Commutative Algebra With A View Toward Algebraic Geometry Corrected 3rd Printing

Combinatorial Commutative AlgebraIntroduction to Algebraic Geometry and Commutative AlgebraA Singular Introduction to Commutative AlgebraIntroduction To Commutative AlgebraAlgebraic Geometry and Commutative AlgebraComputational Methods in Commutative Algebra and Algebraic GeometryIntroduction to Commutative Algebra and Algebraic GeometryHistory Algebraic GeometryFuzzy Commutative AlgebraRepresentation TheoryCohen-Macaulay RingsA Course in Constructive AlgebraCommutative AlgebraLocal AlgebraCommutative AlgebraThe Geometry of SyzygiesAn Introduction to Commutative AlgebraGröbner BasesGraduate AlgebraCommutative AlgebraUndergraduate Commutative AlgebraA Term of Commutative AlgebraCommutative AlgebraProgress in Commutative Algebra 1Computational Commutative Algebra 1Basic Commutative AlgebraCommutative Ring TheoryProgress in Commutative Algebra 2The Use of Ultraproducts in Commutative AlgebraA Course in Commutative AlgebraCommutative Algebra and Algebraic GeometryGraduate AlgebraSteps in Commutative AlgebraCombinatorics and Commutative AlgebraAlgebraic GeometryCommutatve Algbra With A View Toward AlgThe Geometry of SchemesCommutative Algebra:

Constructive MethodsAn Introduction to Homological AlgebraAdvances in Commutative Ring Theory

Combinatorial Commutative Algebra

Translated from the popular French edition, this book offers a detailed introduction to various basic concepts, methods, principles, and results of commutative algebra. It takes a constructive viewpoint in commutative algebra and studies algorithmic approaches alongside several abstract classical theories. Indeed, it revisits these traditional topics with a new and simplifying manner, making the subject both accessible and innovative. The algorithmic aspects of such naturally abstract topics as Galois theory, Dedekind rings, Prüfer rings, finitely generated projective modules, dimension theory of commutative rings, and others in the current treatise, are all analysed in the spirit of the great developers of constructive algebra in the nineteenth century. This updated and revised edition contains over 350 well-arranged exercises, together with their helpful hints for solution. A basic knowledge of linear algebra, group theory, elementary number theory as well as the fundamentals of ring and module theory is required. Commutative Algebra: Constructive Methods will be useful for graduate students, and also researchers, instructors and theoretical computer scientists.

Introduction to Algebraic Geometry and Commutative Algebra

This book contains several fundamental ideas that are revived time after time in different guises, providing a better understanding of algebraic geometric phenomena. It shows how the field is enriched with loans from analysis and topology and from commutative algebra and homological algebra.

A Singular Introduction to Commutative Algebra

Recent developments are covered Contains over 100 figures and 250 exercises Includes complete proofs

Introduction To Commutative Algebra

The landscape of homological algebra has evolved over the last half-century into a fundamental tool for the working mathematician. This book provides a unified account of homological algebra as it exists today. The historical connection with topology, regular local rings, and semi-simple Lie algebras are also described. This book is suitable for second or third year graduate students. The first half of the book takes as its subject the canonical topics in homological algebra: derived functors, Tor and Ext, projective dimensions and spectral sequences. Homology of group and Lie algebras illustrate these topics. Intermingled are less canonical topics, such as the derived inverse limit functor lim1, local cohomology, Galois cohomology, and affine Lie algebras. The last part of the book covers less traditional topics that are a vital part of the modern homological toolkit: simplicial methods, Hochschild

and cyclic homology, derived categories and total derived functors. By making these tools more accessible, the book helps to break down the technological barrier between experts and casual users of homological algebra.

Algebraic Geometry and Commutative Algebra

Commutative Algebra is best understood with knowledge of the geometric ideas that have played a great role in its formation, in short, with a view towards algebraic geometry. The author presents a comprehensive view of commutative algebra, from basics, such as localization and primary decomposition, through dimension theory, differentials, homological methods, free resolutions and duality, emphasizing the origins of the ideas and their connections with other parts of mathematics. Many exercises illustrate and sharpen the theory and extended exercises give the reader an active part in complementing the material presented in the text. One novel feature is a chapter devoted to a quick but thorough treatment of Grobner basis theory and the constructive methods in commutative algebra and algebraic geometry that flow from it. Applications of the theory and even suggestions for computer algebra projects are included. This book will appeal to readers from beginners to advanced students of commutative algebra or algebraic geometry. To help beginners, the essential ideals from algebraic geometry are treated from scratch. Appendices on homological algebra, multilinear algebra and several

other useful topics help to make the book relatively self- contained. Novel results and presentations are scattered throughout the text.

