

Algebra Geometry An Introduction To University Mathematics

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Algebraic Geometry - Elena Rubei 2014-05-27
Algebraic geometry is one of the most classic subjects of university research in mathematics. It has a very complicated language that makes

life very difficult for beginners. This book is a little dictionary of algebraic geometry: for every of the most common words in algebraic geometry, it contains its definition, several

references and the statements of the main theorems about that term (without their proofs). Also some terms of other subjects, close to algebraic geometry, have been included. It was born to help beginners that know some basic facts of algebraic geometry, but not every basic fact, to follow seminars and to read papers, by providing them with basic definitions and statements. The form of a dictionary makes it very easy and quick to consult.

Distilling Ideas - Brian P. Katz 2013

Mathematics is not a spectator sport: successful students of mathematics grapple with ideas for themselves. Distilling Ideas presents a carefully designed sequence of exercises and theorem statements that challenge students to create proofs and concepts. As students meet these challenges, they discover strategies of proofs and strategies of thinking beyond mathematics. In other words, Distilling Ideas helps its users to develop the skills, attitudes, and habits of mind of a mathematician and to enjoy the process of

distilling and exploring ideas. Distilling Ideas is an ideal textbook for a first proof-based course. The text engages the range of students' preferences and aesthetics through a corresponding variety of interesting mathematical content from graphs, groups, and epsilon-delta calculus. Each topic is accessible to users without a background in abstract mathematics because the concepts arise from asking questions about everyday experience. All the common proof structures emerge as natural solutions to authentic needs. Distilling Ideas or any subset of its chapters is an ideal resource either for an organized Inquiry Based Learning course or for individual study. A student response to Distilling Ideas: "I feel that I have grown more as a mathematician in this class than in all the other classes I've ever taken throughout my academic life."

An Introduction to Algebraic Geometry - Kenji Ueno 1997

This introduction to algebraic geometry allows

readers to grasp the fundamentals of the subject with only linear algebra and calculus as prerequisites. After a brief history of the subject, the book introduces projective spaces and projective varieties, and explains plane curves and resolution of their singularities. The volume further develops the geometry of algebraic curves and treats congruence zeta functions of algebraic curves over a finite field. It concludes with a complex analytical discussion of algebraic curves. The author emphasizes computation of concrete examples rather than proofs, and these examples are discussed from various viewpoints. This approach allows readers to develop a deeper understanding of the theorems.

Algebraic Geometry - Robin Hartshorne
2013-06-29

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.

Elementary Algebraic Geometry - Keith Kendig
2015-02-18

"This second edition of an introductory text is intended for advanced undergraduate and graduate students who have taken a one-year course in algebra and are familiar with complex analysis. Concrete examples and exercises illuminate chapters on curves, ring theory,

arbitrary dimension, and other topics. Includes numerous updated figures specially redrawn for this edition. 2014 edition"--

Algebraic Geometry - Joe Harris 2013-11-11

"This book succeeds brilliantly by concentrating on a number of core topics...and by treating them in a hugely rich and varied way. The author ensures that the reader will learn a large amount of classical material and perhaps more importantly, will also learn that there is no one approach to the subject. The essence lies in the range and interplay of possible approaches. The author is to be congratulated on a work of deep and enthusiastic scholarship." --

MATHEMATICAL REVIEWS

Introduction to Tropical Geometry - Diane Maclagan 2021-12-13

Tropical geometry is a combinatorial shadow of algebraic geometry, offering new polyhedral tools to compute invariants of algebraic varieties. It is based on tropical algebra, where the sum of two numbers is their minimum and

the product is their sum. This turns polynomials into piecewise-linear functions, and their zero sets into polyhedral complexes. These tropical varieties retain a surprising amount of information about their classical counterparts. Tropical geometry is a young subject that has undergone a rapid development since the beginning of the 21st century. While establishing itself as an area in its own right, deep connections have been made to many branches of pure and applied mathematics. This book offers a self-contained introduction to tropical geometry, suitable as a course text for beginning graduate students. Proofs are provided for the main results, such as the Fundamental Theorem and the Structure Theorem. Numerous examples and explicit computations illustrate the main concepts. Each of the six chapters concludes with problems that will help the readers to practice their tropical skills, and to gain access to the research literature. This wonderful book will appeal to students and researchers of all

stripes: it begins at an undergraduate level and ends with deep connections to toric varieties, compactifications, and degenerations. In between, the authors provide the first complete proofs in book form of many fundamental results in the subject. The pages are sprinkled with illuminating examples, applications, and exercises, and the writing is lucid and meticulous throughout. It is that rare kind of book which will be used equally as an introductory text by students and as a reference for experts. —Matt Baker, Georgia Institute of Technology

