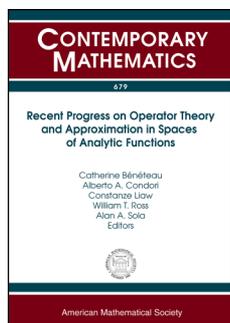
—*Victor Kac, Massachusetts Institute of Technology*

Contents: Introduction; A basis for \mathcal{L} ; A basis for \mathcal{U} ; The Chevalley groups; Simplicity of G ; Chevalley groups and algebraic groups; Generators and relations; Central extensions; Variants of the Bruhat lemma; The orders of the finite Chevalley groups; Isomorphisms and automorphisms; Some twisted groups; Representations; Representations continued; Representations completed; Appendix on finite reflection groups; Bibliography; Index.

University Lecture Series, Volume 66

January 2017, 160 pages, Softcover, ISBN: 978-1-4704-3105-1, LC 2016042277, 2010 *Mathematics Subject Classification*: 20G15; 14Lxx, **AMS members US\$28**, List US\$35, Order code ULECT/66

Analysis



Recent Progress on Operator Theory and Approximation in Spaces of Analytic Functions

Catherine Bénéteau, *University of South Florida, Tampa, FL*, **Alberto A. Condori**, *Florida Gulf Coast University, Fort Myers, FL*, **Constanze Liaw**, *Baylor University, Waco, TX*, **William T. Ross**, *University of Richmond, VA*, and **Alan A. Sola**, *University of South Florida, Tampa, FL*, Editors

This volume contains the Proceedings of the Conference on Completeness Problems, Carleson Measures, and Spaces of Analytic Functions, held from June 29–July 3, 2015, at the Institut Mittag-Leffler, Djursholm, Sweden.

The conference brought together experienced researchers and promising young mathematicians from many countries to discuss recent progress made in function theory, model spaces, completeness problems, and Carleson measures.

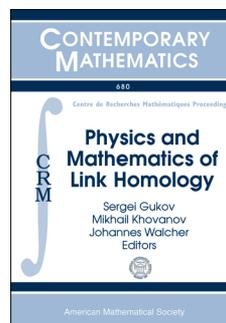
This volume contains articles covering cutting-edge research questions, as well as longer survey papers and a report on the problem session that contains a collection of attractive open problems in complex and harmonic analysis.

Contents: **K. Bickel** and **C. Liaw**, Properties of vector-valued submodules on the bidisk; **A. Bourhim** and **J. Mashreghi**, Composition operators on the Hardy–Hilbert space H^2 and model spaces K_Θ ; **I. Chalendar**, **E. Fricain**, and **D. Timotin**, A survey of some recent results on truncated Toeplitz operators; **M. Fleeman** and **D. Khavinson**, Approximating \bar{z} in the Bergman space; **S. R. Garcia**, **J. Mashreghi**, and **W. T. Ross**, Real complex functions; **P. Gorkin** and **B. D. Wick**, Thin interpolating sequences; **A. Hartmann** and **M. Mitkovski**, Kernels of Toeplitz operators; **E. Saksman** and **K. Seip**, Some open questions in analysis for Dirichlet series; **D. Seco**, Some problems on optimal approximants; **C. Bénéteau**, **A. A. Condori**, **C. Liaw**, **W. T. Ross**, and **A. A. Sola**, Some open problems in complex and harmonic analysis: Report on problem session held during the conference *Completeness problems, Carleson measures, and space of analytic functions*.

Contemporary Mathematics, Volume 679

January 2017, 217 pages, Softcover, ISBN: 978-1-4704-2305-6, LC 2016023124, 2010 *Mathematics Subject Classification*: 11M41, 30H05, 30H20, 35P10, 47A16, 47B32, **AMS members US\$86.40**, List US\$108, Order code CONM/679

Geometry and Topology



Physics and Mathematics of Link Homology

Sergei Gukov, *California Institute of Technology, Pasadena, CA*, **Mikhail Khovanov**, *Columbia University, New York, NY*, and **Johannes Walcher**, *Ruprecht-Karls-Universität Heidelberg, Germany*, Editors

Throughout recent history, the theory of knot invariants has been a fascinating melting pot of ideas and scientific cultures, blending mathematics and physics, geometry, topology and algebra, gauge theory, and quantum gravity.