Computational Methods in Commutative Algebra and Algebraic Geometry

There is no shortage of books on Commutative Algebra, but the present book is different. Most books are monographs, with extensive coverage. There is one notable exception: Atiyah and Macdonald's 1969 classic. It is a clear, concise, and efficient textbook, aimed at beginners, with a good selection of topics. So it has remained popular. However, its age and flaws do show. So there is need for an updated and improved version, which the present book aims to be.

Introduction to Commutative Algebra and Algebraic Geometry

This unique book on commutative algebra is divided into two parts in order to facilitate its use in several types of courses. The first introductory part covers the basic theory, connections with algebraic geometry, computational aspects, and extensions to module theory. The more advanced second part covers material such as associated primes and primary decomposition, local rings, M-sequences and Cohen-Macaulay modules, and homological methods.

History Algebraic Geometry

This book is a companion volume to Graduate

Algebra: Commutative View (published as volume 73 in this series). The main and most important feature of the book is that it presents a unified approach to many important topics, such as group theory, ring theory, Lie algebras, and gives conceptual proofs of many basic results of noncommutative algebra. There are also a number of major results in noncommutative algebra that are usually found only in technical works, such as Zelmanov's proof of the restricted Burnside problem in group theory, word problems in groups, Tits's alternative in algebraic groups, PI algebras, and many of the roles that Coxeter diagrams play in algebra. The first half of the book can serve as a one-semester course on noncommutative algebra, whereas the remaining part of the book describes some of the major directions of research in the past 100 years. The main text is extended through several appendices, which permits the inclusion of more advanced material, and numerous exercises. The only prerequisite for using the book is an undergraduate course in algebra; whenever necessary, results are quoted from Graduate Algebra: Commutative View.

Fuzzy Commutative Algebra

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. Moreover, Grothendieck’s schemes invented in the late 1950s allowed the application of algebraic-geometric methods in fields that formerly seemed to be far away from geometry, like algebraic

number theory. The new techniques paved the way to spectacular progress such as the proof of Fermat's Last Theorem by Wiles and Taylor. The scheme-theoretic approach to algebraic geometry is explained for non-experts. More advanced readers can use the book to broaden their view on the subject. A separate part deals with the necessary prerequisites from commutative algebra. On a whole, the book provides a very accessible and self-contained introduction to algebraic geometry, up to a quite advanced level. Every chapter of the book is preceded by a motivating introduction with an informal discussion of the contents. Typical examples and an abundance of exercises illustrate each section. This way the book is an excellent solution for learning by yourself or for complementing knowledge that is already present. It can equally be used as a convenient source for courses and seminars or as supplemental literature.

Representation Theory

The constructive approach to mathematics has enjoyed a renaissance, caused in large part by the appearance of Errett Bishop's book Foundations of constr"uctiue analysis in 1967, and by the subtle influences of the proliferation of powerful computers. Bishop demonstrated that pure mathematics can be developed from a constructive point of view while maintaining a continuity with classical terminology and spirit; much more of classical mathematics was preserved than had been thought possible, and no classically false theorems resulted, as had been the case in other constructive schools such as intuitionism

and Russian constructivism. The computers created a widespread awareness of the intuitive notion of an effecti ve procedure, and of computation in principle, in addi tion to stimulating the study of constructive algebra for actual implementation, and from the point of view of recursive function theory. In analysis, constructive problems arise instantly because we must start with the real numbers, and there is no finite procedure for deciding whether two given real numbers are equal or not (the real numbers are not discrete) . The main thrust of constructive mathematics was in the direction of analysis, although several mathematicians, including Kronecker and van der waerden, made important contributions to construc tive algebra. Heyting, working in intuitionistic algebra, concentrated on issues raised by considering algebraic structures over the real numbers, and so developed a handmaiden'of analysis rather than a theory of discrete algebraic structures.

