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Classical Galois Theory With Examples Efatwa

An introduction to classical field theory focusing on methods and solutions, providing a foundation for the study of quantum field theory.

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Read Free Classical Galois Theory With Examples Efatwa

Galois theory is a mature mathematical subject of particular beauty. Any Galois theory book written nowadays bears a great debt to Emil Artin ' s classic text "Galois Theory," and this book is no exception. While Artin ' s book

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pioneered an approach to Galois theory that relies heavily on linear algebra, this book ' s author takes the linear algebra emphasis even further. This special approach to the subject together with the clarity of its presentation, as well as the

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choice of topics covered, has made the first edition of this book a more than worthwhile addition to the literature on Galois Theory. The second edition, with a new chapter on transcendental extensions, will only further serve to make the book

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appreciated by and approachable to undergraduate and beginning graduate math majors.

Galois theory is a mature mathematical subject of particular beauty. Any Galois theory book written nowadays bears a great

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debt to Emil Artin ' s classic text "Galois Theory," and this book is no exception. While Artin ' s book pioneered an approach to Galois theory that relies heavily on linear algebra, this book ' s author takes the linear algebra emphasis even

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further. This special approach to the subject together with the clarity of its presentation, as well as the choice of topics covered, makes this book a more than worthwhile addition to the existing literature on Galois Theory. It will be appreciated

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by undergraduate and beginning graduate math majors.

Differential Galois theory is an important, fast developing area which appears more and more in graduate courses since it mixes fundamental objects from many

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different areas of mathematics in a stimulating context. For a long time, the dominant approach, usually called Picard-Vessiot Theory, was purely algebraic. This approach has been extensively developed and is well covered in the literature. An

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alternative approach consists in tagging algebraic objects with transcendental information which enriches the understanding and brings not only new points of view but also new solutions. It is very powerful and can be applied in

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situations where the Picard-Vessiot approach is not easily extended. This book offers a hands-on transcendental approach to differential Galois theory, based on the Riemann-Hilbert correspondence. Along the way, it

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provides a smooth, down-to-earth introduction to algebraic geometry, category theory and tannakian duality. Since the book studies only complex analytic linear differential equations, the main prerequisites are complex function theory, linear

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algebra, and an elementary knowledge of groups and of polynomials in many variables. A large variety of examples, exercises, and theoretical constructions, often via explicit computations, offers first-year

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graduate students an accessible entry into this exciting area. Scheck ' s successful textbook presents a comprehensive treatment, ideally suited for a one-semester course. The textbook describes Maxwell's equations first

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in their integral, directly testable form, then moves on to their local formulation. The first two chapters cover all essential properties of Maxwell's equations, including their symmetries and their covariance in a modern notation. Chapter 3 is

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devoted to Maxwell's theory as a classical field theory and to solutions of the wave equation. Chapter 4 deals with important applications of Maxwell's theory. It includes topical subjects such as metamaterials with negative

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refraction index and solutions of Helmholtz' equation in paraxial approximation relevant for the description of laser beams. Chapter 5 describes non-Abelian gauge theories from a classical, geometric point of view, in analogy to

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Maxwell's theory as a prototype, and culminates in an application to the $U(2)$ theory relevant for electroweak interactions. The last chapter 6 gives a concise summary of semi-Riemannian geometry as the framework for the classical field

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theory of gravitation. The chapter concludes with a discussion of the Schwarzschild solution of Einstein's equations and the classical tests of general relativity. The new concept of this edition presents the content divided into two tracks: the fast

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track for master's students, providing the essentials, and the intensive track for all wanting to get in depth knowledge of the field. Clearly labeled material and sections guide students through the preferred level of treatment.

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Numerous problems and worked examples will provide successful access to Classical Field Theory.

Field Theory and Its Classical Problems

Exploratory Galois Theory

Galois Theory Through Exercises

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Mathematical Aspects of Classical Field Theory

Classical field theory, which concerns the generation and interaction of fields, is a logical precursor to quantum field theory, and can be used to describe

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phenomena such as gravity and electromagnetism. Written for advanced undergraduates, and appropriate for graduate level classes, this book provides a comprehensive introduction to field theories, with a focus on their

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relativistic structural elements.

