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Introduction To Commutative Algebra, Student Economy Edition - Michael Atiyah 2018-04-27
This book is designed to be read by students who have had a first elementary course in general algebra. It provides a common generalization of the primes of arithmetic and the points of geometry. The book explains the various elementary operations which can be performed on ideals.

Focus on Group Theory Research - Lawrence M. Ying 2006
A great many of the objects investigated in mathematics turn out to be groups. These include familiar number systems, such as the integers, the rational numbers, the real numbers, and the complex numbers under addition, as well as the non-zero rationals, reals, and complex numbers, under multiplication. Another important example is given by non-singular matrices under multiplication, and more generally, invertible functions under composition. Group theory allows for the properties of these systems and many others to be investigated in a more general setting, and its results are widely applicable. Group theory is also a rich source of theorems in its own right. Groups underlie many other algebraic structures such as fields and vector spaces. They are also important tools for studying symmetry in all its forms; the principle that the symmetries of any object form a group is foundational for much mathematics. For these reasons, group theory is an important area in modern mathematics, and also one with many applications to mathematical physics. This book presents the latest research in the field.

Number Theory – Diophantine Problems, Uniform Distribution and Applications - Christian Elsholtz 2017-05-26
This volume is dedicated to Robert F. Tichy on the occasion of his 60th birthday. Presenting 22 research and survey papers written by leading experts in their respective fields, it focuses on areas that align with Tichy's research interests and which he significantly shaped, including Diophantine problems, asymptotic counting, uniform distribution and discrepancy of sequences (in theory and application), dynamical systems, prime numbers, and actuarial mathematics. Offering valuable insights into recent developments in these areas, the book will be of interest to researchers and graduate students engaged in number theory and its applications.

Encyclopaedia of Mathematics - Michiel Hazewinkel 2013-12-01
This ENCYCLOPAEDIA OF MATHEMATICS aims to be a reference work for all parts of mathe matics. It is a translation with updates and editorial comments of the Soviet Mathematical Encyclopaedia published by 'Soviet Encyclopaedia Publishing House' in five volumes in 1977-1985. The annotated translation consists of ten volumes including a special index volume. There are three kinds of articles in this ENCYCLOPAEDIA. First of all there are survey-type articles dealing with the various main directions in mathematics (where a rather fine subdivi sion has been used). The main requirement for these articles has been that they should give a reasonably complete up-to-date account of the current state of affairs in these areas and that they should be maximally accessible. On the whole, these articles should be understandable to mathematics students in their first specialization years, to graduates from other mathematical areas and, depending on the specific subject, to specialists in other domains of science, en gineers and teachers of mathematics. These articles treat their material at a fairly general level and aim to give an idea of the kind of problems, techniques and concepts involved in the area in question. They also contain background and motivation rather than precise statements of precise theorems with detailed definitions and technical details on how to carry out proofs and constructions. The second kind of article, of medium length, contains more detailed concrete problems, results and techniques.

Number Theory - R.P. Bambah 2012-12-06
The Indian National Science Academy on the occasion ofthe Golden Jubilee Celebration (Fifty years of India's Independence) decided to publish a number of monographs on the selected fields. The editorial board of INS A invited us to prepare a special monograph in Number Theory. In reponse to this assignment, we invited several eminent Number Theorists to contribute expository/research articles for this monograph on Number Theory. Al though some ofthose invited, due to other preoccupations-could not respond positively to our invitation, we did receive fairly encouraging response from many eminent and creative number theorists throughout the world. These articles are presented herewith in a logical order. We are grateful to all those mathematicians who have sent us their articles. We hope that this monograph will have a significant impact on further development in this subject. R. P. Bambah v. C. Dumir R. J. Hans-Gill A Centennial History of the Prime Number Theorem Tom M. Apostol The Prime Number Theorem Among the thousands of discoveries made by mathematicians over the centuries, some stand out as significant landmarks. One of these is the prime number theorem, which describes the asymptotic distribution of prime numbers. It can be stated in various equivalent forms, two of which are: x (I) K(X) '" -I - as x --+ 00, ogx and Pn '" n log n as n --+ 00. (2) In (1), K(X) denotes the number of primes P ::s x for any x > O.