The 2013 Séminaire de Mathématiques Supérieures in Montréal presented an opportunity for the next generation of scientists to learn in one place about the various perspectives on knot homology, from the mathematical background to the most recent developments, and provided an access point to the relevant parts of theoretical physics as well.

This volume presents a cross-section of topics covered at that summer school and will be a valuable resource for graduate students and researchers wishing to learn about this rapidly growing field.

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

This book is co-published with the Centre de Recherches Mathématiques.

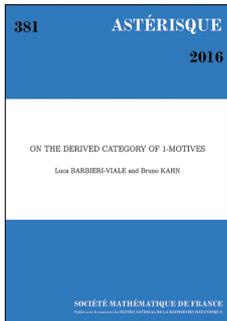
Contents: **R. Pichai** and **V. K. Singh**, Chern-Simons theory and knot invariants; **B. Webster**, Tensor product algebras, Grassmannians and Khovanov homology; **S. Gukov** and **I. Saberi**, Lectures on knot homology and quantum curves; **C. Manolescu**, An introduction to knot Floer homology; **S. Nawata** and **A. Oblomkov**, Lectures on knot homology.

Contemporary Mathematics, Volume 680

January 2017, 177 pages, Softcover, ISBN: 978-1-4704-1459-7, LC 2016027525, 2010 *Mathematics Subject Classification*: 17B37, 57M27, 57R58, 81T45, 81T30, **AMS members US\$86.40**, List US\$108, Order code CONM/680

New AMS-Distributed Publications

Algebra and Algebraic Geometry



On the Derived Category of 1-Motives

Luca Barbieri-Viale, *Università degli Studi di Milano, Italy*, and Bruno Kahn, *Institut de Mathématiques de Jussieu-Paris Rive Gauche, France*

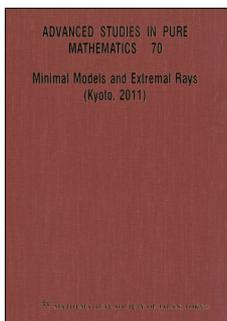
The authors embed the derived category of Deligne 1-motives over a perfect field into the étale version of Voevodsky's

triangulated category of geometric motives after inverting the exponential characteristic. They then show that this full embedding “almost” has a left adjoint LAlb. Applying LAlb to the motive of a variety, the authors get a bounded complex of 1-motives that they compute fully for smooth varieties and partly for singular varieties. Among applications, the authors give motivic proofs of Roitman type theorems and new cases of Deligne’s conjectures on 1-motives.

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.

Astérisque, Number 381

September 2016, 254 pages, Softcover, ISBN: 978-2-85629-837-4, 2010 *Mathematics Subject Classification*: 19E15, 14C15, 14F20, 14C30, 18E30, **AMS members US\$60**, List US\$75, Order code AST/381



Minimal Models and Extremal Rays (Kyoto, 2011)

János Kollár, *Princeton University, NJ*, Osamu Fujino, *Osaka University, Japan*, Shigeru Mukai, *Kyoto University, Japan*, and Noboru Nakayama, *Kyoto University, Japan*, Editors

Since the appearance of extremal rays and the minimal model program in the early 1980s, we have seen the tremendous development of algebraic geometry. With this in mind, the

conference on Minimal Models and Extremal Ray was held at the Research Institute for Mathematical Sciences (RIMS) at Kyoto University in June 2011. The purpose of the conference was to review the past, examine the present, and enjoy discussing the future.