Such structural notions enable a deeper understanding of Maxwell's equations, which lie at the heart of electromagnetism, and can also be applied to modern variants such as Chern – Simons and Born – Infeld.

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The structure of field theories and their physical predictions are illustrated with compelling examples, making this book perfect as a text in a dedicated field theory course, for self-study, or as a reference for those interested in

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classical field theory, advanced electromagnetism, or general relativity. Demonstrating a modern approach to model building, this text is also ideal for students of theoretical physics.

Classical Galois TheoryWith

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Examples American Mathematical Soc.

The book gives a detailed account of the development of the theory of algebraic equations, from its origins in ancient times to its completion by Galois in the nineteenth century.

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The appropriate parts of works by Cardano, Lagrange, Vandermonde, Gauss, Abel, and Galois are reviewed and placed in their historical perspective, with the aim of conveying to the reader a sense of the way in which the theory of

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algebraic equations has evolved and has led to such basic mathematical notions as "group" and "field". A brief discussion of the fundamental theorems of modern Galois theory and complete proofs of the quoted results are provided,

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and the material is organized in such a way that the more technical details can be skipped by readers who are interested primarily in a broad survey of the theory. In this second edition, the exposition has been improved throughout and the

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chapter on Galois has been entirely rewritten to better reflect Galois' highly innovative contributions. The text now follows more closely Galois' memoir, resorting as sparsely as possible to anachronistic modern notions such

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as field extensions. The emerging picture is a surprisingly elementary approach to the solvability of equations by radicals, and yet is unexpectedly close to some of the most recent methods of Galois theory.

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Explore the foundations and modern applications of Galois theory Galois theory is widely regarded as one of the most elegant areas of mathematics. A Classical Introduction to Galois Theory develops the topic from a

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historical perspective, with an emphasis on the solvability of polynomials by radicals. The book provides a gradual transition from the computational methods typical of early literature on the subject to the more abstract approach that

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characterizes most contemporary expositions. The author provides an easily-accessible presentation of fundamental notions such as roots of unity, minimal polynomials, primitive elements, radical extensions, fixed fields, groups of

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automorphisms, and solvable series. As a result, their role in modern treatments of Galois theory is clearly illuminated for readers. Classical theorems by Abel, Galois, Gauss, Kronecker, Lagrange, and Ruffini are presented, and the

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power of Galois theory as both a theoretical and computational tool is illustrated through: A study of the solvability of polynomials of prime degree Development of the theory of periods of roots of unity Derivation of the classical formulas

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for solving general quadratic, cubic, and quartic polynomials by radicals
Throughout the book, key theorems are proved in two ways, once using a classical approach and then again utilizing modern methods.
Numerous worked examples

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showcase the discussed techniques, and background material on groups and fields is provided, supplying readers with a self-contained discussion of the topic. A Classical Introduction to Galois Theory is an excellent

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resource for courses on abstract algebra at the upper-undergraduate level. The book is also appealing to anyone interested in understanding the origins of Galois theory, why it was created, and how it has evolved into the discipline it is

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today.

This text offers a clear, efficient exposition of Galois Theory with exercises and complete proofs.

Topics include: Cardano's formulas; the Fundamental Theorem; Galois' Great Theorem (solvability for

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radicals of a polynomial is equivalent to solvability of its Galois Group); and computation of Galois group of cubics and quartics. There are appendices on group theory and on ruler-compass constructions. Developed on the

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basis of a second-semester graduate algebra course, following a course on group theory, this book will provide a concise introduction to Galois Theory suitable for graduate students, either as a text for a course or for study outside the

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classroom.

Factorization Algebras in Quantum
Field Theory

Electrodynamics and Classical
Theory of Fields and Particles

Galois Theory

Classical Field Theory and the

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Stress-Energy Tensor

Clearly presented discussions of fields, vector spaces, homogeneous linear equations, extension fields, polynomials, algebraic elements, as well as sections on solvable groups, permutation groups, solution of

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equations by radicals, and other concepts. 1966 edition.

