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Inverse Imaging with Poisson Data - Mario Bertero 2018-12-27
Inverse Imaging with Poisson Data is an invaluable resource for graduate students, postdocs and researchers interested in the application of inverse problems to the domains of applied sciences, such as microscopy, medical imaging and astronomy. The purpose of the book is to provide a comprehensive account of the theoretical results, methods and algorithms related to the problem of image reconstruction from Poisson data within the framework of the maximum likelihood approach introduced by Shepp and Vardi.

A Compact Course on Linear PDEs - Alberto Valli 2021-01-12
This textbook is devoted to second order linear partial differential equations. The focus is on variational formulations in Hilbert spaces. It contains elliptic equations, including some basic results on Fredholm alternative and spectral theory, some useful notes on functional analysis, a brief presentation of Sobolev spaces and their properties, saddle point problems, parabolic equations and hyperbolic equations. Many exercises are added, and the complete solution of all of them is included. The work is mainly addressed to students in Mathematics, but also students in Engineering with a good mathematical background should be able to follow the theory presented here.

18 Unconventional Essays on the Nature of Mathematics - Reuben Hersh 2006-01-16
Collection of the most interesting recent writings on the philosophy of mathematics written by highly respected researchers from philosophy, mathematics, physics, and chemistry Interdisciplinary book that will be useful in several fields—with a cross-disciplinary subject area, and contributions from researchers of various disciplines

Using Mathematica for Quantum Mechanics - Roman Schmied 2019-09-28
This book revisits many of the problems encountered in introductory quantum mechanics, focusing on computer implementations for finding and visualizing analytical and numerical solutions. It subsequently uses these implementations as building blocks to solve more complex problems, such as coherent laser-driven dynamics in the Rubidium hyperfine structure or the Rashba interaction of an electron moving in 2D. The simulations are highlighted using the programming language Mathematica. No prior knowledge of Mathematica is needed; alternatives, such as Matlab, Python, or Maple, can also be used.

A Path to Combinatorics for Undergraduates - Titu Andreescu 2013-12-01
This unique approach to combinatorics is centered around unconventional, essay-type combinatorial examples, followed by a number of carefully selected, challenging problems and extensive discussions of their solutions. Topics encompass permutations and combinations, binomial coefficients and their applications, bijections, inclusions and exclusions, and generating functions. Each chapter features fully-worked problems, including many from Olympiads and other competitions, as well as a number of problems original to the authors; at the end of each chapter are further exercises to reinforce understanding, encourage creativity, and build a repertory of problem-solving techniques. The authors' previous text, "102 Combinatorial Problems," makes a fine companion volume to the present work, which is ideal for Olympiad participants and coaches, advanced high school students, undergraduates, and college instructors. The book's unusual problems and examples will interest seasoned mathematicians as well. "A Path to Combinatorics for Undergraduates" is a lively introduction not only to combinatorics, but to mathematical

ingenuity, rigor, and the joy of solving puzzles.

Integral Operators in Non-Standard Function Spaces - Vakhtang Kokilashvili 2016-05-11
This book, the result of the authors' long and fruitful collaboration, focuses on integral operators in new, non-standard function spaces and presents a systematic study of the boundedness and compactness properties of basic, harmonic analysis integral operators in the following function spaces, among others: variable exponent Lebesgue and amalgam spaces, variable Hölder spaces, variable exponent Campanato, Morrey and Herz spaces, Iwaniec-Sbordone (grand Lebesgue) spaces, grand variable exponent Lebesgue spaces unifying the two spaces mentioned above, grand Morrey spaces, generalized grand Morrey spaces, and weighted analogues of some of them. The results obtained are widely applied to non-linear PDEs, singular integrals and PDO theory. One of the book's most distinctive features is that the majority of the statements proved here are in the form of criteria. The book is intended for a broad audience, ranging from researchers in the area to experts in applied mathematics and prospective students.

Book of Proof - Richard H. Hammack 2016-01-01
This book is an introduction to the language and standard proof methods of mathematics. It is a bridge from the computational courses (such as calculus or differential equations) that students typically encounter in their first year of college to a more abstract outlook. It lays a foundation for more theoretical courses such as topology, analysis and abstract algebra. Although it may be more meaningful to the student who has had some calculus, there is really no prerequisite other than a measure of mathematical maturity.