Tropical geometry is an exciting new field, which requires tools from various parts of mathematics and has connections with many areas. A short definition is given by Maclagan and Sturmfels: “Tropical geometry is a marriage between algebraic and polyhedral geometry”. This wonderful book is a pleasant and rewarding journey through different landscapes, inviting the readers from a day at a beach to the hills of modern algebraic geometry. The authors present

building blocks, examples and exercises as well as recent results in tropical geometry, with ingredients from algebra, combinatorics, symbolic computation, polyhedral geometry and algebraic geometry. The volume will appeal both to beginning graduate students willing to enter the field and to researchers, including experts.

—Alicia Dickenstein, University of Buenos Aires, Argentina

Algebraic Geometry - Daniel Perrin 2007-12-16

Aimed primarily at graduate students and beginning researchers, this book provides an introduction to algebraic geometry that is particularly suitable for those with no previous contact with the subject; it assumes only the standard background of undergraduate algebra. The book starts with easily-formulated problems with non-trivial solutions and uses these problems to introduce the fundamental tools of modern algebraic geometry: dimension; singularities; sheaves; varieties; and cohomology. A range of exercises is provided for

each topic discussed, and a selection of problems and exam papers are collected in an appendix to provide material for further study.

Algebraic Geometry - Thomas A. Garrity
2013-02-01

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

Commutative Algebra - J. William Hoffman
2016-05-13

The purpose of this book is twofold: to present some basic ideas in commutative algebra and algebraic geometry and to introduce topics of current research, centered around the themes of Gröbner bases, resultants and syzygies. The presentation of the material combines definitions and proofs with an emphasis on concrete examples. The authors illustrate the use of software such as Mathematica and Singular. The

design of the text in each chapter consists of two parts: the fundamentals and the applications, which make it suitable for courses of various lengths, levels, and topics based on the mathematical background of the students. The fundamentals portion of the chapter is intended to be read with minimal outside assistance, and to learn some of the most useful tools in commutative algebra. The applications of the chapter are to provide a glimpse of the advanced mathematical research where the topics and results are related to the material presented earlier. In the applications portion, the authors present a number of results from a wide range of sources without detailed proofs. The applications portion of the chapter is suitable for a reader who knows a little commutative algebra and algebraic geometry already, and serves as a guide to some interesting research topics. This book should be thought of as an introduction to more advanced texts and research topics. Its novelty is that the material presented is a unique

combination of the essential methods and the current research results. The goal is to equip readers with the fundamental classical algebra and geometry tools, ignite their research interests, and initiate some potential research projects in the related areas.

Algebra & Geometry - Mark V. Lawson

2016-11-25

Algebra & Geometry: An Introduction to University Mathematics provides a bridge between high school and undergraduate mathematics courses on algebra and geometry. The author shows students how mathematics is more than a collection of methods by presenting important ideas and their historical origins throughout the text. He incorporates a hands-on approach to proofs and connects algebra and geometry to various applications. The text focuses on linear equations, polynomial equations, and quadratic forms. The first several chapters cover foundational topics, including the importance of proofs and properties commonly

encountered when studying algebra. The remaining chapters form the mathematical core of the book. These chapters explain the solution of different kinds of algebraic equations, the nature of the solutions, and the interplay between geometry and algebra

Computational Algebraic Geometry - Hal

Schenck 2003-10-06

Table of contents

An Invitation to Algebraic Geometry - Karen E.

