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FRANCIS HESS

Hodge Theory and Complex Algebraic Geometry I: Springer Science & Business Media

A collection of articles discussing integrable systems and algebraic geometry from leading researchers in the field.

Ideals, Varieties, and Algorithms Springer Science & Business Media

The subject of elliptic curves is one of the jewels of nineteenth-century mathematics, originated by Abel, Gauss, Jacobi, and Legendre. This 1997 book presents an introductory account of the subject in the style of the original discoverers, with references to and comments about more recent and modern developments. It combines three of the fundamental themes of mathematics: complex function theory, geometry, and arithmetic. After an informal preparatory chapter, the book follows an historical path, beginning with the work of Abel and Gauss on elliptic integrals and elliptic functions. This is followed by chapters on theta functions, modular groups and modular functions, the quintic, the imaginary quadratic field, and on elliptic curves. Requiring only a first acquaintance with complex function theory, this book is an ideal introduction to the subject for graduate students and researchers in mathematics and physics, with many exercises with hints scattered throughout the text.

Geometry and Topology of Manifolds: Surfaces and Beyond Springer Nature

This fine book by Herb Clemens quickly became a favorite of many algebraic geometers when it was first published in 1980. It has been popular with novices and experts ever since. It is written as a book of "impressions" of a journey through the theory of complex algebraic curves. Many topics of compelling beauty occur along the way. A cursory glance at the subjects visited reveals a wonderfully eclectic selection, from conics and cubics to theta functions, Jacobians, and questions of moduli. By the end of the book, the theme of theta functions becomes clear, culminating in the Schottky problem. The author's intent was to motivate further study and to stimulate mathematical activity. The attentive reader will learn much about complex algebraic curves and the tools used to study them. The book can be especially useful to anyone preparing a course on the topic of complex curves or anyone interested in supplementing his/her reading.

Conics and Cubics American Mathematical Soc.

The book presents the central facts of the local, projective and intrinsic theories of complex algebraic plane curves, with complete proofs and starting from low-level prerequisites. It includes Puiseux series, branches, intersection multiplicity, Bézout theorem, rational functions, Riemann-Roch theorem and rational maps. It is aimed at graduate and advanced undergraduate students, and also at anyone interested in algebraic curves or in an introduction to algebraic geometry via curves.

Riemann Surfaces and Algebraic Curves Cambridge University Press

Developed over more than a century, and still an active area of research today, the classification of algebraic surfaces is an intricate and fascinating branch of mathematics. In this book Professor Beauville gives a lucid and concise account of the subject, following the strategy of F. Enriques, but expressed simply in the language of modern topology and sheaf theory, so as to be accessible to any budding geometer. This volume is self contained and the exercises succeed both in giving the flavour of the extraordinary wealth of examples in the classical subject, and in equipping the reader with most of the techniques needed for research.

Introduction to Compact Riemann Surfaces and Dessins D'Enfants Springer Science & Business Media

Written at a level appropriate to undergraduates, this book covers such topics as the Hilbert Basis Theorem, the Nullstellensatz, invariant theory, projective geometry, and dimension theory. The book bases its discussion of algorithms on a generalisation of the division algorithm for polynomials in one variable that was only discovered in the 1960's. Although the algorithmic roots of algebraic geometry are old, the computational aspects were neglected earlier in this century. This has changed in recent years, and new algorithms, coupled with the power of fast computers, have let to some interesting applications, for example in robotics and in geometric theorem proving. In preparing this new edition, the authors present an improved proof of the Buchberger Criterion as well as a proof of Bezout's Theorem.

Singular Points of Plane Curves Springer

A collection of articles discussing integrable systems and

algebraic geometry from leading researchers in the field.

Elementary Algebraic Geometry OUP Oxford

An introduction to abstract algebraic geometry, with the only prerequisites being results from commutative algebra, which are stated as needed, and some elementary topology. More than 400 exercises distributed throughout the book offer specific examples as well as more specialised topics not treated in the main text, while three appendices present brief accounts of some areas of current research. This book can thus be used as textbook for an introductory course in algebraic geometry following a basic graduate course in algebra. Robin Hartshorne studied algebraic geometry with Oscar Zariski and David Mumford at Harvard, and with J.-P. Serre and A. Grothendieck in Paris. He is the author of "Residues and Duality", "Foundations of Projective Geometry", "Ample Subvarieties of Algebraic Varieties", and numerous research titles.

