Geometric And Cohomological Methods In Group Theo

The Brauer–Grothendieck Group
Equivariant Cohomology in Algebraic Geometry
Homotopy Theoretic Methods in Group Cohomology
Cohomological Methods in Homotopy Theory
Introduction to Étale Cohomology
Geometric Methods in Degree Theory for Equivariant Maps
Homotopy Theory and Arithmetic Geometry – Motivic and Diophantine Aspects
Classical and Involutive Invariants of Krull Domains
Rigid Cohomology over Laurent Series Fields
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Geometric Group Theory
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Manifolds, Sheaves, and Cohomology
The Geometry and Cohomology of Some Simple Shimura Varieties. (AM-151), Volume 151
Geometric Methods in the Algebraic Theory of Quadratic Forms
Étale Cohomology (PMS-33), Volume 33
The Diverse World of PDEs
Geometric and Cohomological Methods in Group Theory
Techniques of Geometric Topology
Cohomological Aspects in Complex Non-Kähler Geometry
Cohomological Theory of Crystals Over Function Fields
Geometric and Cohomological Methods in Group Theory
Geometry and Cohomology in Group Theory
Cohomological and Geometric Approaches to Rationality Problems

Topics in Cohomological Studies of Algebraic Varieties
Cohomological Methods in Transformation Groups
An Introduction to Galois Cohomology and its Applications
Introduction to Hodge Theory

LAMBERT DEON

The Brauer–Grothendieck Group Springer
This is the first monograph dedicated to the systematic exposition of the whole variety of topics related to quantum cohomology. The subject first originated in theoretical physics (quantum string theory) and has continued to develop extensively over the last decade. The author's approach to quantum cohomology is based on the notion of the Frobenius manifold. The first part of the book is devoted to this notion and its extensive interconnections with algebraic formalism of operads, differential equations, perturbations, and geometry. In the second part of the book, the author describes the construction of quantum cohomology and reviews the algebraic geometry mechanisms involved in this construction (intersection and deformation theory of Deligne-Artin and Mumford stacks). Yuri

Manin is currently the director of the Max-Planck-Institut für Mathematik in Bonn, Germany. He has authored and coauthored 10 monographs and almost 200 research articles in algebraic geometry, number theory, mathematical physics, history of culture, and psycholinguistics. Manin's books, such as Cubic Forms: Algebra, Geometry, and Arithmetic (1974), A Course in Mathematical Logic (1977), Gauge Field Theory and Complex Geometry (1988), Elementary Particles: Mathematics, Physics and Philosophy (1989, with I. Yu. Kobzarev), Topics in Non-commutative Geometry (1991), and Methods of Homological Algebra (1996, with S. I. Gelfand), secured for him solid recognition as an excellent expositor. Undoubtedly the present book will serve mathematicians for many years to come.

Equivariant Cohomology in Algebraic Geometry
Princeton University Press
Rationality problems link algebra to geometry, and the difficulties involved depend on the transcendence degree of K over k, or geometrically, on the dimension of the variety. A major success in 19th century algebraic geometry was a complete solution of the rationality problem in dimensions one and two over algebraically closed ground fields of

characteristic zero. Such advances has led to many interdisciplinary applications to algebraic geometry. This comprehensive book consists of surveys of research papers by leading specialists in the field and gives indications for future research in.

Homotopy Theoretic Methods in Group Cohomology

Cambridge University Press

In this monograph, the authors develop a new theory of p-adic cohomology for varieties over Laurent series fields in positive characteristic, based on Berthelot's theory of rigid cohomology. Many major fundamental properties of these cohomology groups are proven, such as finite dimensionality and cohomological descent, as well as interpretations in terms of Monsky-Washnitzer cohomology and Le Stum's overconvergent site. Applications of this new theory to arithmetic questions, such as l-independence and the weight monodromy conjecture, are also discussed. The construction of these cohomology groups, analogous to the Galois representations associated to varieties over local fields in mixed characteristic, fills a major gap in the study of arithmetic cohomology theories over function fields. By extending the scope of existing methods, the results presented here also serve as a first step towards a more general theory of p-adic cohomology over non-perfect ground fields. Rigid Cohomology over Laurent Series Fields will provide a useful tool for anyone interested in the arithmetic of varieties over local fields of positive characteristic. Appendices on important background material such as rigid cohomology and adic spaces make it as self-contained as possible, and an ideal starting point for graduate students looking to explore aspects of the classical theory of rigid cohomology and with an eye towards future research in the subject. *Cohomological Methods in Homotopy Theory* American Mathematical Soc. This book provides an introduction to state-of-the-art applications of homotopy theory to arithmetic geometry. The contributions to this volume are based on original lectures by leading researchers at the LMS-CMI Research School on 'Homotopy Theory and Arithmetic Geometry - Motivic and Diophantine Aspects' and the Nelder Fellow Lecturer Series, which both took place at Imperial College London in the summer of 2018. The contribution by Brazelton, based on the lectures by Wickelgren, provides an introduction to arithmetic enumerative geometry, the notes of Cisinski present motivic sheaves and new cohomological methods for intersection theory, and Schlank's contribution gives an overview of the use of étale homotopy theory for obstructions to the existence of rational points on algebraic varieties. Finally, the article by Asok and Østvær, based in part on the Nelder Fellow lecture series by Østvær, gives a survey of the interplay between motivic homotopy theory and affine algebraic geometry, with a focus on contractible algebraic varieties. Now a major trend in arithmetic geometry, this volume offers a detailed guide to the fascinating circle of recent applications of homotopy theory to number theory. It will be invaluable to research students entering the field, as well as postdoctoral and more established researchers.