Smith 2013-03-09

This is a description of the underlying principles of algebraic geometry, some of its important developments in the twentieth century, and some of the problems that occupy its practitioners today. It is intended for the working or the aspiring mathematician who is unfamiliar with algebraic geometry but wishes to gain an appreciation of its foundations and its goals with a minimum of prerequisites. Few algebraic prerequisites are presumed beyond a basic course in linear algebra.

Introduction to Algebraic Geometry - Serge Lang
2019-03-20

Author Serge Lang defines algebraic geometry as the study of systems of algebraic equations in several variables and of the structure that one can give to the solutions of such equations. The study can be carried out in four ways: analytical, topological, algebraico-geometric, and arithmetic. This volume offers a rapid, concise, and self-contained introductory approach to the algebraic aspects of the third method, the algebraico-geometric. The treatment assumes only familiarity with elementary algebra up to the level of Galois theory. Starting with an opening chapter on the general theory of places, the author advances to examinations of algebraic varieties, the absolute theory of varieties, and products, projections, and correspondences. Subsequent chapters explore normal varieties, divisors and linear systems, differential forms, the theory of simple points, and algebraic groups, concluding with a focus on

the Riemann-Roch theorem. All the theorems of a general nature related to the foundations of the theory of algebraic groups are featured.

Algebraic Geometry - S. Iitaka 2011-10-14

The aim of this book is to introduce the reader to the geometric theory of algebraic varieties, in particular to the birational geometry of algebraic varieties. This volume grew out of the author's book in Japanese published in 3 volumes by Iwanami, Tokyo, in 1977. While writing this English version, the author has tried to rearrange and rewrite the original material so that even beginners can read it easily without referring to other books, such as textbooks on commutative algebra. The reader is only expected to know the definition of Noetherian rings and the statement of the Hilbert basis theorem. The new chapters 1, 2, and 10 have been expanded. In particular, the exposition of D-dimension theory, although shorter, is more complete than in the old version. However, to keep the book of manageable size, the latter

parts of Chapters 6, 9, and 11 have been removed. I thank Mr. A. Sevenster for encouraging me to write this new version, and Professors K. K. Kubota in Kentucky and P. M. H. Wilson in Cambridge for their careful and critical reading of the English manuscripts and typescripts. I held seminars based on the material in this book at The University of Tokyo, where a large number of valuable comments and suggestions were given by students Iwamiya, Kawamata, Norimatsu, Tobita, Tsushima, Maeda, Sakamoto, Tsunoda, Chou, Fujiwara, Suzuki, and Matsuda.

An Introduction to Algebraic Topology - Joseph J. Rotman 2013-11-11

A clear exposition, with exercises, of the basic ideas of algebraic topology. Suitable for a two-semester course at the beginning graduate level, it assumes a knowledge of point set topology and basic algebra. Although categories and functors are introduced early in the text, excessive generality is avoided, and the author explains

the geometric or analytic origins of abstract concepts as they are introduced.

An Introduction to Geometric Algebra and Geometric Calculus - Michael D Taylor
2021-08-02

This is an introduction to geometric algebra in n -dimensional Euclidean space and its application to manifolds and to calculus on manifolds. The treatment is moderately rigorous and is suitable for advanced undergraduates and beginning graduate students in mathematics though it should also be accessible to well-prepared students in physics, engineering, computer science, statistics, etc. Preparation in linear algebra and multivariable analysis as encountered in calculus as well as a modest amount of mathematical maturity should be sufficient.

Introduction to Algebraic Geometry - Justin R. Smith 2014

This book is intended for self-study or as a textbook for graduate students or advanced

undergraduates. It presupposes some basic knowledge of point-set topology and a solid foundation in linear algebra. Otherwise, it develops all of the commutative algebra, sheaf theory and cohomology needed to understand the material. It also presents applications to robotics and other fields.

An Introduction to Algebraic Geometry and Algebraic Groups - Meinolf Geck 2013-03-14

An accessible text introducing algebraic groups at advanced undergraduate and early graduate level, this book covers the conjugacy of Borel subgroups and maximal tori, the theory of algebraic groups with a BN-pair, Frobenius maps on affine varieties and algebraic groups, zeta functions and Lefschetz numbers for varieties over finite fields.

