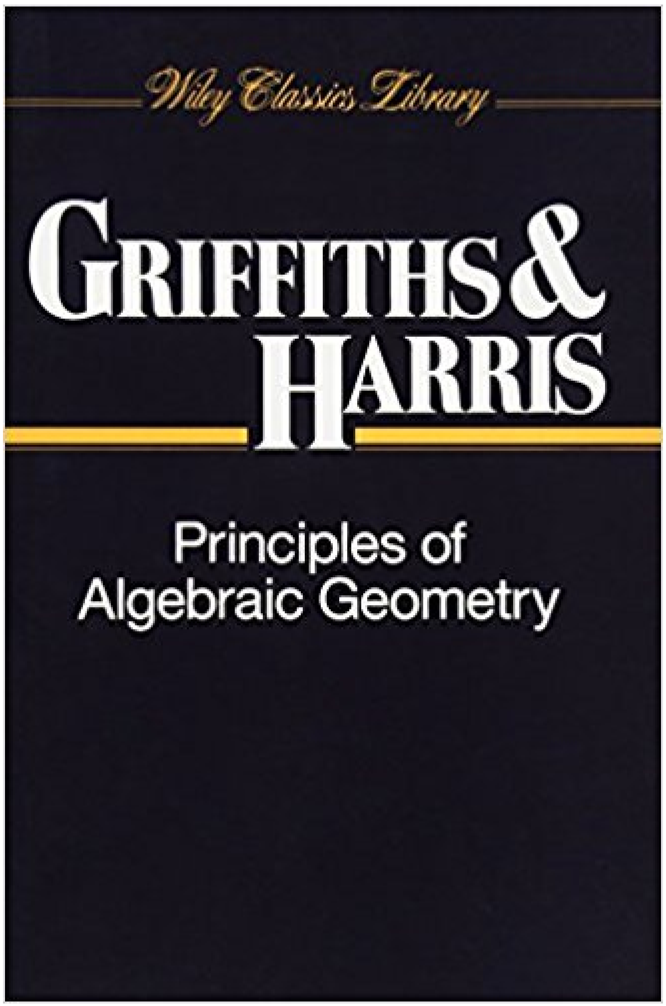
Principles Of Algebraic Geometry



Synopsis

A comprehensive, self-contained treatment presenting general results of the theory. Establishes a geometric intuition and a working facility with specific geometric practices. Emphasizes applications through the study of interesting examples and the development of computational tools. Coverage ranges from analytic to geometric. Treats basic techniques and results of complex manifold theory, focusing on results applicable to projective varieties, and includes discussion of the theory of Riemann surfaces and algebraic curves, algebraic surfaces and the quadric line complex as well as special topics in complex manifolds.

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Customer Reviews

Changes in algebraic geometry have made it a subject that, over the past few years, has become increasingly inaccessible to all but the specialist. This comprehensive, self-contained treatment presents some of the main, general results of the theory accompanied by (and with emphasis on) their applications to the study of interesting examples and to the development of computational tools. It establishes a geometric intuition and a working facility with specific geometric practices, providing mathematicians and physicists with a greater accessibility to the field. The effective utilization of the techniques of elementary complex analysis and topology synthesize the classical and the modern—the geometric and the abstract-into a cohesive presentation. Coverage ranges from analytic to geometric along classical lines. Basic techniques and results of complex manifold theory are treated, focusing on results applicable to projective varieties. Further discussions include the theory of Riemann surfaces and algebraic curves, algebraic surfaces and the quadric line complex, and special topics in complex manifolds.

Other volumes in the Pure and Applied Mathematics series— The Algebraic Structure of Group Rings Donald S. Passman This book offers a comprehensive, self-contained treatment of group rings of infinite groups. It begins with basic definitions and contains background material on group theory and ring theory. Major topics considered include: the trace map, the augmentation ideal and dimension subgroups, linear and polynomial identities and their relationship to the center, semisimplicity and primitivity, polycyclic-by-finite groups and Philip Hall’s problem, zero divisors, and isomorphism questions. 1977 Topological Uniform Structures Warren Page Here is an overall unifying theme of topologies compatible with increasingly enriched algebraic structures, showing the rich interplay among mathematics’ diverse areas. It studies mathematics as a structured, coherent, and harmonious whole, giving a detailed examination of uniform spaces, topological groups, topological vector spaces, topological algebras, and abstract harmonic analysis. Also includes a section on topological vector-valued measure spaces and numerous problems and examples. The text is virtually self-contained, presenting detailed proofs, stressing readability and motivation, and covering much advanced material. 1978 Applied Abstract Analysis Jean-Pierre Aubin Discusses all the main theorems of topology by introducing and studying principal topics in the elementary framework of metric spaces. Considers various applications in differential equations, dynamic systems, game theory, and economics, illustrating the advantages of using an abstract approach to solve problems of a more concrete nature. Also includes a concise review of essential results, a set of exercises and problems, and a terminological index. 1977

Advance and comprehensive. A good reference book.

Great! Book was in perfect condition.

