
Lang Undergraduate Analysis

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Calculus of Several Variables Springer Science & Business Media

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.

Undergraduate Analysis Springer Science & Business Media

Originally published in 2010, reissued as part of Pearson's modern classic series.

Undergraduate Analysis World Scientific Publishing Company

An authorised reissue of the long out of print classic textbook, Advanced Calculus by the late Dr Lynn Loomis and Dr Shlomo

Sternberg both of Harvard University has been a revered but hard to find textbook for the advanced calculus course for decades.

This book is based on an honors course in advanced calculus that the authors gave in the 1960's. The foundational material, presented in the unstarred sections of Chapters 1 through 11, was normally covered, but

different applications of this basic material were stressed from year to year, and the book therefore contains more material than was covered in any one year. It can accordingly be used (with omissions) as a text for a year's course in advanced calculus, or as a text for a three-semester introduction to analysis. The prerequisites are a good grounding in the calculus of one variable from a

mathematically rigorous point of view, together with some acquaintance with linear algebra. The reader should be familiar with limit and continuity type arguments and have a certain amount of mathematical sophistication. As possible introductory texts, we mention Differential and Integral Calculus by R Courant, Calculus by T Apostol, Calculus by M Spivak, and Pure Mathematics by G Hardy. The reader should also have some experience with partial derivatives. In overall plan the book divides roughly into a first half which develops the calculus (principally the differential calculus) in the

setting of normed vector spaces, and a second half which deals with the calculus of differentiable manifolds.

Real Analysis (Classic Version) Springer Science & Business Media

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.

SL2(R) Springer Science & Business Media

The present volume is a text designed for a first course in analysis. Although it is logically self-contained, it presupposes the mathematical maturity acquired by students who will ordinarily have had two years of calculus. When used in this context, most of the first part can be omitted, or reviewed extremely rapidly, or left to the students to read by themselves. The course can proceed immediately into Part Two after covering Chapters 0 and 1. However, the techniques of Part One are precisely those which are not emphasized in elementary calculus courses, since they are regarded as too sophisticated. The context of a third-year course is the first time that they are given proper emphasis, and thus it is important that Part One be thoroughly mastered. Emphasis has shifted from computational aspects of calculus to theoretical aspects: proofs for theorems concerning continuous functions; sketching curves like $x e^{-x}$, $x \log x$, $x \log x$ which are usually regarded as too difficult for the more elementary courses; and other similar

matters.

A First Course in Real Analysis Springer
Author is well-known and established
book author (all Serge Lang books are
now published by Springer); Presents a
brief introduction to the subject; All
manifolds are assumed finite dimensional
in order not to frighten some readers;
Complete proofs are given; Use of
manifolds cuts across disciplines and
includes physics, engineering and
economics

Postmodern Analysis Springer Science
& Business Media

"Advanced Calculus is intended as a
text for courses that furnish the
backbone of the student's
undergraduate education in
mathematical analysis. The goal is to
rigorously present the fundamental
concepts within the context of
illuminating examples and stimulating
exercises. This book is self-contained
and starts with the creation of basic
tools using the completeness axiom.
The continuity, differentiability,
integrability, and power series
representation properties of functions
of a single variable are established.
The next few chapters describe the
topological and metric properties of
Euclidean space. These are the basis
of a rigorous treatment of differential
calculus (including the Implicit
Function Theorem and Lagrange
Multipliers) for mappings between
Euclidean spaces and integration for
functions of several real
variables."--pub. desc.

Undergraduate Analysis Springer
Science & Business Media

This solutions manual for Lang ' s
Undergraduate Analysis provides
worked-out solutions for all problems
in the text. They include enough detail
so that a student can fill in the

intervening details between any pair of
steps.

Complex Analysis in one Variable
Springer

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

Math Talks for Undergraduates Springer
Science & Business Media

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.