Elementary Algebraic Geometry - Klaus Hulek 2003

This book is a true introduction to the basic concepts and techniques of algebraic geometry. The language is purposefully kept on an

elementary level, avoiding sheaf theory and cohomology theory. The introduction of new algebraic concepts is always motivated by a discussion of the corresponding geometric ideas. The main point of the book is to illustrate the interplay between abstract theory and specific examples. The book contains numerous problems that illustrate the general theory. The text is suitable for advanced undergraduates and beginning graduate students. It contains sufficient material for a one-semester course. The reader should be familiar with the basic concepts of modern algebra. A course in one complex variable would be helpful, but is not necessary.

Complex Analysis and Algebraic Geometry - Kunihiko Kodaira 1977-11-24

The articles in this volume cover some developments in complex analysis and algebraic geometry. The book is divided into three parts. Part I includes topics in the theory of algebraic surfaces and analytic surface. Part II covers

topics in moduli and classification problems, as well as structure theory of certain complex manifolds. Part III is devoted to various topics in algebraic geometry analysis and arithmetic. A survey article by Ueno serves as an introduction to the general background of the subject matter of the volume. The volume was written for Kunihiko Kodaira on the occasion of his sixtieth birthday, by his friends and students. Professor Kodaira was one of the world's leading mathematicians in algebraic geometry and complex manifold theory: and the contributions reflect those concerns.

Introduction to Algebraic Geometry -

Brendan Hassett 2007-05-03

Algebraic geometry, central to pure mathematics, has important applications in such fields as engineering, computer science, statistics and computational biology, which exploit the computational algorithms that the theory provides. Users get the full benefit, however, when they know something of the

underlying theory, as well as basic procedures and facts. This book is a systematic introduction to the central concepts of algebraic geometry most useful for computation. Written for advanced undergraduate and graduate students in mathematics and researchers in application areas, it focuses on specific examples and restricts development of formalism to what is needed to address these examples. In particular, it introduces the notion of Gröbner bases early on and develops algorithms for almost everything covered. It is based on courses given over the past five years in a large interdisciplinary programme in computational algebraic geometry at Rice University, spanning mathematics, computer science, biomathematics and bioinformatics.

Methods of Algebraic Geometry in Control

Theory: Part I - Peter Falb 2018-08-25

"An introduction to the ideas of algebraic geometry in the motivated context of system theory." Thus the author describes his textbook

that has been specifically written to serve the needs of students of systems and control. Without sacrificing mathematical care, the author makes the basic ideas of algebraic geometry accessible to engineers and applied scientists. The emphasis is on constructive methods and clarity rather than abstraction. The student will find here a clear presentation with an applied flavor, of the core ideas in the algebra-geometric treatment of scalar linear system theory. The author introduces the four representations of a scalar linear system and establishes the major results of a similar theory for multivariable systems appearing in a succeeding volume (Part II: Multivariable Linear Systems and Projective Algebraic Geometry). Prerequisites are the basics of linear algebra, some simple notions from topology and the elementary properties of groups, rings, and fields, and a basic course in linear systems. Exercises are an integral part of the treatment and are used where relevant in the main body of

the text. The present, softcover reprint is designed to make this classic textbook available to a wider audience. "This book is a concise development of affine algebraic geometry together with very explicit links to the applications...[and] should address a wide community of readers, among pure and applied mathematicians." —*Monatshefte für Mathematik*
Algebraic Geometry and Arithmetic Curves - Qing Liu 2006-06-29