Functional Networks with Applications - Enrique Castillo 2012-12-06
Artificial neural networks have been recognized as a powerful tool to learn and reproduce systems in various fields of applications. Neural net works are inspired by the brain behavior and consist of one or several layers of neurons, or computing units, connected by links. Each artificial neuron receives an input value from the input layer or the neurons in the previ ous layer. Then it computes a scalar output from a linear combination of the received inputs using a given scalar function (the activation function), which is assumed the same for all neurons. One of the main properties of neural networks is their ability to learn from data. There are two types of learning: structural and parametric. Structural learning consists of learning the topology of the network, that is, the number of layers, the number of neurons in each layer, and what neurons are connected. This process is done by trial and error until a good fit to the data is obtained. Parametric learning consists of learning the weight values for a given topology of the network. Since the neural functions are given, this learning process is achieved by estimating the connection weights based on the given information. To this aim, an error function is minimized using several well known learning methods, such as the backpropagation algorithm. Unfortunately, for these methods: (a) The function resulting from the learning process has no physical or engineering interpretation. Thus, neural networks are seen as black boxes.

Concrete Mathematics: A Foundation for Computer Science - Ronald L. Graham 1994

Matematica.blu 2.0. Vol. O-Q.Blu: Goniometria-Trigonometria. Con espansione online. Per le Scuole superiori - Massimo Bergamini 2011

Mathematica Cookbook - Sal Mangano 2010-04-02
Mathematica Cookbook helps you master the application's core principles by walking you through real-world problems. Ideal for browsing, this book includes recipes for working with numerics, data structures, algebraic equations, calculus, and statistics. You'll also venture into exotic territory with recipes for data visualization using 2D and 3D graphic tools, image processing, and music. Although Mathematica 7 is a highly advanced computational platform, the recipes in this book make it accessible to everyone -- whether you're working on high school algebra, simple graphs, PhD-level computation, financial analysis, or advanced engineering models. Learn how to use Mathematica at a higher level with functional programming and pattern matching Delve into the rich library of functions for string and structured text manipulation Learn how to apply the tools to physics and engineering problems Draw on Mathematica's access to physics, chemistry, and biology data Get techniques for solving equations in computational finance Learn how to use Mathematica for sophisticated image processing Process music and audio as musical notes, analog waveforms, or digital sound samples

Ten Pigs - Derek Anderson 2015-04-28
Laugh out loud in this hysterical epic counting bath adventure with a squeaky clean twist! From Derek Anderson, the illustrator of the bestselling Little Quack series! One very happy pig -- one bubbly bathtub. Everything is perfect until nine more join in! And ten? Ten wiggles and squeezes And surfs his way in. One pig looks to take a relaxing bath in solitude, only to be joined by another pig, then another, then another. When Pig Number 10 jumps into the crowded tub, the first pig comes up with a plan to enjoy his bath.

Principia Mathematica - Alfred North Whitehead 1910

Numerical Simulation in Physics and Engineering - Inmaculada Higueras 2016-07-01
This book presents lecture notes from the XVI 'Jacques-Louis Lions' Spanish-French School on Numerical Simulation in Physics and Engineering, held in Pamplona (Navarra, Spain) in September 2014. The subjects covered include: numerical analysis of isogeometric methods, convolution quadrature for wave simulations, mathematical methods in image processing and computer vision, modeling and optimization techniques in food processes, bio-processes and bio-systems, and GPU computing for numerical simulation. The book is highly recommended to graduate students in Engineering or Science who want to focus on numerical simulation, either as a research topic or in the field of industrial applications. It can also benefit senior researchers and technicians working in industry who are interested in the use of state-of-the-art numerical techniques in the fields addressed here. Moreover, the book can be used as a textbook for master courses in Mathematics, Physics, or Engineering.