Mathematics of the USSR. - 1987

Current Technical Papers - 1971

Steps in Commutative Algebra - Rodney Y. Sharp 2000
Introductory account of commutative algebra, aimed at students with a background in basic algebra.

Shock-Wave Solutions of the Einstein Equations with Perfect Fluid Sources: Existence and Consistency by a Locally Inertial Glimm Scheme - Jeff Groah 2004
We demonstrate the consistency of the Einstein equations at the level of shock-waves by proving the existence of shock wave solutions of the spherically symmetric Einstein equations for a perfect fluid, starting from initial density and velocity profiles that are only locally of bounded total variation. For these solutions, the components of the gravitational metric tensor are only Lipschitz continuous at shock waves, and so it follows that these solutions satisfy the Einstein equations, as well as the relativistic compressible Euler equations, only in the weak sense of the theory of distributions. The analysis introduces a locally inertial Glimm scheme that exploits the locally flat character of spacetime, and relies on special properties of the relativistic compressible Euler equations when $p=\sigma^2\rho$, $\sigma\equiv const$. We demonstrate the consistency of the Einstein equations at the level of shock-waves by proving the existence of shock wave solutions of the spherically symmetric Einstein equations for a perfect fluid, starting from initial density and velocity profiles that are only locally of bounded total variation. For these solutions, the components of the gravitational metric tensor are only Lipschitz continuous at shock waves, and so it follows that these solutions satisfy the Einstein equations, as well as the relativistic compressible Euler equations, only in the weak sense of the theory of distributions. The analysis introduces a locally inertial Glimm scheme that exploits the locally flat character of spacetime, and relies on special properties of the relativistic compressible Euler equations when $p=\sigma^2\rho$, $\sigma\equiv const$.

Sucessful Candidates for the Degrees of D.Phil., B.Litt., and B.Sc. with Titles of Their Theses - University of Oxford. Committee for Advanced Studies 1961

Abstract Algebra - John A. Beachy 2006-01-05
Highly regarded by instructors in past editions for its sequencing of topics as well as its concrete approach, slightly slower beginning pace, and extensive set of exercises, the latest edition of Abstract Algebra extends the thrust of the widely used earlier editions as it introduces modern abstract concepts only after a careful study of important examples. Beachy and Blairs clear narrative presentation responds to the needs of inexperienced students who stumble over proof writing, who understand definitions and theorems but cannot do the problems, and who want more examples that tie into their previous experience. The authors introduce chapters by indicating why the material is important and, at the same time, relating the new material to things from the students background and linking the subject matter of the chapter to the broader picture. Instructors will find the latest edition pitched at a suitable level of difficulty and will appreciate its gradual increase in the level of sophistication as the student progresses through the book. Rather than inserting superficial applications at the expense of important mathematical concepts, the Beachy and Blair solid, well-organized treatment motivates the subject with concrete problems from areas that students have previously encountered, namely, the integers and polynomials over the real numbers. Supplementary material for instructors and students available on the books Web site: www.math.niu.edu/~beachy/abstract_algebra/
Introduction To Commutative Algebra - Michael Atiyah 2018-03-09
First Published in 2018. Routledge is an imprint of Taylor & Francis, an Informa company.
Commutative Algebra -

