Algebra Serge Lang

Linear Algebra **Introduction to Algebraic Geometry** Undergraduate Algebra **Real and Functional Analysis Algebra** *Challenges Algebra* Introduction to Arakelov Theory **Calculus of Several Variables** *Introduction to Algebraic and Abelian Functions* **Geometry Complex Analysis** *SL2(R)* Basic Mathematics *Math Talks for Undergraduates* **Differential Manifolds** *A First Course in Calculus* **Introduction to Linear Algebra Undergraduate Analysis Fundamentals of Differential Geometry** *Algebra* Undergraduate Analysis *Math!* **Introduction to Linear Algebra The Beauty of Doing Mathematics Topics in Cohomology of Groups** *Fundamentals of Diophantine Geometry* **Undergraduate Algebra Short Calculus** *A First Course in Calculus Complex Analysis* **Geometry** Algebraic Number Theory **Introduction to Complex Hyperbolic Spaces Riemann-Roch Algebra The Beauty of Doing Mathematics Basic Mathematics** *The File* **Differential and Riemannian Manifolds** *Complex Multiplication*

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Basic Mathematics Sep 19 2021
Complex Analysis Apr 02 2020 Now in its fourth edition, the first part of this book is devoted to the basic material of complex analysis, while the second covers many special topics, such as the Riemann Mapping Theorem, the gamma function, and analytic continuation. Power series methods are used more systematically than is found in other texts, and the resulting proofs often shed more light on the results than the standard proofs. While the first part is suitable for an introductory course at undergraduate level, the additional topics covered in the second part give the instructor of a gradute course a great deal of flexibility in structuring a more advanced course.
Introduction to Linear Algebra Nov 09 2020 A text in linear algebra which is intended for a one-term course. It examines the relation between the geometry and the algebra underlying the subject. It features sections on linear equations, matrices and Gaussian elimination, vector spaces, linear maps, scalar products, determinants, and eigenvalues.
Geometry Dec 23 2021 At last: geometry in an exemplary, accessible and attractive form! The authors emphasise both the intellectually stimulating parts of geometry and routine arguments or computations in concrete or classical cases, as well as practical and physical applications. They also show students the fundamental concepts and the difference between important results and minor technical routines. Altogether, the text presents a coherent high school curriculum for the geometry course, naturally backed by numerous examples and exercises.
Introduction to Algebraic Geometry Oct 01 2022 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.
SL2(R) Oct 21 2021 SL2(R) gives the student an introduction to the infinite dimensional representation theory of semisimple Lie groups by concentrating on one example - SL2(R). This field is of interest not only for its own sake, but for its connections with other areas such as number theory, as brought out, for example, in the work of Langlands. The rapid development

of representation theory over the past 40 years has made it increasingly difficult for a student to enter the field. This book makes the theory accessible to a wide audience, its only prerequisites being a knowledge of real analysis, and some differential equations.
Introduction to Arakelov Theory Mar 26 2022 Arakelov introduced a component at infinity in arithmetic considerations, thus giving rise to global theorems similar to those of the theory of surfaces, but in an arithmetic context over the ring of integers of a number field. The book gives an introduction to this theory, including the analogues of the Hodge Index Theorem, the Arakelov adjunction formula, and the Faltings Riemann-Roch theorem. The book is intended for second year graduate students and researchers in the field who want a systematic introduction to the subject. The residue theorem, which forms the basis for the adjunction formula, is proved by a direct method due to Kunz and Waldi. The Faltings Riemann-Roch theorem is proved without assumptions of semistability. An effort has been made to include all necessary details, and as complete references as possible, especially to needed facts of analysis for Green's functions and the Faltings metrics.
Algebra Feb 10 2021
Introduction to Complex Hyperbolic Spaces Dec 31 2019 Since the appearance of Kobayashi's book, there have been several re sults at the basic level of hyperbolic spaces, for instance Brody's theorem, and results of Green, Kiernan, Kobayashi, Noguchi, etc. which make it worthwhile to have a systematic exposition. Although of necessity I re produce some theorems from Kobayashi, I take a different direction, with different applications in mind, so the present book does not super sede Kobayashi's. My interest in these matters stems from their relations with diophan tine geometry. Indeed, if X is a projective variety over the complex numbers, then I conjecture that X is hyperbolic if and only if X has only a finite number of rational points in every finitely generated field over the rational numbers. There are also a number of subsidiary conjectures related to this one. These conjectures are qualitative. Vojta has made quantitative conjectures by relating the Second Main Theorem of Nevan linna theory to the theory of heights, and he has conjectured bounds on heights stemming from inequalities