Mathematical Statistics and Data Analysis - John A. Rice 2006-04-28
This is the first text in a generation to re-examine the purpose of the mathematical statistics course. The book's approach interweaves traditional topics with data analysis and reflects the use of the computer with close ties to the practice of statistics. The author stresses analysis of data, examines real problems with real data, and motivates the theory. The book's descriptive statistics, graphical displays, and realistic applications stand in strong contrast to traditional texts that are set in abstract settings. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Mathematics for Computer Science - Eric Lehman 2017-03-08
This book covers elementary discrete mathematics for computer science and engineering. It emphasizes mathematical definitions and proofs as well as applicable methods. Topics include formal logic notation, proof methods; induction, well-ordering; sets, relations; elementary graph theory; integer congruences; asymptotic notation and growth of functions; permutations and combinations, counting principles; discrete probability. Further selected topics may also be covered, such as recursive definition and structural induction; state machines and invariants; recurrences; generating functions.

The Mathematical Theory of Communication - Claude E Shannon 1998-09-01
Scientific knowledge grows at a phenomenal pace--but few books have had as lasting an impact or played as important a role in our modern world as The Mathematical Theory of Communication, published originally as a paper on communication theory more than fifty years ago. Republished in book form shortly thereafter, it has since gone through four hardcover and sixteen paperback printings. It is a revolutionary work, astounding in its foresight and contemporaneity. The University of Illinois Press is pleased and honored to issue this commemorative reprinting of a classic.

Principles of Mathematical Analysis - Walter Rudin 1976
The third edition of this well known text continues to provide a solid foundation in mathematical analysis for undergraduate and first-year graduate students. The text begins with a discussion of the real number system as a complete ordered field. (Dedekind's construction is now treated in an appendix to Chapter I.) The topological background needed for the development of convergence, continuity, differentiation and integration is provided in Chapter 2. There is a new section on the gamma function, and many new and interesting exercises are included. This text is part of the Walter Rudin Student Series in Advanced Mathematics.

An Introduction to Sobolev Spaces and Interpolation Spaces - Luc Tartar 2007-05-26
After publishing an introduction to the Navier–Stokes equation and oceanography (Vol. 1 of this series), Luc Tartar follows with another set of lecture notes based on a graduate course in two parts, as indicated by the title. A draft has been available on the internet for a few years. The author has now revised and polished it into a text accessible to a larger audience.

Matematica.blu. Per le Scuole superiori - Massimo Bergamini 2017

A Primer on Mathematical Modelling - Alfio Quarteroni 2020-10-09
In this book we describe the magic world of mathematical models: starting from real-life problems, we formulate them in terms of equations, transform equations into algorithms and algorithms into programs to be executed on computers. A broad variety of examples and exercises illustrate that properly designed models can, e.g.: predict the way the number of dolphins in the Aeolian Sea will change as food availability and fishing activity vary; describe the blood flow in a capillary network; calculate the PageRank of websites. This book also includes a chapter with an elementary introduction to Octave, an open-source programming language widely used in the scientific community. Octave functions and scripts for dealing with the problems presented in the text can be downloaded from https://paola-gervasio.unibs.it/quarteroni-gervasio This book is addressed to any student interested in learning how to construct and apply mathematical models.

Introduction to Mathematical Statistics - Robert V. Hogg 2003

Lectures on Optimal Transport - Luigi Ambrosio 2021-07-22
This textbook is addressed to PhD or senior undergraduate students in mathematics, with interests in analysis, calculus of variations, probability and optimal transport. It originated from the teaching experience of the first author in the Scuola Normale Superiore, where a course on optimal transport and its applications has been given many times during the last 20 years. The topics and the tools were chosen at a sufficiently general and advanced level so that the student or scholar interested in a more specific theme would gain from the book the necessary background to explore it. After a large and detailed introduction to classical theory, more specific attention is devoted to applications to geometric and functional inequalities and to partial differential equations.