This new-in-paperback edition provides a general introduction to algebraic and arithmetic geometry, starting with the theory of schemes, followed by applications to arithmetic surfaces and to the theory of reduction of algebraic curves. The first part introduces basic objects such as schemes, morphisms, base change, local properties (normality, regularity, Zariski's Main Theorem). This is followed by the more global aspect: coherent sheaves and a finiteness theorem for their cohomology groups. Then follows a chapter on sheaves of differentials,

dualizing sheaves, and Grothendieck's duality theory. The first part ends with the theorem of Riemann-Roch and its application to the study of smooth projective curves over a field. Singular curves are treated through a detailed study of the Picard group. The second part starts with blowing-ups and desingularisation (embedded or not) of fibered surfaces over a Dedekind ring that leads on to intersection theory on arithmetic surfaces. Castelnuovo's criterion is proved and also the existence of the minimal regular model. This leads to the study of reduction of algebraic curves. The case of elliptic curves is studied in detail. The book concludes with the fundamental theorem of stable reduction of Deligne-Mumford. This book is essentially self-contained, including the necessary material on commutative algebra. The prerequisites are few, and including many examples and approximately 600 exercises, the book is ideal for graduate students.

Introduction to Differential Geometry - Joel

W. Robbin 2022-01-12

This textbook is suitable for a one semester lecture course on differential geometry for students of mathematics or STEM disciplines with a working knowledge of analysis, linear algebra, complex analysis, and point set topology. The book treats the subject both from an extrinsic and an intrinsic view point. The first chapters give a historical overview of the field and contain an introduction to basic concepts such as manifolds and smooth maps, vector fields and flows, and Lie groups, leading up to the theorem of Frobenius. Subsequent chapters deal with the Levi-Civita connection, geodesics, the Riemann curvature tensor, a proof of the Cartan-Ambrose-Hicks theorem, as well as applications to flat spaces, symmetric spaces, and constant curvature manifolds. Also included are sections about manifolds with nonpositive sectional curvature, the Ricci tensor, the scalar curvature, and the Weyl tensor. An additional chapter goes beyond the scope of a one semester

lecture course and deals with subjects such as conjugate points and the Morse index, the injectivity radius, the group of isometries and the Myers-Steenrod theorem, and Donaldson's differential geometric approach to Lie algebra theory.

Introduction to Algebraic Geometry - Igor Kriz
2021-03-13

The goal of this book is to provide an introduction to algebraic geometry accessible to students. Starting from solutions of polynomial equations, modern tools of the subject soon appear, motivated by how they improve our understanding of geometrical concepts. In many places, analogies and differences with related mathematical areas are explained. The text approaches foundations of algebraic geometry in a complete and self-contained way, also covering the underlying algebra. The last two chapters include a comprehensive treatment of cohomology and discuss some of its applications in algebraic geometry.

Introduction to Algebraic Geometry - Steven Dale Cutkosky 2018-06-01

This book presents a readable and accessible introductory course in algebraic geometry, with most of the fundamental classical results presented with complete proofs. An emphasis is placed on developing connections between geometric and algebraic aspects of the theory. Differences between the theory in characteristic and positive characteristic are emphasized. The basic tools of classical and modern algebraic geometry are introduced, including varieties, schemes, singularities, sheaves, sheaf cohomology, and intersection theory. Basic classical results on curves and surfaces are proved. More advanced topics such as ramification theory, Zariski's main theorem, and Bertini's theorems for general linear systems are presented, with proofs, in the final chapters. With more than 200 exercises, the book is an excellent resource for teaching and learning introductory algebraic geometry.

Undergraduate Algebraic Geometry - Miles Reid
1988-12-15

Algebraic geometry is, essentially, the study of the solution of equations and occupies a central position in pure mathematics. This short and readable introduction to algebraic geometry will be ideal for all undergraduate mathematicians coming to the subject for the first time. With the minimum of prerequisites, Dr Reid introduces the reader to the basic concepts of algebraic geometry including: plane conics, cubics and the group law, affine and projective varieties, and non-singularity and dimension. He is at pains to stress the connections the subject has with commutative algebra as well as its relation to topology, differential geometry, and number theory. The book arises from an undergraduate course given at the University of Warwick and contains numerous examples and exercises illustrating the theory.