Cohen-Macaulay Rings

- Contains many examples and problems (with hints) - Provides a good introduction for beginners in algebraic number theory and algebraic geometry

A Course in Constructive Algebra

Introducing the representation theory of groups and finite dimensional algebras, first studying basic non-commutative ring theory, this book covers the necessary background on elementary homological algebra and representations of groups up to block

theory. It further discusses vertices, defect groups, Green and Brauer correspondences and Clifford theory. Whenever possible the statements are presented in a general setting for more general algebras, such as symmetric finite dimensional algebras over a field. Then, abelian and derived categories are introduced in detail and are used to explain stable module categories, as well as derived categories and their main invariants and links between them. Group theoretical applications of these theories are given – such as the structure of blocks of cyclic defect groups – whenever appropriate. Overall, many methods from the representation theory of algebras are introduced. Representation Theory assumes only the most basic knowledge of linear algebra, groups, rings and fields and guides the reader in the use of categorical equivalences in the representation theory of groups and algebras. As the book is based on lectures, it will be accessible to any graduate student in algebra and can be used for self-study as well as for classroom use.

Commutative Algebra

This is a comprehensive review of commutative algebra, from localization and primary decomposition through dimension theory, homological methods, free resolutions and duality, emphasizing the origins of the ideas and their connections with other parts of mathematics. The book gives a concise treatment of Grobner basis theory and the constructive methods in commutative algebra and algebraic geometry that flow from it. Many exercises included.

Local Algebra

This introduction to polynomial rings, Gröbner bases and applications bridges the gap in the literature between theory and actual computation. It details numerous applications, covering fields as disparate as algebraic geometry and financial markets. To aid in a full understanding of these applications, more than 40 tutorials illustrate how the theory can be used. The book also includes many exercises, both theoretical and practical.

Commutative Algebra

This book explores commutative ring theory, an important a foundation for algebraic geometry and complex analytical geometry.

The Geometry of Syzygies

Now in paperback, this advanced text on Cohen-Macaulay rings has been updated and expanded.

An Introduction to Commutative Algebra

This book is an expanded text for a graduate course in commutative algebra, focusing on the algebraic underpinnings of algebraic geometry and of number theory. Accordingly, the theory of affine algebras is featured, treated both directly and via the theory of Noetherian and Artinian modules, and the theory of graded algebras is included to provide the foundation for projective varieties. Major topics include the

theory of modules over a principal ideal domain, and its applications to matrix theory (including the Jordan decomposition), the Galois theory of field extensions, transcendence degree, the prime spectrum of an algebra, localization, and the classical theory of Noetherian and Artinian rings. Later chapters include some algebraic theory of elliptic curves (featuring the Mordell-Weil theorem) and valuation theory, including local fields. One feature of the book is an extension of the text through a series of appendices. This permits the inclusion of more advanced material, such as transcendental field extensions, the discriminant and resultant, the theory of Dedekind domains, and basic theorems of rings of algebraic integers. An extended appendix on derivations includes the Jacobian conjecture and Makar-Limanov's theory of locally nilpotent derivations. Grobner bases can be found in another appendix. Exercises provide a further extension of the text. The book can be used both as a textbook and as a reference source.

Gröbner Bases

This introductory textbook for a graduate course in pure mathematics provides a gateway into the two difficult fields of algebraic geometry and commutative algebra. Algebraic geometry, supported fundamentally by commutative algebra, is a cornerstone of pure mathematics. Along the lines developed by Grothendieck, this book delves into the rich interplay between algebraic geometry and commutative algebra. A selection is made from the wealth of material in the discipline, along with concise

yet clear definitions and synopses.

Graduate Algebra

"Presents the proceedings of the recently held Third International Conference on Commutative Ring Theory in Fez, Morocco. Details the latest developments in commutative algebra and related areas-featuring 26 original research articles and six survey articles on fundamental topics of current interest. Examines wide-ranging developments in commutative algebra, together with connections to algebraic number theory and algebraic geometry."

Commutative Algebra

* Stanley represents a broad perspective with respect to two significant topics from Combinatorial Commutative Algebra: 1) The theory of invariants of a torus acting linearly on a polynomial ring, and 2) The face ring of a simplicial complex * In this new edition, the author further develops some interesting properties of face rings with application to combinatorics

Undergraduate Commutative Algebra

This substantially enlarged second edition aims to lead a further stage in the computational revolution in commutative algebra. This is the first handbook/tutorial to extensively deal with SINGULAR. Among the book’s most distinctive features is a new, completely unified treatment of the global and local

theories. Another feature of the book is its breadth of coverage of theoretical topics in the portions of commutative algebra closest to algebraic geometry, with algorithmic treatments of almost every topic.