Complex Analysis - Elias M. Stein 2010-04-22
With this second volume, we enter the intriguing world of complex analysis. From the first theorems on, the elegance and sweep of the results is evident. The starting point is the simple idea of extending a function initially given for real values of the argument to one that is defined when the argument is complex. From there, one proceeds to the main properties of holomorphic functions, whose proofs are generally short and quite illuminating: the Cauchy theorems, residues, analytic continuation, the argument principle. With this background, the reader is ready to learn a wealth of additional material connecting the subject with other areas of mathematics: the Fourier transform treated by contour integration, the zeta function and the prime number theorem, and an introduction to elliptic functions culminating in their application to combinatorics and number theory. Thoroughly developing a subject with many ramifications, while striking a careful balance between conceptual insights and the technical underpinnings of rigorous analysis, Complex

Analysis will be welcomed by students of mathematics, physics, engineering and other sciences. The Princeton Lectures in Analysis represents a sustained effort to introduce the core areas of mathematical analysis while also illustrating the organic unity between them. Numerous examples and applications throughout its four planned volumes, of which Complex Analysis is the second, highlight the far-reaching consequences of certain ideas in analysis to other fields of mathematics and a variety of sciences. Stein and Shakarchi move from an introduction addressing Fourier series and integrals to in-depth considerations of complex analysis; measure and integration theory, and Hilbert spaces; and, finally, further topics such as functional analysis, distributions and elements of probability theory.

Matematica.blu 2.0. Vol. U-W.Blu: Derivate e studi di funzioni-Integrali. Con espansione online. Per le Scuole superiori - Massimo Bergamini 2011

Enrico Fermi, Physicist - Emilio Segrè 2019-08-09
In this biography of Enrico Fermi (1901-54), who won the Nobel Prize in physics in 1938 for his work on radioactivity by neutron bombardment and his discovery of transuranic elements and who achieved the first controlled nuclear chain reaction in Chicago in 1942, his student, collaborator, fellow Nobel Prize winner and lifelong friend Emilio Segrè presents the scientist, and explains in nontechnical terms Fermi's work and his achievements. "Segrè's description of Fermi's early life and his involvement with and commitment to physics is extremely interesting... Segrè understands and describes very clearly the outstanding characteristics of Fermi's theoretical work: clarity and completeness... Segrè has succeeded admirably in describing Fermi's entire scientific career, and this book is strongly recommended." — M. L. Goldberger, Science "We must thank Emilio Segrè for this authoritative, revealing and inspiring book. It covers in a masterly fashion the most exciting thirty years of modern physics and the character and activities of one of its greatest contributors." — Nature "A rich, well-rounded portrait of [Fermi] the scientist, his methods, intellectual history, and achievements. Explaining in nontechnical terms the scientific problems Fermi faced or solved, Enrico Fermi, Physicist contains illuminating material concerning Fermi's youth in Italy and the development of his scientific style." — Physics Today "All that might be hoped for in a biography of one Nobel Prize winner in physics by another has been realized in Emilio Segrè's biography of his friend, Enrico Fermi... A truly masterly drawing of Fermi's character, along with his physics and the events through which he moved, Segrè has provided us with a brilliant appreciation of one of the most pre-eminent figures of modern physics." — Physics Bulletin "This excellent biography, written by one of the original group who worked with him during the 1930s at Rome, catches beautifully the style and spirit of its subject... With Fermi's passing the age of the universal experimental and theoretical physicist is gone. Segre's book tells the story of this heroic age of physics and of its principal actor; it is a delight to read, and I recommend it heartily." — American Scientist "Here we meet the man at work and we see the meticulous scientist... This book also shows us another facet of Fermi: that of the conscientious scientist torn between his love of pure research and his love of teaching." — V. Barocas, Annals of Science "Segrè is a sensitive biographer, responsive to all problems that can plague the creative scientist; he shows, above all, Fermi's dedication, zeal, and extraordinary talents. Segrè has provided more than sympathy. Much that is new about Fermi's youth in Italy appears here... [A] very rewarding book... Every physicist will want to read this biography, along with every reader who has an interest in intellectual developments during the 1920-1960 era." — J. Z. Fullmer, The Ohio Journal of Science

Introduction to Probability - Charles Miller Grinstead 2012-10-30
This text is designed for an introductory probability course at the university level for sophomores, juniors, and seniors in mathematics, physical and social sciences, engineering, and computer science. It presents a thorough treatment of ideas and techniques necessary for a firm understanding of the subject.