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

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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

This 1984 book aims to make the general theory of field extensions

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accessible to any reader with a modest background in groups, rings and vector spaces. Galois theory is regarded amongst the central and most beautiful parts of algebra and its creation marked the culmination of generations of investigation.

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This book is devoted to the relation between two different concepts of integrability: the complete integrability of complex analytical Hamiltonian systems and the integrability of complex analytical linear differential equations. For linear differential

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equations, integrability is made precise within the framework of differential Galois theory. The connection of these two integrability notions is given by the variational equation (i.e. linearized equation) along a particular integral curve of the Hamiltonian system. The

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underlying heuristic idea, which motivated the main results presented in this monograph, is that a necessary condition for the integrability of a Hamiltonian system is the integrability of the variational equation along any of its particular integral curves. This

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idea led to the algebraic non-integrability criteria for Hamiltonian systems. These criteria can be considered as generalizations of classical non-integrability results by Poincaré and Lyapunov, as well as more recent results by Ziglin and

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Yoshida. Thus, by means of the differential Galois theory it is not only possible to understand all these approaches in a unified way but also to improve them. Several important applications are also included: homogeneous potentials, Bianchi IX

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cosmological model, three-body problem, Hénon-Heiles system, etc. The book is based on the original joint research of the author with J.M. Peris, J.P. Ramis and C. Simó, but an effort was made to present these achievements in their logical order

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*rather than their historical one. The necessary background on differential Galois theory and Hamiltonian systems is included, and several new problems and conjectures which open new lines of research are proposed. - -
- The book is an excellent introduction*

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to non-integrability methods in Hamiltonian mechanics and brings the reader to the forefront of research in the area. The inclusion of a large number of worked-out examples, many of wide applied interest, is commendable. There are many

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historical references, and an extensive bibliography. (Mathematical Reviews)
For readers already prepared in the two prerequisite subjects [differential Galois theory and Hamiltonian dynamical systems], the author has provided a logically accessible account

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of a remarkable interaction between differential algebra and dynamics.

(Zentralblatt MATH)

Contemporary quantum field theory is mainly developed as quantization of classical fields. Therefore, classical field theory and its BRST extension is

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the necessary step towards quantum field theory. This book aims to provide a complete mathematical foundation of Lagrangian classical field theory and its BRST extension for the purpose of quantization. Based on the standard geometric formulation of theory of

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nonlinear differential operators, Lagrangian field theory is treated in a very general setting. Reducible degenerate Lagrangian theories of even and odd fields on an arbitrary smooth manifold are considered. The second Noether theorems generalized

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to these theories and formulated in the homology terms provide the strict mathematical formulation of BRST extended classical field theory. The most physically relevant field theories OCo gauge theory on principal bundles, gravitation theory on natural

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bundles, theory of spinor fields and topological field theory OCo are presented in a complete way. This book is designed for theoreticians and mathematical physicists specializing in field theory. The authors have tried throughout to provide the necessary

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*mathematical background, thus
making the exposition self-contained.
Field Extensions and Galois Theory
Galois' Theory of Algebraic Equations
The Theoretical Minimum
From Classical Field Theory to
Perturbative Quantum Field Theory*

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A modern and student-friendly introduction to this popular subject: it takes a more "natural" approach and develops the theory at a gentle pace with an emphasis on clear explanations. Features plenty of worked examples and exercises, complete with full

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solutions, to encourage independent study Previous books by Howie in the SUMS series have attracted excellent reviews

The book describes Maxwell's equations first in their integral, directly testable form, then moves on to their

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local formulation. The first two chapters cover all essential properties of Maxwell's equations, including their symmetries and their covariance in a modern notation. Chapter 3 is devoted to Maxwell theory as a classical field theory and to solutions of the wave

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equation. Chapter 4 deals with important applications of Maxwell theory. It includes topical subjects such as metamaterials with negative refraction index and solutions of Helmholtz' equation in paraxial approximation relevant for the

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description of laser beams. Chapter 5 describes non-Abelian gauge theories from a classical, geometric point of view, in analogy to Maxwell theory as a prototype, and culminates in an application to the $U(2)$ theory relevant for electroweak interactions. The last

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chapter 6 gives a concise summary of semi-Riemannian geometry as the framework for the classical field theory of gravitation. The chapter concludes with a discussion of the Schwarzschild solution of Einstein's equations and the classical tests of general relativity

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(perihelion precession of Mercury, and light deflection by the sun). -----

Textbook features: detailed figures, worked examples, problems and solutions, boxed inserts, highlighted special topics, highlighted important math etc., helpful summaries,

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appendix, index.