Residue Currents and Bezout Identities - C.A. Berenstein 2012-12-06
A very primitive form of this monograph has existed for about two and a half years in the form of handwritten notes of a course that Alain Y ger gave at the University of Maryland. The objective, all along, has been to present a coherent picture of the almost mysterious role that analytic methods and, in particular, multidimensional residues, have recently played in obtaining effective estimates for problems in commutative algebra [71;5]* Our original interest in the subject rested on the fact that the study of many questions in harmonic analysis, like finding all distribution solutions (or finding out whether there are any) to a system of linear partial differential equa tions with constant coefficients (or, more generally, convolution equations) in]R. n, can be translated into interpolation problems in spaces of entire functions with growth conditions. This idea, which one can trace back to Euler, is the basis of Ehrenpreis's Fundamental Principle for partial differential equations [37;5], [56;5], and has been explicitly stated, for convolution equations, in the work of Berenstein and Taylor [9;5] (we refer to the survey [8;5] for complete references.) One important point in [9;5] was the use of the Jacobi interpo lation formula, but otherwise, the representation of solutions obtained in that paper were not explicit because of the use of a-methods to prove interpolation results.
Geometry of Quantum Theory - V.S. Varadarajan 2007-12-03
Available for the first time in soft cover, this book is a classic on the foundations of quantum theory. It examines the subject from a point of view that goes back to Heisenberg and Dirac and whose definitive mathematical formulation is due to von Neumann. This view leads most naturally to the fundamental questions that are at the basis of all attempts to understand the world of atomic and subatomic particles.
Gröbner Bases in Commutative Algebra - Viviana Ene 2011-12-01
This book provides a concise yet comprehensive and self-contained introduction to Grobner basis theory and its applications to various current research topics in commutative algebra. It especially aims to help young researchers become acquainted with fundamental tools and techniques related to Grobner bases which are used in commutative algebra and to arouse their interest in exploring further topics such as toric rings, Koszul and Rees algebras, determinantal ideal theory, binomial edge ideals, and their applications to statistics. The book can be used for graduate courses and self-study. More than 100 problems will help the readers to better understand the main theoretical results and will inspire them to further investigate the

topics studied in this book.
Quasianalytic Monogenic Solutions of a Cohomological Equation - S. Marmi 2003
We prove that the solutions of a cohomological equation of complex dimension one and in the analytic category have a monogenic dependence on the parameter, and we investigate the question of their quasi analyticity. This cohomological equation is the standard linearized conjugacy equation for germs of holomorphic maps in a neighborhood of a fixed point. The parameter is the eigenvalue of the linear part, denoted by q. Borel's theory of non-analytic monogenic functions has been first investigated by Arnold and Herman in the related context of the problem of linearization of analytic diffeomorphisms of the circle close to a rotation.Herman raised the question whether the solutions of the cohomological equation had a quasi analytic dependence on the parameter q. Indeed they are analytic for $q\in\mathbb{C}\setminus\mathbb{S}^1$, the unit circle $\S^1$ appears as a natural boundary (because of resonances, i.e. roots of unity), but the solutions are still defined at points of $\mathbb{S}^1$ which lie 'far enough from resonances'. We adapt to our case Herman's construction of an increasing sequence of compacts which avoid resonances and prove that the solutions of our equation belong to the associated space of monogenic functions; some general properties of these monogenic functions and particular properties of the solutions are then studied.For instance the solutions are defined and admit asymptotic expansions at the points of $\mathbb{S}^1$ which satisfy some arithmetical condition, and the classical Carleman Theorem allows us to answer negatively to the question of quasi analyticity at these points. But resonances (roots of unity) also lead to asymptotic expansions, for which quasi analyticity is obtained as a particular case of Ecalle's theory of resurgent functions.And at constant-type points, where no quasi analytic Carleman class contains the solutions, one can still recover the solutions from their asymptotic expansions and obtain a special kind of quasi analyticity. Our results are obtained by reducing the problem, by means of Hadamard's product, to the study of a fundamental solution (which turns out to be the so-called q-logarithm or 'quantum logarithm'). We deduce as a corollary of our work the proof of a conjecture of Gammel on the monogenic and quasi analytic properties of a certain number-theoretical Borel-Wolff-Denjoy series.
Integrability and Nonintegrability in Geometry and Mechanics - A.T. Fomenko 2012-12-06
Approach your problems from the right end It isn't that they can't see the solution. It is and begin with the answers. 1hen one day, that they can't see the problem. perhaps you will find the final question. G. K. Chesterton. The Scandal of Father 'The Hermit Oad in Crane Feathers' in R. Brown 'The point of a Pin' . • 1111 Oulik'. n. . Chi" •. • ~ Mm~ Mu,d. ", Growing specialization and diversification have brought a host of monographs and textbooks on increasingly specialized topics. However, the "tree" of knowledge of mathematics and related fields does not grow only by putting forth new branches. It also happens, quite often in fact, that branches which were thought to be completely disparate are suddenly seen to be related. Further, the kind and level of sophistication of mathematics applied in various sciences has changed drastically in recent years: measure theory is used (non-trivially) in regional and theoretical economics; algebraic geometry interacts with physics; the Minkowsky lemma, coding theory and the structure of water meet one another in packing and covering theory; quantum fields, crystal defects and mathematical programming profit from homotopy theory; Lie algebras are relevant to filtering; and prediction and electrical engineering can use Stein spaces. And in addition to this there are such new emerging subdisciplines as "experimental mathematics", "CFD", "completely integrable systems", "chaos, synergetics and large-scale order", which are almost impossible to fit into the existing classification schemes. They draw upon widely different sections of mathematics.
Commutative Algebra and its Applications - Marco Fontana 2009-09-04