having to do with diophantine approximations and implying both classical and modern conjectures. Noguchi has looked at the function field case and made substantial progress, after the line started by Grauert and Grauert-Reckziegel and continued by a recent paper of Riebesehl. The book is divided into three main parts: the basic complex analytic theory, differential geometric aspects, and Nevanlinna theory. Several chapters of this book are logically independent of each other.
Undergraduate Analysis Apr 14 2021 This logically self-contained introduction to analysis centers around those properties that have to do with uniform convergence and uniform limits in the context of differentiation and integration. From the reviews: "This material can be gone over quickly by the really well-prepared reader, for it is one of the book's pedagogical strengths that the pattern of development later recapitulates this material as it deepens and generalizes it." --AMERICAN MATHEMATICAL SOCIETY
Differential Manifolds Jul 18 2021 The present volume supersedes my Introduction to Differentiable Manifolds written a few years back. I have expanded the book considerably, including things like the Lie derivative, and especially the basic integration theory of differential forms, with Stokes' theorem and its various special formulations in different contexts. The foreword which I wrote in the earlier book is still quite valid and needs only slight extension here. Between advanced calculus and the three great differential theories (differential topology, differential geometry, ordinary differential equations), there lies a no-man's-land for which there exists no systematic exposition in the literature. It is the purpose of this book to fill the gap. The three differential theories are by no means independent of each other, but proceed according to their own flavor. In differential topology, one studies for instance homotopy classes of maps and the possibility of finding suitable differentiable maps in them (immersions, embeddings, isomorphisms, etc.). One may also use differentiable structures on topological manifolds to determine the topological structure of the manifold (e.g. it la Smale [26]).
Real and Functional Analysis Jul 30 2022 This book is meant as a text for a first-year graduate course in analysis. In a sense, it

covers the same topics as elementary calculus but treats them in a manner suitable for people who will be using it in further mathematical investigations. The organization avoids long chains of logical interdependence, so that chapters are mostly independent. This allows a course to omit material from some chapters without compromising the exposition of material from later chapters.

Calculus of Several Variables Feb 22 2022 This new, revised edition covers all of the basic topics in calculus of several variables, including vectors, curves, functions of several variables, gradient, tangent plane, maxima and minima, potential functions, curve integrals, Green's theorem, multiple integrals, surface integrals, Stokes' theorem, and the inverse mapping theorem and its consequences. It includes many completely worked-out problems.

Fundamentals of Diophantine Geometry Aug 07 2020 Diophantine problems represent some of the strongest aesthetic attractions to algebraic geometry. They consist in giving criteria for the existence of solutions of algebraic equations in rings and fields, and eventually for the number of such solutions. The fundamental ring of interest is the ring of ordinary integers Z, and the fundamental field of interest is the field Q of rational numbers. One discovers rapidly that to have all the technical freedom needed in handling general problems, one must consider rings and fields of finite type over the integers and rationals. Furthermore, one is led to consider also finite fields, p-adic fields (including the real and complex numbers) as representing a localization of the problems under consideration. We shall deal with global problems, all of which will be of a qualitative nature. On the one hand we have curves defined over say the rational numbers. Ifthe curve is affine one may ask for its points in Z, and thanks to Siegel, one can classify all curves which have infinitely many integral points. This problem is treated in Chapter VII. One may ask also for those which have infinitely many rational points, and for this, there is only Mordell's conjecture that if the genus is :;;; 2, then there is only a finite number of rational points.

The File Aug 26 2019 The File is a collection of documents from a major dispute involving a number of American college professors, mainly mathematicians, statisticians,and sociologists. The controversy was ignited by the mathematician Serge Lang's reaction to a questionnaire, "The 1977 Survey of the American Professoriate", distributed by E. C. Ladd of the University of Connecticut and S. M. Lipset of Stanford. The ensuing discussion - in part acrimonious and personal - soon involved a large group of active and passive participants, and included issues such as survey techniques, evaluation of academic work, public and political honesty, and McCarthyism at Harvard.

Geometry Mar 02 2020 At last: geometry in an exemplary, accessible and attractive form! The authors emphasise both the intellectually stimulating parts of geometry and routine arguments or computations in concrete or classical cases, as well as practical and physical applications. They also show students the fundamental concepts and the difference between important results and minor technical routines. Altogether, the text presents a coherent high school curriculum for the geometry course, naturally backed by numerous examples and exercises.