Lucid coverage of the major theories of abstract algebra, with helpful illustrations and exercises included throughout. Unabridged, corrected republication of the work originally published 1971. Bibliography. Index.

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Includes 24 tables and figures.

Galois theory is considered one of the most beautiful subjects in mathematics, but it is hard to appreciate this fact fully without seeing specific examples. Numerous examples are therefore included throughout this text, in the

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hope that they will lead to a deeper understanding and genuine appreciation of the more abstract and advanced literature on Galois theory. Classical field theory predicts how physical fields interact with matter, and is a logical precursor to quantum

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field theory. This introduction focuses purely on modern classical field theory, helping graduates and researchers build an understanding of classical field theory methods before embarking on future studies in quantum field theory. It describes

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various classical methods for fields with negligible quantum effects, for instance electromagnetism and gravitational fields. It focuses on solutions that take advantage of classical field theory methods as opposed to applications or geometric

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properties. Other fields covered includes fermionic fields, scalar fields and Chern–Simons fields. Methods such as symmetries, global and local methods, Noether theorem and energy momentum tensor are also discussed, as well as important solutions of the

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*classical equations, in particular
soliton solutions.*

*Special Relativity and Classical Field
Theory*

Cogalois Theory

Second Edition

Problem Book in Quantum Field

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Theory

An introduction to the classical notions behind modern Galois theory. Comprehensive graduate-level text by a distinguished

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theoretical physicist reveals the classical underpinnings of modern quantum field theory. Topics include space-time, Lorentz transformations,

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conservation laws,
equations of motion,
Green's functions, and
more. 1964 edition.

Based on a highly
regarded lecture course
at Moscow State

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University, this is a clear and systematic introduction to gauge field theory. It is unique in providing the means to master gauge field theory prior to

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the advanced study of quantum mechanics.

Though gauge field theory is typically included in courses on quantum field theory, many of its ideas and

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results can be understood at the classical or semi-classical level.

Accordingly, this book is organized so that its early chapters require

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no special knowledge of quantum mechanics.

Aspects of gauge field theory relying on quantum mechanics are introduced only later and in a graduated

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fashion--making the text ideal for students studying gauge field theory and quantum mechanics simultaneously. The book begins with the basic

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concepts on which gauge field theory is built.

It introduces gauge-invariant Lagrangians and describes the spectra of linear perturbations, including

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perturbations above nontrivial ground states. The second part focuses on the construction and interpretation of classical solutions that

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exist entirely due to the nonlinearity of field equations: solitons, bounces, instantons, and sphalerons. The third section considers some

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of the interesting effects that appear due to interactions of fermions with topological scalar and gauge fields.

Mathematical digressions

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and numerous problems are included throughout. An appendix sketches the role of instantons as saddle points of Euclidean functional integral and related

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topics. Perfectly suited as an advanced undergraduate or beginning graduate text, this book is an excellent starting point for anyone seeking to

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understand gauge fields. Galois connections provide the order- or structure-preserving passage between two worlds of our imagination - and thus

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are inherent in human thinking wherever logical or mathematical reasoning about certain hierarchical structures is involved. Order-theoretically, a Galois

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connection is given simply by two opposite order-inverting (or order preserving) maps whose composition yields two closure operations (or one closure and one

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kernel operation in the order-preserving case). Thus, the "hierarchies" in the two opposite worlds are reversed or transported when passing to the other world, and

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going forth and back becomes a stationary process when iterated. The advantage of such an "adjoint situation" is that information about objects and

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relationships in one of the two worlds may be used to gain new information about the other world, and vice versa. In classical Galois theory, for

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instance, properties of permutation groups are used to study field extensions. Or, in algebraic geometry, a good knowledge of polynomial rings gives

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insight into the structure of curves, surfaces and other algebraic varieties, and conversely.