Introduction to Étale Cohomology

Cambridge University Press

One of the most important mathematical achievements of the past several decades has been A. Grothendieck's work on algebraic geometry. In the early 1960s, he and M. Artin introduced étale cohomology in order to extend the methods of sheaf-theoretic cohomology from complex varieties to more general schemes. This work found many applications, not only in algebraic geometry, but also in several different branches of number theory and in the representation theory of finite and p-adic groups. Yet until now, the work has been available only in the original massive and difficult papers. In order to provide an accessible introduction to étale cohomology, J. S. Milne offers this more elementary account covering the essential features of the theory. The author begins with a review of the basic properties of flat and étale morphisms and of the algebraic fundamental group. The next two chapters concern the basic theory of étale sheaves and elementary étale cohomology, and are followed by an application of the cohomology to the study of the Brauer group. After a detailed analysis of the cohomology of curves and surfaces, Professor Milne proves the fundamental theorems in étale cohomology -- those of base change, purity, Poincaré duality, and the Lefschetz trace formula. He then applies these theorems to show the rationality of some very general L-series. Originally published in 1980. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books

published by Princeton University Press since its founding in 1905. *Geometric Methods in Degree Theory for Equivariant Maps* Cambridge University Press
This book consists essentially of notes which were written for an Advanced Course on Classifying Spaces and Cohomology of Groups. The course took place at the Centre de Recerca Mathematica (CRM) in Bellaterra from May 27 to June 2, 1998 and was part of an emphasis semester on Algebraic Topology. It consisted of two parallel series of 6 lectures of 90 minutes each and was intended as an introduction to new homotopy theoretic methods in group cohomology. The first part of the book is concerned with methods of decomposing the classifying space of a finite group into pieces made of classifying spaces of appropriate subgroups. Such decompositions have been used with great success in the last 10-15 years in the homotopy theory of classifying spaces of compact Lie groups and p-compact groups in the sense of Dwyer and Wilkerson. For simplicity the emphasis here is on finite groups and on homological properties of various decompositions known as centralizer resp. normalizer resp. subgroup decomposition. A unified treatment of the various decompositions is given and the relations between them are

explored. This is preceeded by a detailed discussion of basic notions such as classifying spaces, simplicial complexes and homotopy colimits.

Homotopy Theory and Arithmetic Geometry – Motivic and Diophantine Aspects European Mathematical Society
This volume reflects the fruitful connections between group theory and topology. It contains articles on cohomology, representation theory, geometric and combinatorial group theory. Some of the world's best known figures in this very active area of mathematics have made contributions, including substantial articles from Ol'shanskii, Mikhajlovskii, Carlson, Benson, Linnell, Wilson and Grigorchuk, which will be valuable reference works for some years to come. Pure mathematicians working in the fields of algebra, topology, and their interactions, will find this book of great interest.

Classical and Involutive Invariants of Krull Domains Birkhauser
A graduate-level introduction to the core notions of equivariant cohomology, an indispensable tool in several areas of modern mathematics.

Rigid Cohomology over Laurent Series Fields Princeton University Press
This volume contains the proceedings of the Alexandre Vinogradov Memorial Conference on Diffieties, Cohomological Physics,

and Other Animals, held from December 13–17, 2021, at Independent University of Moscow and Moscow State University, Moscow, Russia. The papers reflect the modern interplay between partial differential equations and various aspects of algebra and computer science. The topics discussed are: relations between integrability and differential rings, supermanifolds, differential calculus over graded algebras, noncommutative generalizations of PDEs, quantum vector fields, generalized Nijenhuis torsion, cohomological approach to the geometry of differential equations, the argument shift method, Frölicher structures in the formal Kadomtsev–Petviashvili hierarchy, and computer-based determination of optimal systems of Lie subalgebras. The companion volume (Contemporary Mathematics, Volume 788) is devoted to Geometry and Mathematical Physics.