Math Talks for Undergraduates Aug 19 2021 For many years, Serge Lang has given talks on selected items in mathematics which could be extracted at a level understandable by those who have had calculus. Written in a conversational tone, Lang now presents a collection of those talks as a book covering such topics as: prime numbers, the abc conjecture, approximation theorems of analysis, Bruhat-Tits spaces, and harmonic and symmetric polynomials. Each talk is written in a lively and informal style meant to engage any reader looking for further insight into mathematics.

The Beauty of Doing Mathematics Oct 28 2019 If someone told you that mathematics is quite beautiful, you might be surprised. But you should know that some people do mathematics all their lives, and create mathematics, just as a composer creates music. Usually, every time a mathematician solves a problem, this gives rise to many oth ers, new and just as beautiful as the one which was solved. Of course, often these problems are quite difficult, and as in other disciplines can be understood only by those who have studied the subject with some depth, and know the subject well. In 1981, Jean Brette, who is responsible for the Mathematics Section of the Palais de la Decouverte (Science Museum) in Paris, invited me to give a conference at the Palais. I had never given such a conference before, to a non-mathematical public. Here was a challenge: could I communicate to such a Saturday afternoon audience what it means to do mathematics, and why one does mathematics? By "mathematics" I mean pure mathematics. This doesn't mean that pure math is better than other types of math, but I and a number of others do pure mathematics, and it's about them that I am now concerned. Math has a bad reputation, stemming from the most elementary levels. The word is in fact used in many different contexts. First, I had to explain briefly these possible contexts, and the one with which I wanted to deal.

Linear Algebra Nov 02 2022 "Linear Algebra" is intended for a one-term course at the junior or senior level. It begins with an exposition of the basic theory of vector spaces and proceeds to explain the fundamental structure theorem for linear maps, including eigenvectors and eigenvalues, quadratic and hermitian forms, diagnolization of symmetric, hermitian, and unitary linear maps and matrices, triangulation, and Jordan canonical form. The book also includes a useful chapter on convex sets and the finite-dimensional Krein-Milman theorem. The presentation is aimed at the student who has already had some exposure to the elementary theory of matrices, determinants and linear maps. However the book is logically self-contained. In this new edition, many parts of the book have been rewritten and reorganized, and new exercises have been added.

Complex Analysis Nov 21 2021 The present book is meant as a text for a course on complex analysis at the advanced undergraduate level, or first-year graduate level. Somewhat more material has been included than can be covered at leisure in one term, to give opportunities for the instructor to exercise his taste, and lead the

course in whatever direction strikes his fancy at the time. A large number of routine exercises are included for the more standard portions, and a few harder exercises of striking theoretical interest are also included, but may be omitted in courses addressed to less advanced students. In some sense, I think the classical German prewar texts were the best (Hurwitz-Courant, Knopp, Bieberbach, etc.) and I would recom mend to anyone to look through them. More recent texts have empha sized connections with real analysis, which is important, but at the cost of exhibiting succinctly and clearly what is peculiar about complex anal ysis: the power series expansion, the uniqueness of analytic continuation, and the calculus of residues. The systematic elementary development of formal and convergent power series was standard fare in the German texts, but only Cartan, in the more recent books, includes this material, which I think is quite essential, e. g. , for differential equations. I have written a short text, exhibiting these features, making it applicable to a wide variety of tastes. The book essentially decomposes into two parts.

Basic Mathematics Sep 27 2019 This text in basic mathematics is ideal for high school or college students. It provides a firm foundation in basic principles of mathematics and thereby acts as a springboard into calculus, linear algebra and other more advanced topics. The information is clearly presented, and the author develops concepts in such a manner to show how one subject matter can relate and evolve into another.

Algebraic Number Theory Jan 30 2020 This is a second edition of Lang's well-known textbook. It covers all of the basic material of classical algebraic number theory, giving the student the background necessary for the study of further topics in algebraic number theory, such as cyclotomic fields, or modular forms. "Lang's books are always of great value for the graduate student and the research mathematician. This updated edition of Algebraic number theory is no exception."—- MATHEMATICAL REVIEWS