Excellenta book

A classic

thank you

Once thought to be highly esoteric and useless by those interested in applications, algebraic geometry has literally taken the world by storm. Indeed, coding theory, cryptography, steganography, computer graphics, control theory, and artificial intelligence are just a few of the areas that are now making heavy use of algebraic geometry. This book would probably be the most useful one for those interested in applications, for it is an overview of algebraic geometry from the complex analytic point of view, and complex analysis is a subject that most engineers and scientists have had to learn at some point in their careers. But one must not think that this book is entirely concrete in its content. There are many places where the authors discuss concepts that are very abstract, particularly the discussion of sheaf theory, and this might make its reading difficult. The complex analytic point of view however is the best way of learning the material from a practical point of view, and mastery of this book will pave the way for indulging oneself in its many applications. Algebraic geometry is an exciting subject, but one must master some background material before beginning a study of it. This is done in the initial part of the book (Part 0), wherein the reader will find an overview of harmonic analysis (potential theory) and Kahler geometry in the context of compact complex manifolds. Readers first encountering Kahler geometry should just view it as a generalization of Euclidean geometry in a complex setting. Indeed, the so-called Kahler condition is nothing other than an approximation of the Euclidean metric to order 2 at each point. The authors choose to introduce algebraic varieties in a projective space setting in chapter 1, i.e. they are the set of complex zeros of homogeneous polynomials in projective space. The absence of a global holomorphic function for a compact complex manifold motivates a study of meromorphic functions and divisors. Divisors are introduced as formal sums of irreducible analytic hypersurfaces, but they are related to the defining functions for these hypersurfaces also, via the poles and zeros of meromorphic functions. For the mathematical purist, a "sheafified" version of divisors is also outlined. Divisors and line bundles are basically "linear" tools used to investigate complex varieties through their representation as complex submanifolds of projective space. In addition, various approaches are used to study codimension-one subvarieties, such as the results of Kodaira and Spencer. Although the famous Kodaira vanishing theorem is clothed in the language of Cech cohomology, this cohomology is represented by harmonic forms, thus making its understanding more accessible. The authors also show explicitly to what extent an algebraic variety can be thought of as a compact complex manifold via the Kodaira embedding theorem. Projective space of course is not the most complicated of constructions, as readers familiar with the theory of vector bundles will know. Grassmannians are an example of this, and they are introduced and discussed in the book as generalizations of projective space. And, just as in the ordinary theory of vector bundles, the authors show how to use Grassmannians to act as universal bundles for holomorphic vector bundles. The presence of meromorphic functions will alert the astute reader as to the role of Riemann surfaces in the study of complex algebraic varieties. Indeed, in chapter 2, the authors cast many classical complex analytic results to modern ones, and they prove the famous Riemann-Roch theorem, which essentially counts the number of meromorphic functions on a Riemann surface of genus g. The theory of Abelian varieties is outlined, and the reader gets a taste of "Italian" algebraic geometry but done in the rigorous setting of Plucker formulas and coordinates. Chapter 3 is a summary of some of the other methodologies and techniques used to study general analytic varieties, the first of these being the theory of currents, i.e differential forms with distribution coefficients. It is perhaps not surprising to see this applied here, given that it can handle both the smooth and piecewise smooth chains simultaneously. The currents are associated to analytic varieties and allow a definition of their intersection numbers and a proof that they are positive. The all-important Chern classes are introduced here, and it is shown that the Chern classes of a holomorphic vector bundle over an algebraic variety are fundamental classes of algebraic cycles. Most importantly the authors introduce spectral sequences, a topic that is usually formidable for newcomers to algebraic geometry. The study of surfaces is studied in chapter 4, with the differences between its study and the theory of curves (Riemann surfaces) emphasized. The reader gets a first crack at the notion of a rational map, and the birational classification of surfaces is shown. Intuitively, one expects that the classification of surfaces would be easy if it were not for "singular points", and this is born out in the use of blowing up singularities in this chapter. Rational surfaces are characterized using Noether’s lemma, and a rather detailed discussion is given of surfaces that are not rational, giving the reader more examples of rigorous "Italian" geometry.

Harris and Griffiths covers and amazing number of topics from complex algebraic/differential/analytic geometry in a unified way. However the book has tons of typos, incomplete arguments, wrong arguments and a lot of (non trivial) mathematical inaccuracies spread throughout the book. In my opinion, these problems greatly affects the quality and potential of the book. A second edition could have fixed some of these problems, however it never appeared. In spite of this, this book is still suitable as a good supplement to many others great books available where you can find most of the topics cover in Harris and Griffiths.

Just wanted to add the following:1) The mathematics in this book is some of the most beautiful stuff I’ve ever seen. I don’t in any way mean to deny the beauty of the Spec of a Ring, but - even if you have always planned on working in Grothendeick's world - I think this is worth reading for any algebraic geometer (regardless of what field you're living over).With their bare hands, Griffiths and Harris prove some of the greatest results in maths. I learned more reading Chapter O than I did taking the entire collection of "first- year" grad courses (algebra & analysis). The material was more interesting, and it tied together in a way that had you remember all of it. From elliptic operator theory to the representation of sl(2), in the same chapter!2) For string theorists trying to learn some of the math lingo, this is a necessary first step, though I would also highly recommend Candelas's notes, and Aspinwall's great paper, "K3 Surfaces and String Duality". Also, Brian Greene's notes are very nice. T. Hubsch's book is also great for the big picture, but I was disappointed by several non-trivial errors in his explanations of math concepts. I recommend all of the above to mathematicians as well - I am a mathematician, and I learned a lot of valuable side material from these physics sources. Especially in trying to understand mirror symmetry. Of course, Cox and Katz's newish book is also excellent for this.3) My favorite parts: chap 1: divisors and line bundles, the exp sheaf sequence. read this, and then skip to the same picture for line bundles on a torus. the same type of bouncing back and forth works for getting the analogs between Reimann surfaces and complex surfaces...actually, every page of this huge book has something valuable. I can't imagine what it was like to learn this field before this book came along. The price is exorbitant, but in the grand scheme of things, I've spent hundreds (thousands?) on math books that lie on my shelf, never to be explored. this one has given me years of enjoyment.

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