Methods of Algebraic Geometry in Control Theory: Part II - Peter Falb 2018-09-14

"An introduction to the ideas of algebraic geometry in the motivated context of system theory." This describes this two volume work which has been specifically written to serve the needs of researchers and students of systems, control, and applied mathematics. Without sacrificing mathematical rigor, the author makes the basic ideas of algebraic geometry accessible to engineers and applied scientists. The emphasis is on constructive methods and clarity rather than on abstraction. While familiarity with Part I is helpful, it is not essential, since a considerable amount of relevant material is included here. Part I, Scalar Linear Systems and Affine Algebraic Geometry, contains a clear presentation, with an applied flavor, of the core ideas in the algebra-geometric treatment of scalar linear system theory. Part II extends the theory to multivariable systems. After delineating limitations of the scalar theory through carefully chosen examples, the author introduces seven representations of a

multivariable linear system and establishes the major results of the underlying theory. Of key importance is a clear, detailed analysis of the structure of the space of linear systems including the full set of equations defining the space. Key topics also covered are the Geometric Quotient Theorem and a highly geometric analysis of both state and output feedback. Prerequisites are the basics of linear algebra, some simple topological notions, the elementary properties of groups, rings, and fields, and a basic course in linear systems. Exercises, which are an integral part of the exposition throughout, combined with an index and extensive bibliography of related literature make this a valuable classroom tool or good self-study resource. The present, softcover reprint is designed to make this classic textbook available to a wider audience. "The exposition is extremely clear. In order to motivate the general theory, the author presents a number of examples of two or three input-, two-output systems in detail. I

highly recommend this excellent book to all those interested in the interplay between control theory and algebraic geometry." —Publications Mathematicae, Debrecen "This book is the multivariable counterpart of Methods of Algebraic Geometry in Control Theory, Part I.... In the first volume the simpler single-input-single-output time-invariant linear systems were considered and the corresponding simpler affine algebraic geometry was used as the required prerequisite. Obviously, multivariable systems are more difficult and consequently the algebraic results are deeper and less transparent, but essential in the understanding of linear control theory.... Each chapter contains illustrative examples throughout and terminates with some exercises for further study."

—Mathematical Reviews

Algebraic and Analytic Geometry - Amnon

Neeman 2007-09-13

Modern introduction to algebraic geometry for undergraduates; uses analytic ideas to access

algebraic theory.

Algebraic Geometry - Ulrich Görtz 2010-08-09

This book introduces the reader to modern algebraic geometry. It presents Grothendieck's technically demanding language of schemes that is the basis of the most important developments in the last fifty years within this area. A systematic treatment and motivation of the theory is emphasized, using concrete examples to illustrate its usefulness. Several examples from the realm of Hilbert modular surfaces and of determinantal varieties are used methodically to discuss the covered techniques. Thus the reader experiences that the further development of the theory yields an ever better understanding of these fascinating objects. The text is complemented by many exercises that serve to check the comprehension of the text, treat further examples, or give an outlook on further results. The volume at hand is an introduction to schemes. To get started, it requires only basic knowledge in abstract algebra and topology.

Essential facts from commutative algebra are assembled in an appendix. It will be complemented by a second volume on the cohomology of schemes.

Introduction to Algebraic Geometry - Serge Lang 2019-03-20

Rapid, concise, self-contained introduction assumes only familiarity with elementary algebra. Subjects include algebraic varieties; products, projections, and correspondences; normal varieties; differential forms; theory of simple points; algebraic groups; more. 1958 edition.

An Introduction to Linear Algebra - L. Mirsky 2012-12-03

Rigorous, self-contained coverage of determinants, vectors, matrices and linear equations, quadratic forms, more. Elementary, easily readable account with numerous examples and problems at the end of each chapter.

Introduction to Projective Geometry - C. R. Wylie 2011-09-12

This introductory volume offers strong reinforcement for its teachings, with detailed examples and numerous theorems, proofs, and exercises, plus complete answers to all odd-numbered end-of-chapter problems. 1970 edition.

College Geometry - Nathan Altshiller-Court
2013-12-30

The standard university-level text for decades, this volume offers exercises in construction problems, harmonic division, circle and triangle geometry, and other areas. 1952 edition, revised and enlarged by the author.