A Term of Commutative Algebra

This book is the first to be devoted entirely to fuzzy abstract algebra. It presents an up-to-date version of fuzzy commutative algebra, and focuses on the connection between L-subgroups of a group, and L-subfields of a field. In particular, an up-to-date treatment of nonlinear systems of fuzzy intersection equations is given. Contents:L-Subsets and L-SubgroupsL-Subgroups of Abelian GroupsL-Subrings and L-IdealsL-SubmodulesL-SubfieldsStructure of L-Subrings and L-IdealsAlgebraic L-Varieties and Intersection EquationsL-SubspacesGalois Theory and Group L-Subalgebras Readership: Pure mathematicians. Keywords:Fuzzy Subsets;Fuzzy Subgroups;Fuzzy Subrings;Fuzzy Ideals;Fuzzy Submodules ;Fuzzy Subfields;Fuzzy Varieties;Fuzzy Subspaces;Fuzzy Galois Theory;Fuzzy Group SubalgebrasReviews: “The book is self-contained … This will serve as a nice reference book for researchers in the field. It may also be used as a good text for an advanced graduate course. There are a good number of exercises at the end of each chapter of the book.” Mathematical Reviews

Commutative Algebra

Exploring ultraproducts of Noetherian local rings from

an algebraic perspective, this volume illustrates the many ways they can be used in commutative algebra. The text includes an introduction to tight closure in characteristic zero, a survey of flatness criteria, and more.

Progress in Commutative Algebra 1

This is a comprehensive review of commutative algebra, from localization and primary decomposition through dimension theory, homological methods, free resolutions and duality, emphasizing the origins of the ideas and their connections with other parts of mathematics. The book gives a concise treatment of Grobner basis theory and the constructive methods in commutative algebra and algebraic geometry that flow from it. Many exercises included.

Computational Commutative Algebra 1

This is an English translation of the now classic "Algbre Locale - Multiplicits" originally published by Springer as LNM 11. It gives a short account of the main theorems of commutative algebra, with emphasis on modules, homological methods and intersection multiplicities. Many modifications to the original French text have been made for this English edition, making the text easier to read, without changing its intended informal character.

Basic Commutative Algebra

The origins of the mathematics in this book date back

more than two thou sand years, as can be seen from the fact that one of the most important algorithms presented here bears the name of the Greek mathematician Eu clid. The word "algorithm" as well as the key word "algebra" in the title of this book come from the name and the work of the ninth-century scientist Mohammed ibn Musa al-Khowarizmi, who was born in what is now Uzbek istan and worked in Baghdad at the court of Harun al-Rashid's son. The word "algorithm" is actually a westernization of al-Khowarizmi's name, while "algebra" derives from "al-jabr," a term that appears in the title of his book Kitab al-jabr wa'l muqabala, where he discusses symbolic methods for the solution of equations. This close connection between algebra and al gorithms lasted roughly up to the beginning of this century; until then, the primary goal of algebra was the design of constructive methods for solving equations by means of symbolic transformations. During the second half of the nineteenth century, a new line of thought began to enter algebra from the realm of geometry, where it had been successful since Euclid's time, namely, the axiomatic method.

Commutative Ring Theory

This is the second of two volumes of a state-of-the-art survey article collection which emanates from three commutative algebra sessions at the 2009 Fall Southeastern American Mathematical Society Meeting at Florida Atlantic University. The articles reach into diverse areas of commutative algebra and build a bridge between Noetherian and non-Noetherian

commutative algebra. The current trends in two of the most active areas of commutative algebra are presented: non-noetherian rings (factorization, ideal theory, integrality), advances from the homological study of noetherian rings (the local theory, graded situation and its interactions with combinatorics and geometry). This second volume discusses closures, decompositions, and factorization.

Progress in Commutative Algebra 2

First Published in 2018. Routledge is an imprint of Taylor & Francis, an Informa company.