Algebra, Algebraic Topology and their Interactions - Jan-Erik Roos 2006-11-14

Numerical Semigroups - Valentina Barucci 2020-05-13
This book presents the state of the art on numerical semigroups and related subjects, offering different perspectives on research in the field and including results and examples that are very difficult to find in a structured exposition elsewhere. The contents comprise the proceedings of the 2018 INdAM "International

Meeting on Numerical Semigroups", held in Cortona, Italy. Talks at the meeting centered not only on traditional types of numerical semigroups, such as Arf or symmetric, and their usual properties, but also on related types of semigroups, such as affine, Puiseux, Weierstrass, and primary, and their applications in other branches of algebra, including semigroup rings, coding theory, star operations, and Hilbert functions. The papers in the book reflect the variety of the talks and derive from research areas including Semigroup Theory, Factorization Theory, Algebraic Geometry, Combinatorics, Commutative Algebra, Coding Theory, and Number Theory. The book is intended for researchers and students who want to learn about recent developments in the theory of numerical semigroups and its connections with other research fields.

A Term of Commutative Algebra - Steven Kleiman 2013-01-01
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.

Discriminant Equations in Diophantine Number Theory - Jan-Hendrik Evertse 2016-11-03
Discriminant equations are an important class of Diophantine equations with close ties to algebraic number theory, Diophantine approximation and Diophantine geometry. This book is the first comprehensive account of discriminant equations and their applications. It brings together many aspects, including effective results over number fields, effective results over finitely generated domains, estimates on the number of solutions, applications to algebraic integers of given discriminant, power integral bases, canonical number systems, root separation of polynomials and reduction of hyperelliptic curves. The authors' previous title, Unit Equations in Diophantine Number Theory, laid the groundwork by presenting important results that are used as tools in the present book. This material is briefly summarized in the introductory chapters along with the necessary basic algebra and algebraic number theory, making the book accessible to experts and young researchers alike.

Real Solutions to Equations from Geometry - Frank Sottile 2011-08-31
Understanding, finding, or even deciding on the existence of real solutions to a system of equations is a difficult problem with many applications outside of mathematics. While it is hopeless to expect much in general, we know a surprising amount about these questions for systems which possess additional structure often coming from geometry. This book focuses on equations from toric varieties and Grassmannians. Not only is much known about these, but such equations are common in applications. There are three main themes: upper bounds on the number of real solutions, lower bounds on the number of real solutions, and geometric problems that can have all solutions be real. The book begins with an overview, giving background on real solutions to univariate polynomials and the geometry of sparse polynomial systems. The first half of the book concludes with fewnomial upper bounds and with lower bounds to sparse polynomial systems. The second half of the book begins by sampling some geometric problems for which all solutions can be real, before devoting the last five chapters to the Shapiro Conjecture, in which the relevant polynomial systems have only real solutions.