Lectures on Logarithmic Algebraic Geometry Springer Science & Business Media

This book represents a novel approach to differential topology. Its main focus is to give a comprehensive introduction to the classification of manifolds, with special attention paid to the case of surfaces, for which the book provides a complete classification from many points of view: topological, smooth, constant curvature, complex, and conformal. Each chapter briefly revisits basic results usually known to graduate students from an alternative perspective, focusing on surfaces. We provide full proofs of some remarkable results that sometimes are missed in basic courses (e.g., the construction of triangulations on surfaces, the classification of surfaces, the Gauss-Bonnet theorem, the degree-genus formula for complex plane curves, the existence of constant curvature metrics on conformal surfaces), and we give hints to questions about higher dimensional manifolds. Many examples and remarks are scattered through the book. Each chapter ends with an exhaustive collection of problems and a list of topics for further study. The book is primarily addressed to graduate students who did take standard introductory courses on algebraic topology, differential and Riemannian geometry, or algebraic geometry, but have not seen their deep interconnections, which permeate a modern approach to geometry and topology of manifolds.

A Scrapbook of Complex Curve Theory American Mathematical Soc.

The theory of Riemann surfaces occupies a very special place in mathematics. It is a culmination of much of traditional calculus, making surprising connections with geometry and arithmetic. It is an extremely useful part of mathematics, knowledge of which is needed by specialists in many other fields. It provides a model for a large number of more recent developments in areas including manifold topology, global analysis, algebraic geometry, Riemannian geometry, and diverse topics in mathematical physics. This graduate text on Riemann surface theory proves the fundamental analytical results on the existence of meromorphic functions and the Uniformisation Theorem. The approach taken emphasises PDE methods, applicable more generally in global analysis. The connection with geometric topology, and in particular the role of the mapping class group, is also explained. To this end, some more sophisticated topics have been included, compared with traditional texts at this level. While the treatment is novel, the roots of the subject in traditional calculus and complex analysis are kept well in mind. Part I sets up the interplay between complex analysis and topology, with the latter treated informally. Part II works as a rapid first course in Riemann surface theory, including elliptic curves. The core of the book is contained in Part III, where the fundamental analytical results are proved. Following this section, the remainder of the text illustrates various facets of the more advanced theory.

Complex Algebraic Surfaces Cambridge University Press

An elementary account of the theory of compact Riemann surfaces and an introduction to the Belyi-Grothendieck theory of dessins d'enfants.

Recent Advances in Algebraic Geometry Springer Science & Business Media

This book details the heart and soul of modern commutative and algebraic geometry. It covers such topics as the Hilbert Basis Theorem, the Nullstellensatz, invariant theory, projective geometry, and dimension theory. In addition to enhancing the text of the second edition, with over 200 pages reflecting changes to enhance clarity and correctness, this third edition of *Ideals, Varieties and Algorithms* includes: a significantly updated section on Maple; updated information on AXIOM, CoCoA, Macaulay 2, Magma, Mathematica and SINGULAR; and presents a shorter proof of the Extension Theorem.

Complex Algebraic Curves Princeton University Press

* Employs proven conception of teaching topics in commutative algebra through a focus on their applications to algebraic geometry, a significant departure from other works on plane algebraic curves in which the topological-analytic aspects are stressed *Requires only a basic knowledge of algebra, with all necessary algebraic facts collected into several appendices * Studies algebraic curves over an algebraically closed field K and those of prime characteristic, which can be applied to coding theory and cryptography * Covers filtered algebras, the associated graded rings and Rees rings to deduce basic facts about intersection theory of plane curves, applications of which are standard tools of computer algebra * Examples, exercises, figures and suggestions for further study round out this fairly self-contained textbook

A Concise Introduction to Algebraic Varieties Springer Science & Business Media

This monograph deals with symmetries of compact Riemann surfaces. A symmetry of a compact Riemann surface S is an antianalytic involution of S. It is well known that Riemann surfaces exhibiting symmetry correspond to algebraic curves which can be defined over the field of real numbers. In this monograph we consider three topics related to the topology of symmetries, namely the number of conjugacy classes of symmetries, the numbers of ovals of symmetries and the symmetry types of Riemann surfaces.