Undergraduate Analysis Springer
Problems in Real Analysis: Advanced
Calculus on the Real Axis features a
comprehensive collection of
challenging problems in mathematical
analysis that aim to promote creative,
non-standard techniques for solving
problems. This self-contained text
offers a host of new mathematical
tools and strategies which develop a
connection between analysis and other
mathematical disciplines, such as
physics and engineering. A broad view
of mathematics is presented

throughout; the text is excellent for the classroom or self-study. It is intended for undergraduate and graduate students in mathematics, as well as for researchers engaged in the interplay between applied analysis, mathematical physics, and numerical analysis.

Undergraduate Algebra Springer Science & Business Media

Among the traditional purposes of such an introductory course is the training of a student in the conventions of pure mathematics: acquiring a feeling for what is considered a proof, and supplying literate written arguments to support mathematical propositions. To this extent, more than one proof is included for a theorem - where this is considered beneficial - so as to stimulate the students' reasoning for alternate approaches and ideas. The second half of this book, and consequently the second semester, covers differentiation and integration, as well as the connection between these concepts, as displayed in the general theorem of Stokes. Also included are some beautiful applications of this theory, such as Brouwer's fixed point theorem, and the Dirichlet principle for harmonic functions. Throughout, reference is made to earlier sections, so as to reinforce the main ideas by repetition. Unique in its applications to some topics not usually covered at this level.

Real and Functional Analysis Cambridge University Press

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.

Springer Science & Business Media

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.

Problems and Solutions for Complex Analysis Springer

Mathematics is the music of science, and real analysis is the Bach of mathematics. There are many other foolish things I could say about the subject of this book, but the foregoing will give the reader an idea of where my heart lies. The present book was written to support a first course in real analysis, normally taken after a year of elementary calculus. Real analysis is, roughly speaking, the modern setting for Calculus, "real" alluding to the field of real numbers that underlies it all. At center stage are functions, defined and taking values in sets of real numbers or in sets (the plane, 3-space, etc.) readily derived from the real numbers; a first course in real analysis traditionally places the emphasis on real-valued functions defined on sets of real numbers. The agenda for the course: (1) start with the axioms for the field of real numbers, (2) build, in one semester and with appropriate rigor, the foundations of calculus (including the "Fundamental Theorem"), and, along the way, (3) develop those skills and attitudes that enable us to continue learning mathematics on our own. Three decades of experience with the exercise have not diminished my astonishment that it can be done.

Primer of Modern Analysis Springer

Science & Business Media

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

Basic Elements of Real Analysis

Undergraduate Analysis

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.

A Course in Mathematical Analysis

Springer Science & Business Media

The present volume contains all the exercises and their solutions for Lang's second edition of Undergraduate Analysis. The wide variety of exercises, which range from computational to more conceptual and which are of varying difficulty, cover the following subjects and more: real numbers, limits, continuous functions, differentiation and elementary integration, normed vector spaces, compactness, series, integration in one variable, improper integrals, convolutions,

Fourier series and the Fourier integral, functions in n -space, derivatives in vector spaces, the inverse and implicit mapping theorem, ordinary differential equations, multiple integrals, and differential forms. My objective is to offer those learning and teaching analysis at the undergraduate level a large number of completed exercises and I hope that this book, which contains over 600 exercises covering the topics mentioned above, will achieve my goal. The exercises are an integral part of Lang's book and I encourage the reader to work through all of them. In some cases, the problems in the beginning chapters are used in later ones, for example, in Chapter IV when one constructs bump functions, which are used to smooth out singularities, and prove that the space of functions is dense in the space of regulated maps. The numbering of the problems is as follows. Exercise IX. 5. 7 indicates Exercise 7, § 5, of Chapter IX.

Acknowledgments I am grateful to Serge Lang for his help and enthusiasm in this project, as well as for teaching me mathematics (and much more) with so much generosity and patience.

Mathematical Analysis Springer

Science & Business Media

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

Complex Analysis with Applications

Birkhäuser

Examining the basic principles in real

analysis and their applications, this text provides a self-contained resource for graduate and advanced undergraduate courses. It contains independent chapters aimed at various fields of application, enhanced by highly advanced graphics and results explained and supplemented with practical and theoretical exercises. The presentation of the book is meant to provide natural connections to classical fields of applications such as Fourier analysis or statistics. However, the book also covers modern areas of research, including new and seminal results in the area of functional analysis.