Rings and Factorization - David Sharpe 1987-08-28
This textbook is an introduction to the concept of factorization and its application to problems in algebra and number theory. With the minimum of prerequisites, the reader is introduced to the notion of rings, fields, prime elements and unique factorization. The author shows how concepts can be applied to a variety of examples such as factorizing polynomials, finding determinants of matrices and Fermat's 'two-squares theorem'. Based on an undergraduate course given at the University of Sheffield, Dr Sharpe has included numerous examples which demonstrate how frequently these ideas are useful in concrete, rather than abstract, settings. The book also contains many exercises of varying degrees of difficulty together with hints and solutions. Second and third year undergraduates will find this a readable and enjoyable account of a subject lying at the heart of much of mathematics.

Manuscripta Mathematica - 1989

Soliton Equations and their Algebro-Geometric Solutions: Volume 1, (1+1)-Dimensional

Continuous Models - Fritz Gesztesy 2003-06-05
The focus of this book is on algebro-geometric solutions of completely integrable nonlinear partial differential equations in (1+1)-dimensions, also known as soliton equations. Explicitly treated integrable models include the KdV, AKNS, sine-Gordon, and Camassa-Holm hierarchies as well as the classical massive Thirring system. An extensive treatment of the class of algebro-geometric solutions in the stationary as well as time-dependent contexts is provided. The formalism presented includes trace formulas, Dubrovin-type initial value problems, Baker-Akhiezer functions, and theta function representations of all relevant quantities involved. The book uses techniques from the theory of differential equations, spectral analysis, and elements of algebraic geometry (most notably, the theory of compact Riemann surfaces). The presentation is rigorous, detailed, and self-contained, with ample background material provided in various appendices. Detailed notes for each chapter together with an exhaustive bibliography enhance the presentation offered in the main text.

Local Cohomology - M. P. Brodmann 2013
On its original publication, this algebraic introduction to Grothendieck's local cohomology theory was the first book devoted solely to the topic and it has since become the standard reference for graduate students. This second edition has been thoroughly revised and updated to incorporate recent developments in the field.

Research in British Universities, Polytechnics and Colleges - 1984

Books in Print Supplement - 1982

Computational Commutative Algebra 1 - Martin Kreuzer 2008-07-05
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.

Progress in Commutative Algebra 1 - Christopher Francisco 2012-04-26
This is the first of two volumes of a state-of-the-art survey article collection which originates 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. These volumes present current trends in two of the most active areas of commutative algebra: non-noetherian rings (factorization, ideal theory, integrality), and noetherian rings (the local theory, graded situation, and interactions with combinatorics and geometry). This volume contains combinatorial and homological surveys. The combinatorial papers document some of the increasing focus in commutative algebra recently on the interaction between algebra and combinatorics. Specifically, one can use combinatorial techniques to investigate resolutions and other algebraic structures as with the papers of Fløystad on Boij-Söderburg theory, of Geramita, Harbourne and Migliore, and of Cooper on Hilbert functions, of Clark on minimal poset resolutions and of Mermin on simplicial resolutions. One can also utilize algebraic invariants to understand combinatorial structures like graphs, hypergraphs, and simplicial complexes such as in the paper of Morey and Villarreal on edge ideals. Homological techniques have become indispensable tools for the study of noetherian rings. These ideas have yielded amazing levels of interaction with other fields like algebraic topology (via differential graded techniques as well as the foundations of homological algebra), analysis (via the study of D-modules), and combinatorics (as described in the previous paragraph). The homological articles the editors have included in this volume relate mostly to how homological techniques help us better understand rings and singularities both noetherian and non-noetherian such as in the papers by Roberts, Yao, Hummel and Leuschke.