Undergraduate Algebraic Geometry Cambridge University Press

This book provides an accessible and self-contained introduction to the theory of algebraic curves over a finite field, a subject that has been of fundamental importance to mathematics for many years and that has essential applications in areas such as finite geometry, number theory, error-correcting codes, and cryptology. Unlike other books, this one emphasizes the algebraic geometry rather than the function field approach to algebraic curves. The authors begin by developing the general theory of curves over any field, highlighting peculiarities occurring for positive characteristic and requiring of the reader only basic knowledge of algebra and geometry. The special properties that a curve over a finite field can have are then discussed. The geometrical theory of linear series is used to find estimates for the number of rational points on a curve, following the theory of Stöhr and Voloch. The approach of Hasse and Weil via zeta functions is explained, and then attention turns to more advanced results: a state-of-the-art introduction to maximal curves over finite fields is provided; a comprehensive account is given of the automorphism group of a curve; and some applications to coding theory and finite geometry are described. The book includes many examples and exercises. It is an indispensable resource for researchers and the ideal textbook for graduate students.

Complex Projective Geometry Cambridge University Press

This book covers the design, construction, and implementation of algebraic-geometric codes from Hermitian curves. Matlab simulations of algebraic-geometric codes and Reed-Solomon codes compare their bit error rate using different modulation schemes over additive white Gaussian noise channel model. Simulation results of Algebraic-geometric codes bit error rate performance using quadrature amplitude modulation (16QAM and 64QAM) are presented for the first time and shown to outperform Reed-Solomon codes at various code rates and channel models. The book proposes algebraic-geometric block turbo codes. It also presents simulation results that show an improved bit error rate performance at the cost of high system complexity due to using algebraic-geometric codes and Chase-Pyndiah's algorithm simultaneously. The book proposes algebraic-geometric irregular block turbo codes (AG-IBTC) to reduce system complexity. Simulation results for AG-IBTCs are presented for the first time.

Algebraic Curves and Riemann Surfaces for

Undergraduates American Mathematical Society

Algebraic Geometry has been at the center of much of mathematics for hundreds of years. It is not an easy field to break into, despite its humble beginnings in the study of circles, ellipses, hyperbolas, and parabolas. This text consists of a series of ex

Algebraic Curves and Riemann Surfaces Cambridge University Press

This is an excellent introduction to algebraic geometry, which assumes only standard undergraduate mathematical topics: complex analysis, rings and fields, and topology. Reading this book will help establish the geometric intuition that lies behind the more advanced ideas and techniques used in the study of higher-dimensional varieties.

Forward Error Correction Based On Algebraic-Geometric Theory Springer Science & Business Media

This graduate textbook offers a self-contained introduction to the

concepts and techniques of logarithmic geometry, a key tool for analyzing compactification and degeneration in algebraic geometry and number theory. It features a systematic exposition of the foundations of the field, from the basic results on convex geometry and commutative monoids to the theory of logarithmic schemes and their de Rham and Betti cohomology. The book will be of use to graduate students and researchers working in algebraic, analytic, and arithmetic geometry as well as related

fields.

[Plane Algebraic Curves](#) American Mathematical Soc.

Hurwitz theory, the study of analytic functions among Riemann surfaces, is a classical field and active research area in algebraic geometry. The subject's interplay between algebra, geometry, topology and analysis is a beautiful example of the interconnectedness of mathematics. This book introduces students to this increasingly important field, covering key topics such as manifolds, monodromy representations and the Hurwitz

potential. Designed for undergraduate study, this classroom-tested text includes over 100 exercises to provide motivation for the reader. Also included are short essays by guest writers on how they use Hurwitz theory in their work, which ranges from string theory to non-Archimedean geometry. Whether used in a course or as a self-contained reference for graduate students, this book will provide an exciting glimpse at mathematics beyond the standard university classes.