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Visual Group Theory American Mathematical Soc.
This volume reproduces, in the first five chapters, the content of a one semester course given at the University of Pennsylvania in the spring of 1968. The final chapter was material that was not presented during the course due to lack of time. The aim of the course was to acquaint students with a body of material upon which some of the modern research in Diophantine geometry and higher arithmetic is based, and in a way which emphasized the many interesting roads out of these elementary foundations.
Differential Galois Theory through Riemann-Hilbert Correspondence Springer Science & Business Media
Before he died at the age of twenty, shot in a mysterious early-morning duel at the end of May 1832, Evariste Galois created mathematics that changed the direction of algebra. This book contains English translations of almost all the Galois material. The translations are presented alongside a new transcription of the original French and are enhanced by three levels of commentary. An introduction explains the context of Galois' work, the various publications in which it appears, and the vagaries of his manuscripts. Then there is a chapter in which the five mathematical articles published in his lifetime are reprinted. After that come the testamentary letter and the first memoir (in which Galois expounded on the ideas that led to Galois Theory), which are the most famous of the manuscripts. These are followed by the second memoir and other lesser known manuscripts. This book makes available to a wide mathematical and historical readership some of the most exciting mathematics of the first half of the nineteenth century, presented in its original form. The primary aim is to establish a text of what Galois wrote. The details of what he did, the proper evidence of his genius, deserve to be well understood and appreciated by mathematicians as well as historians of mathematics.
Arithmetic Fundamental Groups and Noncommutative Algebra Cambridge University Press
This volume is the offspring of a week-long workshop on "Galois groups over Q and related topics," which was held at the Mathematical Sciences Research Institute during the week March 23-27, 1987. The organizing committee consisted of Kenneth Ribet (chairman), Yasutaka Ihara, and Jean-Pierre Serre. The conference focused on three principal themes: 1. Extensions of Q with finite simple Galois groups. 2. Galois actions on fundamental groups, nilpotent extensions of Q arising from Fermat curves, and the interplay between Gauss sums and cyclotomic units. 3. Representations of Gal(Q/Q) with values in GL(2)j deformations and connections with modular forms. Here is a summary of the conference program: • G. Anderson: "Gauss sums, circular units and the simplex" • G. Anderson and Y. Ihara: "Galois actions on 11"1 (•••) and higher circular units" • D. Blasius: "Maass forms and Galois representations" • P. Deligne: "Galois action on 1I"1(P-{0, 1, oo}) and Hodge analogue" • W. Feit: "Some Galois groups over number fields" • Y. Ihara: "Arithmetic aspect of Galois actions on 1I"1(P - {O, 1, oo})" - survey talk • U. Jannsen: "Galois cohomology of i-adic representations" • B. Matzat: - "Rationality criteria for Galois extensions" - "How to construct polynomials with Galois group Mll over Q" • B. Mazur: "Deforming GL(2) Galois representations" • K. Ribet: "Lowering the level of modular representations of Gal(Q/ Q)" • J-P. Serre: - Introductory Lecture - "Degree 2 modular representations of Gal(Q/Q)" • J.
Galois Groups Over ? Springer Science & Business Media
Differential Galois theory has seen intense research activity during the last decades in several directions: elaboration of more general theories, computational aspects, model theoretic approaches, applications to classical and quantum mechanics as well as to other mathematical areas such as number theory. This book intends to introduce the reader to this subject by presenting Picard-Vessiot theory, i.e. Galois theory of linear differential equations, in a self-contained way. The needed prerequisites from algebraic geometry and algebraic groups are contained in the first two parts of the book. The third part includes Picard-Vessiot extensions, the fundamental theorem of Picard-Vessiot theory, solvability by quadratures, Fuchsian equations, monodromy group and Kovacic's algorithm. Over one hundred exercises will help to assimilate the concepts and to introduce the reader to some topics beyond the scope of this book. This book is suitable for a graduate course in differential Galois theory. The last chapter contains several suggestions for further reading encouraging the reader to enter more deeply into different topics of differential Galois theory or related fields.
Algebraic Groups and Differential Galois Theory GRIN Verlag
The first comprehensive modern introduction to central simple algebra starting from the basics and reaching advanced results.