The Use of Ultraproducts in Commutative Algebra

This introductory account of commutative algebra is aimed at advanced undergraduates and first year graduate students. Assuming only basic abstract algebra, it provides a good foundation in commutative ring theory, from which the reader can proceed to more advanced works in commutative algebra and algebraic geometry. The style throughout is rigorous but concrete, with exercises and examples given within chapters, and hints provided for the more challenging problems used in the subsequent development. After reminders about basic material on commutative rings, ideals and modules are extensively discussed, with applications including to canonical forms for square matrices. The core of the book discusses the fundamental theory of commutative Noetherian rings. Affine algebras over

fields, dimension theory and regular local rings are also treated, and for this second edition two further chapters, on regular sequences and Cohen–Macaulay rings, have been added. This book is ideal as a route into commutative algebra.

A Course in Commutative Algebra

This ACM volume deals with tackling problems that can be represented by data structures which are essentially matrices with polynomial entries, mediated by the disciplines of commutative algebra and algebraic geometry. The discoveries stem from an interdisciplinary branch of research which has been growing steadily over the past decade. The author covers a wide range, from showing how to obtain deep heuristics in a computation of a ring, a module or a morphism, to developing means of solving nonlinear systems of equations - highlighting the use of advanced techniques to bring down the cost of computation. Although intended for advanced students and researchers with interests both in algebra and computation, many parts may be read by anyone with a basic abstract algebra course.

Commutative Algebra and Algebraic Geometry

This textbook offers a thorough, modern introduction into commutative algebra. It is intented mainly to serve as a guide for a course of one or two semesters, or for self-study. The carefully selected subject matter concentrates on the concepts and results at the

center of the field. The book maintains a constant view on the natural geometric context, enabling the reader to gain a deeper understanding of the material. Although it emphasizes theory, three chapters are devoted to computational aspects. Many illustrative examples and exercises enrich the text.

Graduate Algebra

First textbook-level account of basic examples and techniques in this area. Suitable for self-study by a reader who knows a little commutative algebra and algebraic geometry already. David Eisenbud is a well-known mathematician and current president of the American Mathematical Society, as well as a successful Springer author.

Steps in Commutative Algebra

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.

Combinatorics and Commutative Algebra

For those looking for an introduction to the area of commutative algebra, this book opens all the right doors and provides a clarity of understanding that all will welcome.

Algebraic Geometry

Originally published in 1985, this classic textbook is an English translation of Einführung in die kommutative Algebra und algebraische Geometrie. As part of the Modern Birkhäuser Classics series, the publisher is proud to make Introduction to Commutative Algebra and Algebraic Geometry available to a wider audience. Aimed at students who have taken a basic course in algebra, the goal of the text is to present important results concerning the representation of algebraic varieties as intersections of the least possible number of hypersurfaces and—a closely related problem—with the most economical generation of ideals in Noetherian rings. Along the way, one encounters many basic concepts of commutative algebra and algebraic geometry and proves many facts which can then serve as a basic stock for a deeper study of these subjects.

Commutatve Algbra With A View Toward Alg

Contains contributions by over 25 leading international mathematicians in the areas of commutative algebra and algebraic geometry. The text presents developments and results based on, and inspired by, the work of Mario Fiorentini. It covers topics ranging from almost numerical invariants of algebraic curves to deformation of projective schemes.

The Geometry of Schemes

This is the first of two volumes of a state-of-the-art survey article collection which emanates from three commutative algebra sessions at the 2009 Fall Southeastern American Mathematical Society Meeting at Florida Atlantic University meeting. The articles reach into diverse areas of commutative algebra and build a bridge between Noetherian and non-Noetherian commutative algebra. The current trends in two of the most active areas of commutative algebra are presented: non-noetherian rings (factorization, ideal theory, integrality), advances from the homological study of noetherian rings (the local theory, graded situation and its interactions with combinatorics and geometry). This fist volume concentrates on combinatorics and homology.

Commutative Algebra: Constructive Methods

An Introduction to Homological Algebra

This textbook, set for a one or two semester course in commutative algebra, provides an introduction to commutative algebra at the postgraduate and research levels. The main prerequisites are familiarity with groups, rings and fields. Proofs are self-contained. The book will be useful to beginners and experienced researchers alike. The material is so arranged that the beginner can learn through self-study or by attending a course. For the experienced researcher, the book may serve to present new perspectives on some well-known results, or as a reference.

Advances in Commutative Ring Theory

Grothendieck’s beautiful theory of schemes permeates modern algebraic geometry and underlies its applications to number theory, physics, and applied mathematics. This simple account of that theory emphasizes and explains the universal geometric concepts behind the definitions. In the book, concepts are illustrated with fundamental examples, and explicit calculations show how the constructions of scheme theory are carried out in practice.