High-Dimensional Probability - Roman Vershynin 2018-09-30
High-dimensional probability offers insight into the behavior of random vectors, random matrices, random subspaces, and objects used to quantify uncertainty in high dimensions. Drawing on ideas from probability,

analysis, and geometry, it lends itself to applications in mathematics, statistics, theoretical computer science, signal processing, optimization, and more. It is the first to integrate theory, key tools, and modern applications of high-dimensional probability. Concentration inequalities form the core, and it covers both classical results such as Hoeffding's and Chernoff's inequalities and modern developments such as the matrix Bernstein's inequality. It then introduces the powerful methods based on stochastic processes, including such tools as Slepian's, Sudakov's, and Dudley's inequalities, as well as generic chaining and bounds based on VC dimension. A broad range of illustrations is embedded throughout, including classical and modern results for covariance estimation, clustering, networks, semidefinite programming, coding, dimension reduction, matrix completion, machine learning, compressed sensing, and sparse regression.

Computational Commutative Algebra 1 - Martin Kreuzer 2008-07-15
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 - Aron Simis 2020-03-09
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.

Ideals, Varieties, and Algorithms - David Cox 2013-04-17
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. Contains a new section on Axiom and an update about MAPLE, Mathematica and REDUCE.

Computational Methods in Commutative Algebra and Algebraic Geometry - Wolmer Vasconcelos 2004-05-18
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.

Encyclopaedia of Mathematics, Supplement III - Michiel Hazewinkel 2007-11-23

This is the third supplementary volume to Kluwer's highly acclaimed twelve-volume Encyclopaedia of Mathematics. This additional volume contains nearly 500 new entries written by experts and covers developments and topics not included in the previous volumes. These entries are arranged alphabetically throughout and a detailed index is included. This supplementary volume enhances the existing twelve volumes, and together, these thirteen volumes represent the most authoritative, comprehensive and up-to-date Encyclopaedia of Mathematics available.

Generalized Solutions of Nonlinear Partial Differential Equations - E.E. Rosinger 1987-11-01
During the last few years, several fairly systematic nonlinear theories of generalized solutions of rather arbitrary nonlinear partial differential equations have emerged. The aim of this volume is to offer the reader a sufficiently detailed introduction to two of these recent nonlinear theories which have so far contributed most to the study of generalized solutions of nonlinear partial differential equations, bringing the reader to the level of ongoing research. The essence of the two nonlinear theories presented in this volume is the observation that much of the mathematics concerning existence, uniqueness regularity, etc., of generalized solutions for nonlinear partial differential equations can be reduced to elementary calculus in Euclidean spaces, combined with elementary algebra in quotient rings of families of smooth functions on Euclidean spaces, all of that joined by certain asymptotic interpretations. In this way, one avoids the complexities and difficulties of the customary functional analytic methods which would involve sophisticated topologies on various function spaces. The result is a rather elementary yet powerful and far-reaching method which can, among others, give generalized solutions to linear and nonlinear partial differential equations previously unsolved or even unsolvable within distributions or hyperfunctions. Part 1 of the volume discusses the basic limitations of the linear theory of distributions when dealing with linear or nonlinear partial differential equations, particularly the impossibility and degeneracy results. Part 2 examines the way Colombeau constructs a nonlinear theory of generalized functions and then succeeds in proving quite impressive existence, uniqueness, regularity, etc., results concerning generalized solutions of large classes of linear and nonlinear partial differential equations. Finally, Part 3 is a short presentation of the nonlinear theory of Rosinger, showing its connections with Colombeau's theory, which it contains as a particular case.

Homological Questions in Local Algebra - Jan R. Strooker 1990-09-06
This book presents an account of several conjectures arising in commutative algebra from the pioneering work of Serre and Auslander-Buchsbaum. The approach is via Hochster's 'Big Cohen-Macaulay modules', though the complementary view point of Peskine-Szpiro and Roberts, who study the homology of certain complexes, is not neglected. Various refinements of Hochster's construction, obtained in collaboration with Bartijn, are included. A special feature is a long chapter written by Van den Dries which explains how a certain type of result can be 'lifted' from prime characteristic to characteristic zero. Though this is primarily a research monograph, it does provide introductions to most of the topics treated. Non-experts may therefore find it an appealing guide into an active area of algebra.