Algebraic Topology Via Differential Geometry Springer Nature
An extended tour through a selection of the most important trends in modern geometric group theory.

Geometric Methods in Algebra and Number Theory
Springer
This monograph developed out of the Abendseminar of 1958-1959 at the University of Zürich. The purpose of this

monograph is to develop the de Rham cohomology theory, and to apply it to obtain topological invariants of smooth manifolds and fibre bundles. It also addresses the purely algebraic theory of the operation of a Lie algebra in a graded differential algebra.
The Arithmetic and Geometry of Algebraic Cycles Springer
This monograph is devoted to Krull domains and its invariants. The book shows how a serious study of invariants of Krull domains necessitates input from various fields of mathematics, including rings and module theory, commutative algebra, K-theory, cohomology theory, localization theory and algebraic geometry. About half of the book is dedicated to so-called involutive invariants, such as the involutive Brauer group, and is essentially the first to cover these topics. In a structured and methodical way, the work presents a large quantity of results previously scattered throughout the literature. Audience: This volume is recommended as a first introduction to this rapidly developing subject, but will also be useful as a state-of-the-art reference work, both to students at graduate and postgraduate levels and to researchers in commutative rings and algebra, algebraic K-theory, algebraic geometry, and associative rings.
Ergodic Theoretic

Methods in Group Homology Springer This book provides an introduction to state-of-the-art applications of homotopy theory to arithmetic geometry. The contributions to this volume are based on original lectures by leading researchers at the LMS-CMI Research School on ‘Homotopy Theory and Arithmetic Geometry - Motivic and Diophantine Aspects’ and the Nelder Fellow Lecturer Series, which both took place at Imperial College London in the summer of 2018. The contribution by Brazelton, based on the lectures by Wickelgren, provides an introduction to arithmetic enumerative geometry, the notes of Cisinski present motivic sheaves and new cohomological methods for intersection theory, and Schlank’s contribution gives an overview of the use of étale homotopy theory for obstructions to the existence of rational points on algebraic varieties. Finally, the article by Asok and Østvær, based in part on the Nelder Fellow lecture series by Østvær, gives a survey of the interplay between motivic homotopy theory and affine algebraic geometry, with a focus on contractible algebraic varieties. Now a major trend in arithmetic geometry, this volume offers a detailed guide to the fascinating circle of recent applications of homotopy theory to number theory. It will be invaluable to research students entering the field, as well as postdoctoral and more established researchers.

Connections, Curvature, and Cohomology: Cohomology of principal bundles and homogeneous spaces American Mathematical Soc.

This book offers a concise introduction to ergodic methods in group homology, with a particular focus on the computation of L2-Betti numbers. Group homology integrates group actions into homological structure. Coefficients based on probability measure preserving actions combine ergodic theory and homology. An example of such an interaction is provided by L2-Betti numbers: these invariants can be understood in terms of group homology with coefficients related to the group von Neumann algebra, via approximation by finite index subgroups, or via dynamical systems. In this way, L2-Betti numbers lead to orbit/measure equivalence invariants and measured group theory helps to compute L2-Betti numbers. Similar methods apply also to compute the rank gradient/cost of groups as well as the simplicial volume of manifolds. This book introduces L2-Betti numbers of groups at an elementary level and then develops the ergodic point of view, emphasising the connection with approximation phenomena for homological gradient invariants of groups and spaces. The text is an extended version of the lecture notes for a minicourse at the MSRI summer graduate school “Random and arithmetic structures in topology” and thus accessible to the graduate or advanced undergraduate students. Many examples and exercises illustrate the material.

Topological Methods in Algebraic Geometry American Mathematical Society Étale Cohomology is one of the most important methods in modern Algebraic Geometry and Number Theory. It has, in the last decades, brought fundamental new insights in arithmetic and algebraic geometric problems with many applications and many important results. The book gives a short and easy introduction into the world of Abelian Categories, Derived Functors, Grothendieck Topologies, Sheaves, General Étale Cohomology, and Étale Cohomology of Curves.