Galois Groups and Fundamental Groups Springer Science & Business Media
This book is based on a course given by the author at Harvard University in the fall semester of 1988. The course focused on the inverse problem of Galois Theory: the construction of field extensions having a given finite group as Galois group. In the first part of the book, classical methods and results, such as the Scholz and Reichardt constructi
Algebra and Galois Theories Cambridge University Press
Ever since the concepts of Galois groups in algebra and fundamental groups in topology emerged during the nineteenth century, mathematicians have known of the strong analogies between the two concepts. This book presents the connection starting at an elementary level, showing how the judicious use of algebraic geometry gives access to the powerful interplay between algebra and topology that underpins much modern research in geometry and number theory. Assuming as little technical background as possible, the book starts with basic algebraic and topological concepts, but already presented from the modern viewpoint advocated by Grothendieck. This enables a systematic yet accessible development of the theories of fundamental groups of algebraic curves, fundamental groups of schemes, and Tannakian fundamental groups. The connection between fundamental groups and linear differential equations is also developed at increasing levels of generality. Key applications and recent results, for example on the inverse Galois problem, are given throughout.
Algebra American Mathematical Soc.
Assuming little technical background, the author presents the strong analogies between these two concepts starting at an elementary level.
Topics in Galois Theory Springer Science & Business Media
This book is devoted to the structure of the absolute Galois groups of certain algebraic extensions of the field of rational numbers. Its main result, a theorem proved by the authors and Florian Pop in 2012, describes the absolute Galois group of distinguished semi-local algebraic (and other) extensions of the rational numbers as free products of the free profinite group on countably many generators and local Galois groups. This is an instance of a positive answer to the generalized inverse problem of Galois theory. Adopting both an arithmetic and probabilistic approach, the book carefully sets out the preliminary material needed to prove the main theorem and its supporting results. In addition, it includes a description of Melnikov's construction of free products of profinite groups and, for the first time in book form, an account of a generalization of the theory of free products of profinite groups and their subgroups. The book will be of interest to researchers in field arithmetic, Galois theory and profinite groups.
Aspects of Galois Theory Springer Nature
This self-contained book serves both as an introduction to profinite groups and as a reference for specialists in some areas of the theory. It contains complete and clear proofs for most results, many of which appear here in book form for the first time. Suitable as a basis for courses.
The Mathematical Writings of Évariste Galois Springer
Galois theory is a central part of algebra, dealing with symmetries between solutions of algebraic equations in one variable. This is a collection of papers from the participants of a conference on Galois theory, and brings together articles from some of the world's leading experts in this field. Topics are centred around the Inverse Galois Problem, comprising the full range of methods and approaches in this area, making this an invaluable resource for all those whose research involves Galois theory.
Topological Galois Theory Springer
Field Arithmetic explores Diophantine fields through their absolute Galois groups. This largely self-contained treatment starts with techniques from algebraic geometry, number theory, and profinite groups. Graduate students can effectively learn generalizations of finite field ideas. We use Haar measure on the absolute Galois group to replace counting arguments. New Chebotarev density variants interpret diophantine properties. Here we have the only complete treatment of Galois stratifications, used by Denef and Loeser, et al, to study Chow motives of Diophantine statements. Progress from the first edition starts by characterizing the finite-field like P(seudo)A(lgebraically)C(losed) fields. We once believed PAC fields were rare. Now we know they include valuable Galois extensions of the rationals that present its absolute Galois group through known groups. PAC fields have projective absolute Galois group. Those that are Hilbertian are characterized by this group being pro-free. These last decade results are tools for studying fields by their relation to those with projective absolute group. There are still mysterious problems to guide a new generation: Is the solvable closure of the rationals PAC; and do projective Hilbertian fields have pro-free absolute Galois group (includes Shafarevich's conjecture)?
Inverse Galois Theory Cambridge University Press
This book presents the connection between Galois groups in algebra and fundamental groups in topology. Starting at an elementary level, it shows how the judicious use of algebraic geometry gives access to the powerful interplay between algebra and topology that underpins much modern research in geometry and number theory.