Complex Multiplication Jun 24 2019 The small book by Shimura-Taniyama on the subject of complex multi is a classic. It gives the results obtained by them (and some by Weil) plication in the higher dimensional case, generalizing in a non-trivial way the method of Deuring for elliptic curves, by reduction mod p. Partly through the work of Shimura himself (cf. [Sh 1] [Sh 2], and [Sh 5]), and some others (Serre, Tate, Kubota, Ribet, Deligne etc.) it is possible today to make a more snappy and extensive presentation of the fundamental results than was possible in 1961. Several persons have found my lecture notes on this subject useful to them, and so I have decided to publish this short book to make them more widely available. Readers acquainted with the standard theory of abelian varieties, and who wish to get rapidly an idea of the fundamental facts of complex multi plication, are advised to look first at the two main theorems, Chapter 3, §6 and Chapter 4, §1, as well as the rest of Chapter 4. The applications of Chapter 6 could also be profitably read early. I am much indebted to N. Schappacher for a careful reading of the manu script resulting in a number of useful suggestions. S. LANG Contents CHAPTER 1

Analytic Complex Multiplication 4 I. Positive Definite Involutions . . . 6 2. CM Types and Subfields. . . . . 8 3. Application to Abelian Manifolds. 4. Construction of Abelian Manifolds with CM 14 21 5. Reflex of a CM Type . . . . .

Short Calculus Jun 04 2020 From the reviews "This is a reprint of the original edition of Lang's 'A First Course in Calculus', which was first published in 1964....The treatment is 'as rigorous as any mathematician would wish it'....[The exercises] are refreshingly simply stated, without any extraneous verbiage, and at times quite challenging....There are answers to all the exercises set and some supplementary problems on each topic to tax even the most able." --Mathematical Gazette

Algebra Apr 26 2022

Algebra Jun 28 2022 This book is intended as a basic text for a one year course in algebra at the graduate level or as a useful reference for mathematicians and professionals who use higher-level algebra. This book successfully addresses all of the basic concepts of algebra. For the new edition, the author has added exercises and made numerous corrections to the text. From MathSciNet's review of the first edition: "The author has an impressive knack for presenting the important and interesting ideas of algebra in just the "right" way, and he never gets bogged down in the dry formalism which pervades some parts of algebra."

Challenges May 28 2022 This collection, based on several of Lang's "Files", deals with the area where the worlds of science and academia meet those of journalism and politics: social organisation, government, and the roles that education and journalism play in shaping opinions. In discussing specific cases in which he became involved, Lang addresses general questions of standards: standards of journalism, discourse, and of science. Recurring questions concern how people process information and misinformation; inhibition of critical thinking and the role of education; how to make corrections, and how attempts at corrections are sometimes obstructed; the extent to which we submit to authority, and whether we can hold the authorities accountable; the competence of so-called experts; and the use of editorial and academic power to suppress or marginalize ideas, evidence, or data that do not fit the tenets of certain establishments. By treating case studies and providing extensive documentation, Lang challenges some individuals and establishments to reconsider the ways they exercise their official or professional responsibilities.

Topics in Cohomology of Groups Sep 07 2020 The book is a mostly translated reprint of a report on cohomology of groups from the 1950s and 1960s, originally written as background for the Artin-Tate notes on class field theory, following the cohomological approach. This report was first published (in French) by Benjamin. For this new English edition, the author added Tate's local duality, written up from letters which John Tate sent to Lang in 1958 - 1959. Except for this last item, which requires more substantial background in algebraic geometry and especially abelian varieties, the rest of the book is basically elementary, depending only on standard homological algebra at the level of first year graduate students.

Differential and Riemannian Manifolds Jul

26 2019 This is the third version of a book on Differential Manifolds; in this latest expansion three chapters have been added on Riemannian and pseudo-Riemannian geometry, and the section on sprays and Stokes' theorem have been rewritten. This text provides an introduction to basic concepts in differential topology, differential geometry and differential equations. In differential topology one studies classes of maps and the possibility of finding differentiable maps in them, and one uses differentiable structures on manifolds to determine their topological structure. In differential geometry one adds structures to the manifold (vector fields, sprays, a metric, and so forth) and studies their properties. In differential equations one studies vector fields and their integral curves, singular points, stable and unstable manifolds, and the like.

Introduction to Algebraic and Abelian Functions Jan 24 2022 Introduction to Algebraic and Abelian Functions is a self-contained presentation of a fundamental subject in algebraic geometry and number theory. For this revised edition, the material on theta functions has been expanded, and the example of the Fermat curves is carried throughout the text. This volume is geared toward a second-year graduate course, but it leads naturally to the study of more advanced books listed in the bibliography.