Geometric and Cohomological Group Theory Cambridge University Press This is an account of the theory of certain types of compact transformation groups, namely those that are susceptible to study using ordinary cohomology theory and rational homotopy theory, which in practice means the torus groups and elementary abelian p-groups. The efforts of many mathematicians have combined to bring a depth of understanding to this area. However to make it reasonably accessible to a wide audience, the authors have streamlined the presentation, referring the reader to the literature for purely technical results and working in a simplified setting where possible. In this way the reader with a relatively modest background in algebraic topology and homology theory can penetrate rather deeply into the subject, whilst the book at the same time makes a useful reference for the more specialised reader.

Frobenius Manifolds, Quantum Cohomology, and Moduli Spaces

Springer

In these notes, we provide a summary of recent results on the cohomological properties of compact complex manifolds not endowed with a Kähler structure. On the one hand, the large number of developed analytic techniques makes it possible to prove strong cohomological properties for compact Kähler manifolds. On the other, in order to further investigate any of these properties, it is natural to look for manifolds that do not have any Kähler structure. We focus in particular on studying Bott-Chern and Aeppli cohomologies of compact complex manifolds. Several results concerning the computations of Dolbeault and Bott-Chern cohomologies on nilmanifolds are summarized, allowing readers to study explicit examples. Manifolds endowed

with almost-complex structures, or with other special structures (such as, for example, symplectic, generalized-complex, etc.), are also considered.
Mixed Motives and their Realization in Derived Categories
Birkhäuser
This book develops a new cohomological theory for schemes in positive characteristic p and it applies this theory to give a purely algebraic proof of a conjecture of Goss on the rationality of certain L-functions arising in the arithmetic of function fields. These L-functions are power series over a certain ring A, associated to any family of Drinfeld A-modules or, more generally, of A-motives on a variety of finite type over the finite field $\mathbb{F}_p$. By analogy to the Weil conjecture, Goss conjectured that these L-functions are in fact rational functions. In 1996 Taguchi and Wan gave a first proof of Goss's conjecture by analytic methods a la Dwork. The present text introduces A-crystals, which can be viewed as generalizations of families of A-motives, and studies their cohomology. While A-crystals are defined in terms of coherent sheaves together with a Frobenius map, in many ways they actually behave like constructible etale sheaves. A central result is a Lefschetz trace formula for L-functions of A-

crystals, from which the rationality of these L-functions is immediate. Beyond its application to Goss's L-functions, the theory of A-crystals is closely related to the work of Emerton and Kisin on unit root F-crystals, and it is essential in an Eichler - Shimura type isomorphism for Drinfeld modular forms as constructed by the first author. The book is intended for researchers and advanced graduate students interested in the arithmetic of function fields and/or cohomology theories for varieties in positive characteristic. It assumes a good working knowledge in algebraic geometry as well as familiarity with homological algebra and derived categories, as provided by standard textbooks. Beyond that the presentation is largely self contained.

Etale Cohomology (PMS-33) CUP Archive In this volume the authors seek to illustrate how methods of differential geometry find application in the study of the topology of differential manifolds. Prerequisites are few since the authors take pains to set out the theory of differential forms and the algebra required. The reader is introduced to De Rham cohomology, and explicit and detailed calculations are present as examples. Topics covered include Mayer-Vietoris exact sequences, relative cohomology, Pioncare duality and Lefschetz's theorem. This book will

be suitable for graduate students taking courses in algebraic topology and in differential topology. Mathematicians studying relativity and mathematical physics will find this an invaluable introduction to the techniques of differential geometry.
The Brauer-Grothendieck Group
Springer
One of the most important mathematical achievements of the past several decades has been A. Grothendieck's work on algebraic geometry. In the early 1960s, he and M. Artin introduced étale cohomology in order to extend the methods of sheaf-theoretic cohomology from complex varieties to more general schemes. This work found many applications, not only in algebraic geometry, but also in several different branches of number theory and in the representation theory of finite and p-adic groups. Yet until now, the work has been available only in the original massive and difficult papers. In order to provide an accessible introduction to étale cohomology, J. S. Milne offers this more elementary account covering the essential features of the theory. The author begins with a review of the basic properties of flat and étale morphisms and of the algebraic fundamental group. The next two chapters concern the basic theory of étale sheaves and elementary étale cohomology, and are

followed by an application of the cohomology to the study of the Brauer group. After a detailed analysis of the cohomology of curves and surfaces, Professor Milne proves the fundamental theorems in étale cohomology -- those of base change, purity, Poincaré duality, and the Lefschetz trace formula. He then applies these theorems to show the rationality of some very general L-series. Originally published in 1980. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905.