Moreover, restriction to the "Galois-closed" or

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"Galois-open" objects (the fixed points of the composite maps) leads to a precise "duality between two maximal subworlds".

This book develops a

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novel approach to perturbative quantum field theory: starting with a perturbative formulation of classical field theory, quantization is achieved

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by means of deformation quantization of the underlying free theory and by applying the principle that as much of the classical structure as possible

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should be maintained.
The resulting
formulation of
perturbative quantum
field theory is a
version of the Epstein-
Glaser renormalization

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that is conceptually clear, mathematically rigorous and pragmatically useful for physicists. The connection to traditional formulations

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of perturbative quantum field theory is also elaborated on, and the formalism is illustrated in a wealth of examples and exercises.

Topics in Galois Theory

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Classical Galois Theory
Classical Field Theory
With Examples

**This first volume develops
factorization algebras
with a focus upon
examples exhibiting their**

Page 106/180

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**use in field theory, which
will be useful for
researchers and
graduates.**

**In the fall of 1990, I
taught Math 581 at New
Mexico State University**

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for the first time. This course on field theory is the first semester of the year-long graduate algebra course here at NMSU. In the back of my mind, I thought it would

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**be nice someday to write
a book on field theory,
one of my favorite
mathematical subjects,
and I wrote a crude form
of lecture notes that
semester. Those notes sat**

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undisturbed for three years until late in 1993 when I finally made the decision to turn the notes into a book. The notes were greatly expanded and rewritten, and they

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**were in a form sufficient
to be used as the text for
Math 581 when I taught it
again in the fall of 1994.
Part of my desire to write
a textbook was due to the
nonstandard format of**

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**our graduate algebra
sequence. The first
semester of our sequence
is field theory. Our
graduate students
generally pick up group
and ring theory in a**

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senior-level course prior to taking field theory. Since we start with field theory, we would have to jump into the middle of most graduate algebra textbooks. This can make

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**reading the text difficult
by not knowing what the
author did before the
field theory chapters.
Therefore, a book devoted
to field theory is desirable
for us as a text. While**

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there are a number of field theory books around, most of these were less complete than I wanted.

Combining a concrete perspective with an

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**exploration-based
approach, Exploratory
Galois Theory develops
Galois theory at an
entirely undergraduate
level. The text grounds
the presentation in the**

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**concept of algebraic
numbers with complex
approximations and
assumes of its readers
only a first course in
abstract algebra. For
readers with Maple or**

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Mathematica, the text introduces tools for hands-on experimentation with finite extensions of the rational numbers, enabling a familiarity never before available to

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**students of the subject.
The text is appropriate
for traditional lecture
courses, for seminars, or
for self-paced
independent study by
undergraduates and**

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graduate students.

**Since 1973, Galois Theory
has been educating
undergraduate students
on Galois groups and
classical Galois theory. In
Galois Theory, Fifth**

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**Edition, mathematician
and popular science
author Ian Stewart
updates this well-
established textbook for
today's algebra students.
New to the Fifth Edition**

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**Reorganised and revised
Chapters 7 and 13 New
exercises and examples
Expanded, updated
references Further
historical material on
figures besides Galois:**

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**Omar Khayyam,
Vandermonde, Ruffini,
and Abel A new final
chapter discussing other
directions in which Galois
Theory has developed: the
inverse Galois problem,**

Page 123/180

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**differential Galois theory,
and a (very) brief
introduction to p-adic
Galois representations**
**This bestseller continues
to deliver a rigorous, yet
engaging, treatment of**

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**the subject while keeping
pace with current
educational
requirements. More than
200 exercises and a
wealth of historical notes
augment the proofs,**

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**formulas, and theorems.
This book is a concise
introduction to the key
concepts of classical field
theory for beginning
graduate students and
advanced undergraduate**

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**students who wish to
study the unifying
structures and physical
insights provided by
classical field theory
without dealing with the
additional complication of**

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quantization. In that regard, there are many important aspects of field theory that can be understood without quantizing the fields. These include the action

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**formulation, Galilean and
relativistic invariance,
traveling and standing
waves, spin angular
momentum, gauge
invariance, subsidiary
conditions, fluctuations,**

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spinor and vector fields, conservation laws and symmetries, and the Higgs mechanism, all of which are often treated briefly in a course on quantum field theory.