Undergraduate Analysis Jan 12 2021 This logically self-contained introduction to analysis centers around those properties that have to do with uniform convergence and uniform limits in the context of differentiation and integration. From the reviews: "This material can be gone over quickly by the really well-prepared reader, for it is one of the book's pedagogical strengths that the pattern of development later recapitulates this material as it deepens and generalizes it." --AMERICAN MATHEMATICAL SOCIETY

A First Course in Calculus Jun 16 2021 This fifth edition of Lang's book covers all the topics traditionally taught in the first-year calculus sequence. Divided into five parts, each section of A FIRST COURSE IN CALCULUS contains examples and applications relating to the topic covered. In addition, the rear of the book contains detailed solutions to a large number of the exercises, allowing them to be used as worked-out examples -- one of the main improvements over previous editions.

Fundamentals of Differential Geometry Mar 14 2021 This book provides an introduction to the basic concepts in differential topology, differential geometry, and differential equations, and some of the main basic theorems in all three areas. This new edition includes new chapters, sections, examples, and exercises. From the reviews: "There are many books on the fundamentals of differential geometry, but this one is quite exceptional; this is not surprising for those who know Serge Lang's books." --EMS NEWSLETTER

Math! Dec 11 2020

Undergraduate Algebra Jul 06 2020 The companion title, Linear Algebra, has sold over 8,000 copies The writing style is very accessible The material can be covered easily in a one-year or one-term course Includes Noah Snyder's proof of the Mason-Stothers polynomial abc theorem New material included on product structure for matrices including

descriptions of the conjugation representation of the diagonal group

Introduction to Linear Algebra May 16 2021 This is a short text in linear algebra, intended for a one-term course. In the first chapter, Lang discusses the relation between the geometry and the algebra underlying the subject, and gives concrete examples of the notions which appear later in the book. He then starts with a discussion of linear equations, matrices and Gaussian elimination, and proceeds to discuss vector spaces, linear maps, scalar products, determinants, and eigenvalues. The book contains a large number of exercises, some of the routine computational type, while others are conceptual.

Undergraduate Algebra Aug 31 2022 The companion title, Linear Algebra, has sold over 8,000 copies The writing style is very accessible The material can be covered easily in a one-year or one-term course Includes Noah Snyder's proof of the Mason-Stothers polynomial abc theorem New material included on product structure for matrices including descriptions of the conjugation representation of the diagonal group

Riemann-Roch Algebra Nov 29 2019 In various contexts of topology, algebraic geometry, and algebra (e.g. group representations), one meets the following situation. One has two contravariant functors K and A from a certain category to the category of rings, and a natural transformation p:K--+A of contravariant functors. The Chern character being the central exam ple, we call the homomorphisms Px: K(X)--+ A(X) characters. Given f: X--+ Y, we denote the pull-back homomorphisms by and fA: A(Y)--+ A(X). As functors to abelian groups, K and A may also be covariant, with push-forward homomorphisms and fA: A(X)--+ A(Y). Usually these maps do not commute with the character, but there is an element r f E A(X) such that the following diagram is commutative: K(X)~A(X) fK j J~A K(Y) --p;-+ A(Y) The map in the top line is p x multiplied by r f. When such commutativity holds, we say that Riemann-Roch holds for f. This type of formulation was first given by Grothendieck, extending the work of Hirzebruch to such a relative, functorial setting. Since then viii INTRODUCTION several other theorems of this Riemann-Roch type have appeared. Un derlying most of these there is a basic structure having to do only with elementary algebra, independent of the geometry. One purpose of this monograph is to describe this algebra independently of any context, so that it can serve axiomatically as the need arises.

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The Beauty of Doing Mathematics Oct 09 2020 If someone told you that mathematics is quite beautiful, you might be surprised. But you should know that some people do mathematics all their lives, and create mathematics, just as a

composer creates music. Usually, every time a mathematician solves a problem, this gives rise to many oth ers, new and just as beautiful as the one which was solved. Of course, often these problems are quite difficult, and as in other disciplines can be understood only by those who have studied the subject with some depth, and know the subject well. In 1981, Jean Brette, who is responsible for the Mathematics Section of the Palais de la Decouverte (Science Museum) in Paris, invited me to give a conference at the Palais. I had never given such a conference before, to a non-mathematical public. Here was a challenge: could I communicate to such a Saturday afternoon audience what it means to do mathematics, and why one does mathematics? By "mathematics" I mean pure mathematics. This doesn't mean that pure math is better than other types of math, but I and a number of others do pure mathematics, and it's about them that I am now concerned. Math has a bad reputation, stemming from the most elementary levels. The word is in fact used in many different contexts. First, I had to explain briefly these possible contexts, and the one with which I wanted to deal.