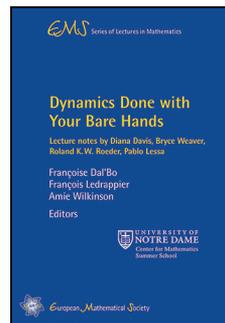
This volume contains the proceedings of this conference and consists of one survey article on the mathematical work of Shigefumi Mori, who turned sixty in 2011, and thirteen research papers presented by the authors.

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

Advanced Studies in Pure Mathematics, Volume 70

September 2016, 420 pages, Hardcover, ISBN: 978-4-86497-036-5, 2010 *Mathematics Subject Classification*: 14-06; 14E30, 14B07, 14D05, 14E07, 14E15, 14F17, 14F18, 14J17, 14J28, 14J32, 14J45, 53D05, **AMS members US\$121.60**, List US\$152, Order code ASPM/70

Analysis



Dynamics Done with Your Bare Hands

Lecture Notes by Diana Davis, Bryce Weaver, Roland K. W. Roeder, and Pablo Lessa

Françoise Dal'Bo, *Université de Rennes I, France*, François Ledrappier, *University of Notre Dame, IN*, and Amie Wilkinson, *University of Chicago, IL*, Editors

This book arose from four lectures given at the Undergraduate Summer School of the Thematic Program Dynamics and Boundaries, held at the University of Notre Dame. It is intended to introduce (under)graduate students to the field of dynamical systems by emphasizing elementary examples, exercises, and bare hands constructions.

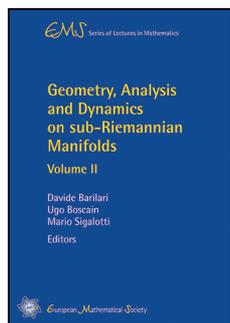
The lecture by Diana Davis is devoted to billiard flows on polygons, a simple-sounding class of continuous time dynamical system for which many problems remain open. Bryce Weaver focuses on the dynamics of a 2×2 matrix acting on the flat torus. This example introduced by Vladimir Arnold illustrates the wide class of uniformly hyperbolic dynamical systems, including the geodesic flow for negatively curved, compact manifolds. Roland Roeder considers a dynamical system on the complex plane governed by a quadratic map with a complex parameter. These maps exhibit complicated dynamics related to the Mandelbrot set defined as the set of parameters for which the orbit remains bounded. Pablo Lessa deals with a type of non-deterministic dynamical system: a simple walk on an infinite graph, obtained by starting at a vertex and choosing a random neighbor at each step. The central question concerns the recurrence property. When the graph is a Cayley graph of a group, the behavior of the walk is deeply related to algebraic properties of the group.

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

EMS Series of Lectures in Mathematics, Volume 26

November 2016, 214 pages, Softcover, ISBN: 978-3-03719-168-2, 2010 *Mathematics Subject Classification*: 37Axx, 37Bxx, 37Dxx, 37Fxx, 37Hxx, 53Axx, **AMS members US\$35.20**, List US\$44, Order code EMSSERLEC/26

Geometry and Topology



Geometry, Analysis and Dynamics on sub-Riemannian Manifolds: Volume II

Davide Barilari, *Université Paris-Diderot, France*, **Ugo Boscain**, *École Polytechnique, Palaiseau, France*, and **Mario Sigalotti**, *École Polytechnique, Palaiseau, France*, Editors

Sub-Riemannian manifolds model media with constrained dynamics: motion at any point is allowed only along a limited set of directions, which are prescribed by the physical problem. From the theoretical point of view, sub-Riemannian geometry is the geometry underlying the theory of hypoelliptic operators and degenerate diffusions on manifolds.

In the last twenty years, sub-Riemannian geometry has emerged as an independent research domain, with extremely rich motivations and ramifications in several parts of pure and applied mathematics, such as geometric analysis, geometric measure theory, stochastic calculus and evolution equations together with applications in mechanics, optimal control and biology.