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Classical Theory of Gauge Fields

**Proceedings of the AMS-
IMS-SIAM Joint Summer
Research Conference
Held July 20-26, 1991,
with Support from the**

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**National Science
Foundation**

**Algebra für Einsteiger
Fundamentals and
Applications**

*Acclaimed by American
Mathematical Monthly as*

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"an excellent introduction, "this treatment ranges from basic definitions to important results and applications, introducing both the

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spirit and techniques of abstract algebra. It develops the elementary properties of rings and fields, explores extension fields and Galois theory, and

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examines numerous applications. 1982 edition.

This textbook offers a unique introduction to classical Galois theory through many concrete

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examples and exercises of varying difficulty (including computer-assisted exercises). In addition to covering standard material, the book explores topics

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related to classical problems such as Galois' theorem on solvable groups of polynomial equations of prime degrees, Nagell's proof of non-solvability by

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*radicals of quintic
equations,
Tschirnhausen's
transformations, lunes
of Hippocrates, and
Galois' resolvents.
Topics related to open*

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conjectures are also discussed, including exercises related to the inverse Galois problem and cyclotomic fields. The author presents proofs of theorems,

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historical comments and useful references alongside the exercises, providing readers with a well-rounded introduction to the subject and a gateway to

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further reading. A valuable reference and a rich source of exercises with sample solutions, this book will be useful to both students and lecturers. Its original

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concept makes it particularly suitable for self-study.

Extending Structures: Fundamentals and Applications treats the extending structures

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*(ES) problem in the
context of groups,
Lie/Leibniz algebras,
associative algebras and
Poisson/Jacobi algebras.
This concisely written
monograph offers the*

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reader an incursion into the extending structures problem which provides a common ground for studying both the extension problem and the factorization

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*problem. Features
Provides a unified
approach to the
extension problem and
the factorization
problem Introduces the
classifying complements*

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problem as a sort of converse of the factorization problem; and in the case of groups it leads to a theoretical formula for computing the number of

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*types of isomorphisms of
all groups of finite
order that arise from a
minimal set of data
Describes a way of
classifying a certain
class of finite Lie/Leib*

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*niz/Poisson/Jacobi/associative algebras etc.
using flag structures
Introduces new
(non)abelian
cohomological objects
for all of the*

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aforementioned categories As an application to the approach used for dealing with the classification part of the ES problem, the

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Galois groups associated with extensions of Lie algebras and associative algebras are described Galois theory is the culmination of a centuries-long search

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*for a solution to the
classical problem of
solving algebraic
equations by radicals.
In this book,
Bewersdorff follows the
historical development*

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of the theory, emphasizing concrete examples along the way. As a result, many mathematical abstractions are now seen as the natural

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consequence of particular investigations. Few prerequisites are needed beyond general college mathematics, since the necessary ideas and

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properties of groups and fields are provided as needed. Results in Galois theory are formulated first in a concrete, elementary way, then in the modern form. Each

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chapter begins with a simple question that gives the reader an idea of the nature and difficulty of what lies ahead. The applications of the theory to

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*geometric constructions,
including the ancient
problems of squaring the
circle, duplicating the
cube, and trisecting an
angle, and the
construction of regular*

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n -gons are also presented. This book is suitable for undergraduates and beginning graduate students.

This volume offers a

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*systematic,
comprehensive
investigation of field
extensions, finite or
not, that possess a
Galois correspondence.
The subject is somewhat*

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dual to the very classical Galois Theory dealing with field extensions possessing a Galois correspondence. Solidly backed by over 250 exercises and an

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extensive bibliography, this book presents a compact and complete review of basic field theory, considers the Vahlen-Capelli Criterion, investigates

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*the radical, Kneser,
strongly Kneser,
Cogalois, and G-Cogalois
extensions, discusses
field extensions that
are simultaneously
Galois and G-Cogalois,*

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*and presents nice
applications to
elementary field
arithmetic.*