Algebraic Geometry I: Schemes - Ulrich Görtz
2020-07-27

This book introduces the reader to modern algebraic geometry. It presents Grothendieck's technically demanding language of schemes that is the basis of the most important developments in the last fifty years within this area. A systematic treatment and motivation of the theory is emphasized, using concrete examples

to illustrate its usefulness. Several examples from the realm of Hilbert modular surfaces and of determinantal varieties are used methodically to discuss the covered techniques. Thus the reader experiences that the further development of the theory yields an ever better understanding of these fascinating objects. The text is complemented by many exercises that serve to check the comprehension of the text, treat further examples, or give an outlook on further results. The volume at hand is an introduction to schemes. To get started, it requires only basic knowledge in abstract algebra and topology. Essential facts from commutative algebra are assembled in an appendix. It will be complemented by a second volume on the cohomology of schemes.

Algebraic Geometry and Commutative Algebra - Siegfried Bosch 2022-04-23

Algebraic Geometry is a fascinating branch of Mathematics that combines methods from both Algebra and Geometry. It transcends the limited

scope of pure Algebra by means of geometric construction principles. Putting forward this idea, Grothendieck revolutionized Algebraic Geometry in the late 1950s by inventing schemes. Schemes now also play an important role in Algebraic Number Theory, a field that used to be far away from Geometry. The new point of view paved the way for spectacular progress, such as the proof of Fermat's Last Theorem by Wiles and Taylor. This book explains the scheme-theoretic approach to Algebraic Geometry for non-experts, while more advanced readers can use it to broaden their view on the subject. A separate part presents the necessary prerequisites from Commutative Algebra, thereby providing an accessible and self-contained introduction to advanced Algebraic Geometry. Every chapter of the book is preceded by a motivating introduction with an informal discussion of its contents and background. Typical examples, and an abundance of exercises illustrate each section. Therefore the book is an

excellent companion for self-studying or for complementing skills that have already been acquired. It can just as well serve as a convenient source for (reading) course material and, in any case, as supplementary literature. The present edition is a critical revision of the earlier text.

Noncommutative Algebraic Geometry - Gwyn Bellamy 2016-06-20

This book provides a comprehensive introduction to the interactions between noncommutative algebra and classical algebraic geometry.

An Undergraduate Primer in Algebraic Geometry - Ciro Ciliberto 2021-05-05

This book consists of two parts. The first is devoted to an introduction to basic concepts in algebraic geometry: affine and projective varieties, some of their main attributes and examples. The second part is devoted to the theory of curves: local properties, affine and projective plane curves, resolution of

singularities, linear equivalence of divisors and linear series, Riemann–Roch and Riemann–Hurwitz Theorems. The approach in this book is purely algebraic. The main tool is commutative algebra, from which the needed results are recalled, in most cases with proofs. The prerequisites consist of the knowledge of basics in affine and projective geometry, basic algebraic concepts regarding rings, modules, fields, linear algebra, basic notions in the theory of categories, and some elementary point-set topology. This book can be used as a textbook for an undergraduate course in algebraic geometry. The users of the book are not necessarily intended to become algebraic geometers but may be interested students or researchers who want to have a first smattering in the topic. The book contains several exercises, in which there are more examples and parts of the theory that are not fully developed in the text. Of some exercises, there are solutions at the end of each chapter.

Algebraic Geometry - S. Iitaka 1982

The aim of this book is to introduce the reader to the geometric theory of algebraic varieties, in particular to the birational geometry of algebraic varieties. This volume grew out of the author's book in Japanese published in 3 volumes by Iwanami, Tokyo, in 1977. While writing this English version, the author has tried to rearrange and rewrite the original material so that even beginners can read it easily without referring to other books, such as textbooks on commutative algebra. The reader is only expected to know the definition of Noetherian rings and the statement of the Hilbert basis theorem. The new chapters 1, 2, and 10 have been expanded. In particular, the exposition of D-dimension theory, although shorter, is more complete than in the old version. However, to keep the book of manageable size, the latter parts of Chapters 6, 9, and 11 have been removed. I thank Mr. A. Sevenster for encouraging me to write this new version, and

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where a large number of valuable comments and suggestions were given by students Iwamiya, Kawamata, Norimatsu, Tobita, Tsushima, Maeda, Sakamoto, Tsunoda, Chou, Fujiwara, Suzuki, and Matsuda.