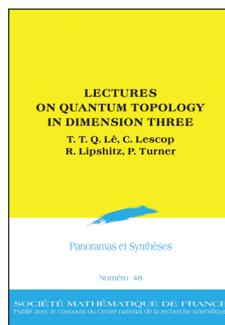
The aim of the lectures collected here is to present sub-Riemannian structures for the use of both researchers and graduate students.

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

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

EMS Series of Lectures in Mathematics, Volume 25

October 2016, 307 pages, Softcover, ISBN: 978-3-03719-163-7, 2010 *Mathematics Subject Classification*: 53C17, 35H10, 60H30, 49J15, **AMS members US\$46.40**, List US\$58, Order code EMSSERLEC/25



Lectures on Quantum Topology in Dimension Three

Thang T. Q. Lê, *Georgia Institute of Technology, Atlanta, Georgia*, **Christine Lescop**, *Université Grenoble Alpes, France*, **Robert Lipshitz**, *Columbia University, New York, NY*, and **Paul Turner**, *Université de Genève, Geneva, Switzerland*

This monograph contains three lecture series from the SMF school Geometric and Quantum Topology in Dimension 3, which was held at CIRM in June 2014. These lectures present recent progress on the study of 3-manifold and link invariants. Thang Lê describes the state of the art about the AJ conjecture, which relates generalizations of the Jones polynomial to the Cooper, Culler, Gillet, Long and Shalen A-polynomial, which is defined from $SL_2(\mathbb{C})$ -representation spaces of link exterior fundamental groups.

In 1999, Khovanov defined a homology theory for knots of R^3 whose Euler characteristic is the Jones polynomial. Paul Turner presents the latest developments and the applications of this categorification of the Jones polynomial in a useful guide of the literature around this extensively studied topic. Robert Lipshitz presents the famous Osváth Szábo Heegaard Floer homology theories together with efficient sketches of proofs of some of their spectacular applications. These lectures are introduced by a partial survey of the history of these invariants, written by Christine Lescop.

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.

Panoramas et Synthèses, Number 48

September 2016, 174 pages, Softcover, ISBN: 978-2-85629-842-8, 2010 *Mathematics Subject Classification*: 57M27, 57M25, 57N10, **AMS members US\$41.60**, List US\$52, Order code PASY/48

Number Theory



La Conjecture Locale de Gross-Prasad pour les Représentations Tempérées des Groupes Unitaires

Raphaël Beuzart-Plessis,
Université d'Aix-Marseille, France

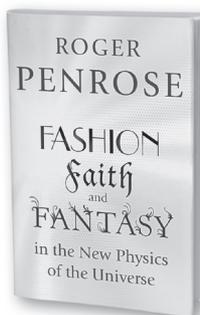
A note to readers: This book is in French.

This volume represents a straight continuation of Waldspurger's recent work that deals with special orthogonal groups.

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Mémoires de la Société Mathématique de France, Number 149

September 2016, 164 pages, Softcover, ISBN: 978-2-85629-841-1, 2010 *Mathematics Subject Classification*: 22E50, 11F85, 20G05, **AMS members US\$53.60**, List US\$67, Order code SMFMEM/149



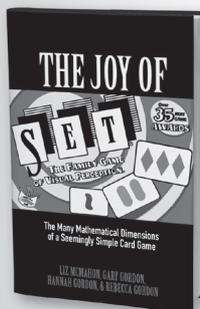
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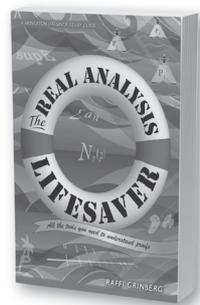
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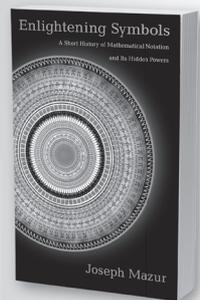
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