*Galois Theory of Linear
Differential Equations*

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Elements of Abstract Algebra Extending Structures

This text concerns continuum mechanics, electrodynamics and the mechanics of electrically polarized media, and gravity. Geared toward advanced undergraduates

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and graduate students, it offers an accessible approach that formulates theories according to the principle of least action. The chief advantage of this formulation is its simplicity and ease, making the physical content of classical subjects available to students of physics in a concise form. Author Davison E. Soper,

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a Professor of Physics at the University of Oregon, intended this treatment as a primary text for courses in classical field theory as well as a supplement for courses in classical mechanics or classical electrodynamics. Topics include fields and transformation laws, the principle of stationary action, general features of

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classical field theory, the mechanics of fluids and elastic solids, special types of solids, nonrelativistic approximations, and the electromagnetic field. Additional subjects include electromagnetically polarized materials, gravity, momentum conservation in general relativity, and dissipative processes.

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The Problem Book in Quantum Field Theory contains about 200 problems with solutions or hints that help students to improve their understanding and develop skills necessary for pursuing the subject. It deals with the Klein-Gordon and Dirac equations, classical field theory, canonical quantization of scalar, Dirac and

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electromagnetic fields, the processes in the lowest order of perturbation theory, renormalization and regularization. The solutions are presented in a systematic and complete manner. The material covered and the level of exposition make the book appropriate for graduate and undergraduate students in physics, as well

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as for teachers and researchers.

Classical field theory, which concerns the generation and interaction of fields, is a logical precursor to quantum field theory, and can be used to describe phenomena such as gravity and electromagnetism.

Written for advanced undergraduates, and appropriate for graduate level classes, this

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book provides a comprehensive introduction to field theories, with a focus on their relativistic structural elements. Such structural notions enable a deeper understanding of Maxwell's equations, which lie at the heart of electromagnetism and can also be applied to modern variants such as Chern-Simons and Born-

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Infeld. The structure of field theories and their physical predictions are illustrated with compelling examples, making this book perfect as a text in a dedicated field theory course, for self-study, or as a reference for those interested in classical field theory, advanced electromagnetism, or general relativity. Demonstrating a

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modern approach to model building, this text is also ideal for students of theoretical physics.

The third volume in the bestselling physics series cracks open Einstein's special relativity and field theory. Physicist Leonard Susskind and data engineer Art Friedman are back. This time, they

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introduce readers to Einstein's special relativity and Maxwell's classical field theory. Using their typical brand of real math, enlightening drawings, and humor, Susskind and Friedman walk us through the complexities of waves, forces, and particles by exploring special relativity and electromagnetism. It's a must-read for

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both devotees of the series and any armchair physicist who wants to improve their knowledge of physics' deepest truths. From the reviews: "This is a great book, which will hopefully become a classic in the subject of differential Galois theory. [...] the specialist, as well as the novice, have long been missing an introductory

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book covering also specific and advanced research topics. This gap is filled by the volume under review, and more than satisfactorily." Mathematical Reviews Differential Galois Theory through Riemann-Hilbert Correspondence Introduction to Field Theory Lectures Delivered at the University of

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Notre Dame by Emil Artin (Notre Dame Mathematical Lectures,

Galois Connections and Applications

Classical field theory has undergone a renaissance in recent years.

Symplectic techniques have yielded deep insights into its foundations, as

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has an improved understanding of the variational calculus. Further impetus for the study of classical fields has come from other areas, such as integrable systems, Poisson geometry, global analysis, and quantum theory. This book contains the proceedings of

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the AMS-IMS-SIAM Joint Summer
Research Conference on
Mathematical Aspects of Classical
Field Theory, held in July 1991 at the
University of Washington at Seattle.
The conference brought together
researchers in many of the main areas

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of classical field theory to present the latest ideas and results. The volume contains thirty refereed papers, both survey and research articles, and is designed to reflect the state of the art as well as chart the future course of the subject.

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Advanced Classical Field Theory
Differential Galois Theory and Non-
Integrability of Hamiltonian Systems
Fields and Galois Theory
On Electrodynamics, Non-Abelian
Gauge Theories and Gravitation