Nonlocal and Fractional Operators - Luisa Beghin 2021-07-23
The purpose of this volume is to explore new bridges between different research areas involved in the theory and applications of the fractional calculus. In particular, it collects scientific and original contributions to the development of the theory of nonlocal and fractional operators. Special attention is given to the applications in mathematical physics, as well as in probability. Numerical methods aimed to the solution of problems with fractional differential equations are also treated in the book. The contributions

have been presented during the international workshop "Nonlocal and Fractional Operators", held in Sapienza University of Rome, in April 2019, and dedicated to the retirement of Prof. Renato Spigler (University Roma Tre). Therefore we also wish to dedicate this volume to this occasion, in order to celebrate his scientific contributions in the field of numerical analysis and fractional calculus. The book is suitable for mathematicians, physicists and applied scientists interested in the various aspects of fractional calculus.

Reduced Basis Methods for Partial Differential Equations - Alfio Quarteroni 2015-08-19
This book provides a basic introduction to reduced basis (RB) methods for problems involving the repeated solution of partial differential equations (PDEs) arising from engineering and applied sciences, such as PDEs depending on several parameters and PDE-constrained optimization. The book presents a general mathematical formulation of RB methods, analyzes their fundamental theoretical properties, discusses the related algorithmic and implementation aspects, and highlights their built-in algebraic and geometric structures. More specifically, the authors discuss alternative strategies for constructing accurate RB spaces using greedy algorithms and proper orthogonal decomposition techniques, investigate their approximation properties and analyze offline-online decomposition strategies aimed at the reduction of computational complexity. Furthermore, they carry out both a priori and a posteriori error analysis. The whole mathematical presentation is made more stimulating by the use of representative examples of applicative interest in the context of both linear and nonlinear PDEs. Moreover, the inclusion of many pseudocodes allows the reader to easily implement the algorithms illustrated throughout the text. The book will be ideal for upper undergraduate students and, more generally, people interested in scientific computing. All these pseudocodes are in fact implemented in a MATLAB package that is freely available at https://github.com/redbkit

Extended Abstracts Spring 2019 - Berta Barquero 2021
The book presents research works developed within the Anthropological Theory of the Didactic (ATD) by senior and young researchers that participated in the Intensive Research Program Advances in the anthropological theory of the didactic and their consequences in curricula and teacher education held at the Centre de Recerca Matematica (CRM) in Barcelona. It is organized in three axes of current research on the ATD: teacher education and the professionalization of teaching; the curriculum problem in the historical transition from the classical paradigm of visiting works to the emerging didactic paradigm of questioning the world; and research in didactics at the university level.

An Undergraduate Primer in Algebraic Geometry - Ciro Ciliberto 2021-05-05
This book consists of two parts. The first is devoted to an introduction to basic concepts in algebraic geometry: affine and projective varieties, some of their main attributes and examples. The second part is devoted to the theory of curves: local properties, affine and projective plane curves, resolution of singularities, linear equivalence of divisors and linear series, Riemann–Roch and Riemann–Hurwitz Theorems. The approach in this book is purely algebraic. The main tool is commutative algebra, from which the needed results are recalled, in most cases with proofs. The prerequisites consist of the knowledge of basics in affine and projective geometry, basic algebraic concepts regarding rings, modules, fields, linear algebra, basic notions in the theory of categories, and some elementary point–set topology. This book can be used as a textbook for an undergraduate course in algebraic geometry. The users of the book are not necessarily intended to become algebraic geometers but may be interested students or researchers who want to have a first smattering in the topic. The book contains several exercises, in which there are more examples and parts of the theory that are not fully developed in the text. Of some exercises, there are solutions at the end of each chapter.

PISA 2012 Results: Excellence through Equity (Volume II) Giving Every Student the Chance to Succeed - OECD 2013-12-03
This second volume of PISA 2012 results defines and measures equity in education and analyses how equity in education has evolved across countries between PISA 2003 and 2012.

JIMD Reports, Volume 20 - Johannes Zschocke 2015-03-26
JIMD Reports publishes case and short research reports in the area of inherited metabolic disorders. Case reports highlight some unusual or previously unrecorded feature relevant to the disorder or serve as an

important reminder of clinical or biochemical features of a Mendelian disorder.