Profinite Groups Springer Science & Business Media
The arithmetic and geometry of moduli spaces and their fundamental groups are a very active research area. This book offers a complete overview of developments made over the last decade. The papers in this volume examine the geometry of moduli spaces of curves with a function on them. The main players in Part 1 are the absolute Galois group $G {\mathbb Q $ of the algebraic numbers and its close relatives. By analyzing how $G {\mathbb Q $ acts on fundamental groups defined by Hurwitz moduli problems, the authors achieve a grand generalization of Serre's program from the 1960s. Papers in Part 2 apply θ-functions and configuration spaces to the study of fundamental groups over positive characteristic fields. In this section, several authors use Grothendieck's famous lifting results to give extensions to wildly ramified covers. Properties of the fundamental groups have brought collaborations between geometers and group theorists. Several Part 3 papers investigate new versions of the genus 0 problem. In particular, this includes results severely limiting possible monodromy groups of sphere covers. Finally, Part 4 papers treat Deligne's theory of Tannakian categories and arithmetic versions of the Kodaira-Spencer map. This volume is geared toward graduate students and research mathematicians interested in arithmetic algebraic geometry.
Fundamental Concepts of Abstract Algebra American Mathematical Soc.
A consistent and near complete survey of the important progress made in the field over the last few years, with the main emphasis on the rigidity method and its applications. Among others, this monograph presents the most successful existence theorems known and construction methods for Galois extensions as well as solutions for embedding problems combined with a collection of the existing Galois realizations.
Galois Groups and Fundamental Groups on Riemann Surfaces Courier Corporation
The section conjecture in anabelian geometry, announced by Grothendieck in 1983, is concerned with a description of the set of rational points of a hyperbolic algebraic curve over a number field in terms of the arithmetic of its fundamental group. While the conjecture is still open today in 2012, its study has revealed interesting arithmetic for curves and opened connections, for example, to the question whether the Brauer-Manin obstruction is the only one against rational points on curves. This monograph begins by laying the foundations for the space of sections of the fundamental group extension of an algebraic variety. Then, arithmetic assumptions on the base field are imposed and the local-to-global approach is studied in detail. The monograph concludes by discussing analogues of the section conjecture created by varying the base field or the type of variety, or by using a characteristic quotient or its birational analogue in lieu of the fundamental group extension.
Progress in Galois Theory Springer
This Lecture Notes volume is the fruit of two research-level summer schools jointly organized by the GTEM node at Lille University and the team of Galatasaray University (Istanbul): "Geometry and Arithmetic of Moduli Spaces of Coverings (2008)" and "Geometry and Arithmetic around Galois Theory (2009)". The volume focuses on geometric methods in Galois theory. The choice of the editors is to provide a complete and comprehensive account of modern points of view on Galois theory and related moduli problems, using stacks, gerbes and groupoids. It contains lecture notes on étale fundamental group and fundamental group scheme, and moduli stacks of curves and covers. Research articles complete the collection.

Arithmetic and Geometry Around Galois Theory Springer
Number theory currently has at least three different perspectives on non-abelian phenomena: the Langlands programme, non-commutative Iwasawa theory and anabelian geometry. In the second half of 2009, experts from each of these three areas gathered at the Isaac Newton Institute in Cambridge to explain the latest advances in their research and to investigate possible avenues of future investigation and collaboration. For those in attendance, the overwhelming impression was that number theory is going through a tumultuous period of theory-building and experimentation analogous to the late 19th century, when many different special reciprocity laws of abelian class field theory were formulated before knowledge of the Artin–Takagi theory. Non-abelian Fundamental Groups and Iwasawa Theory presents the state of the art in theorems, conjectures and speculations that point the way towards a new synthesis, an as-yet-undiscovered unified theory of non-abelian arithmetic geometry.

The Arithmetic of Fundamental Groups Courier Corporation
First year, undergraduate, mathematics students in Japan have for many years had the opportunity of a unique experience---an introduction, at an elementary level, to some very advanced ideas in mathematics from one of the leading mathematicians of the world. English reading students now have the opportunity to enjoy this lively presentation, from elementary ideas to cartoons to funny examples, and to follow the mind of an imaginative and creative mathematician into a world of enduring mathematical creations.

Galois Theory Through Exercises European Mathematical Society
This undergraduate text presents extensive coverage of set theory, groups, rings, modules, vector spaces, and fields. It offers numerous examples, definitions, theorems, proofs, and practice exercises. 1991 edition.