Logic, Language, Information, and Computation - Alexandra Silva 2021-10-05
Edited in collaboration with FoLLI, the Association of Logic, Language and Information this book constitutes the refereed proceedings of the 27th Workshop on Logic, Language, Information and Communication, WoLLIC 2021, Virtual Event, in October 2021. The 25 full papers presented included 6 invited lectures were fully reviewed and selected from 50 submissions. The idea is to have a forum which is large enough in the number of possible interactions between logic and the sciences related to information and computation.

Advances in Probability and Mathematical Statistics - Daniel Hernández-Hernández 2021-11-14
This volume contains papers which were presented at the XV Latin American Congress of Probability and Mathematical Statistics (CLAPEM) in December 2019 in Mérida-Yucatán, México. They represent well the wide set of topics on probability and statistics that was covered at this congress, and their high quality and variety illustrates the rich academic program of the conference.

Debt - David Graeber 2012
Economic history states that money replaced a bartering system, yet there isn't any evidence to support this axiom. Anthropologist Graeber presents a stunning reversal of this conventional wisdom. For more than 5000 years, humans have used elaborate credit systems to buy and sell goods. Since the beginning of the agrarian empires, humans have been divided into debtors and creditors. Through time, virtual credit money was replaced by gold and the system as a whole went into decline. This fascinating history is told for the first time.

Introductory Combinatorics - Kenneth P. Bogart 1990
Introductory, Combinatorics, Third Edition is designed for introductory courses in combinatorics, or more generally, discrete mathematics. The author, Kenneth Bogart, has chosen core material of value to students in a wide variety of disciplines: mathematics, computer science, statistics, operations research, physical sciences, and behavioral sciences. The rapid growth in the breadth and depth of the field of combinatorics in the last several decades, first in graph theory and designs and more recently in enumeration and ordered sets, has led to a recognition of combinatorics as a field with which the aspiring mathematician should become familiar. This long-overdue new edition of a popular set presents a broad comprehensive survey of modern combinatorics which is important to the various scientific fields of study.

Mathematics for Machine Learning - Marc Peter Deisenroth 2020-04-23
The fundamental mathematical tools needed to understand machine learning include linear algebra, analytic geometry, matrix decompositions, vector calculus, optimization, probability and statistics. These topics are traditionally taught in disparate courses, making it hard for data science or computer science students, or professionals, to efficiently learn the mathematics. This self-contained textbook bridges the gap between mathematical and machine learning texts, introducing the mathematical concepts with a minimum of prerequisites. It uses these concepts to derive four central machine learning methods: linear regression, principal component analysis, Gaussian mixture models and support vector machines. For students and others with a mathematical background, these derivations provide a starting point to machine learning texts. For those learning the mathematics for the first time, the methods help build intuition and practical experience with applying mathematical concepts. Every chapter includes worked examples and exercises to test understanding. Programming tutorials are offered on the book's web site.

MATHEMATICAL RECREATIONS AND ESSAYS - W.W. ROUSE BALL
The book is divided into two parts. The first part consists of seven chapters, in which are included var-ious problems and amusements of the kind usually called mathematical recreations. The questions discussed in the first of these chapters are connected with arithmetic; those in the second with geometry; and those in the third relate to mechanics. The fourth chapter contains an account of some miscellaneous problems which involve both num-ber and situation; the fifth chapter contains a concise account of magic squares; and the sixth and seventh chapters deal with some unicursal problems. The second part consists of five chapters, which are mostly histori-cal. They deal respectively with three classical problems in geometry—namely, the duplication of the cube, the trisection of an angle, and the quadrature of the circle—astrology, the hypotheses as to the nature of space and mass, and a means of measuring time.

Calculus - Tom M. Apostol 2019-04-26
An introduction to the Calculus, with an excellent balance between theory and technique. Integration is treated before differentiation--this is a departure from most modern texts, but it is historically correct, and it is the best way to establish the true connection between the integral and the derivative. Proofs of all the important theorems are given, generally preceded by geometric or intuitive discussion. This Second Edition introduces the mean-value theorems and their applications earlier in the text, incorporates a treatment of linear algebra, and contains many new and easier exercises. As in the first edition, an interesting historical introduction precedes each important new concept.