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Ramanujan: Essays and Surveys - Srinivasa Ramanujan Aiyangar 2001

This book contains essays on Ramanujan and his work that were written especially for this volume. It also includes important survey articles in areas influenced by Ramanujan's mathematics. Most of the articles in the book are nontechnical, but even those that are more technical contain substantial sections that will engage the general reader. The book opens with the only four existing photographs of Ramanujan, presenting historical accounts of them and information about other people in the photos. This section includes an account of a cryptic family history written by his younger brother, S. Lakshmi Narasimhan. Following are articles on Ramanujan's illness by R. A. Rankin, the British physician D. A. B. Young, and Nobel laureate S. Chandrasekhar. They present a study of his symptoms, a convincing diagnosis of the cause of his death, and a thorough exposition of Ramanujan's life as a patient in English sanitariums and nursing homes. Following this are biographies of S. Janaki (Mrs. Ramanujan) and S. Narayana Iyer, Chief Accountant of the Madras Port Trust Office, who first communicated Ramanujan's work to the Journal of the Indian Mathematical Society. The last half of the book begins with a section on "Ramanujan's Manuscripts and Notebooks". Included is an important article by G. E. Andrews on Ramanujan's lost notebook. The final two sections feature both nontechnical articles, such as Jonathan and Peter Borwein's "Ramanujan and pi", and more technical articles by Freeman Dyson, Atle Selberg, Richard Askey, and G. N. Watson. This volume complements the book Ramanujan: Letters and Commentary, Volume 9, in the AMS series, History of Mathematics. For more on Ramanujan, see these AMS publications Ramanujan: Twelve Lectures on Subjects Suggested by His Life and Work, Volume 136.H, and Collected Papers of Srinivasa Ramanujan, Volume 159.H, in the AMS Chelsea Publishing series.

Mathematics and Social Utopias in France - Simon Altmann 2006-10-17

Social reformer, banker, and mathematician, Olinde Rodrigues is a fascinating figure of nineteenth-century Paris. Information about him is obscure--scattered in publications on history, mathematics, and the social sciences--and often inaccurate. Rodrigues left no papers or archives. Here, for the first time, is an authoritative account of his family history, education, and important mathematical works. Written by a team of prominent mathematicians and historians, the book comprises the interests and associations that make Rodrigues such a remarkable character in the history of mathematics. This is a superb panorama of nineteenth-century France, portrayed through the life and work of Olinde Rodrigues. The beginning chapters attempt to recreate the scientific and social background of nineteenth-century Paris and Rodrigues's place in it. The following chapters discuss his contributions to a variety of mathematical fields (e.g., orthogonal polynomials, combinatorics, and rotations). The final chapters discuss contemporary reactions to his mathematical work. Sufficient background is given to make it accessible to readers familiar with basic college mathematics. The book is suitable for specialists in the history of mathematics and/or science, graduate students, and mathematicians. Co-published with the London Mathematical Society beginning with Volume 4.

Taming the Unknown - Victor J. Katz 2020-04-07

What is algebra? For some, it is an abstract language of x's and y's. For mathematics majors and professional mathematicians, it is a world of axiomatically defined constructs like groups, rings, and fields. Taming the Unknown considers how these two seemingly different types of

algebra evolved and how they relate. Victor Katz and Karen Parshall explore the history of algebra, from its roots in the ancient civilizations of Egypt, Mesopotamia, Greece, China, and India, through its development in the medieval Islamic world and medieval and early modern Europe, to its modern form in the early twentieth century. Defining algebra originally as a collection of techniques for determining unknowns, the authors trace the development of these techniques from geometric beginnings in ancient Egypt and Mesopotamia and classical Greece. They show how similar problems were tackled in Alexandrian Greece, in China, and in India, then look at how medieval Islamic scholars shifted to an algorithmic stage, which was further developed by medieval and early modern European mathematicians. With the introduction of a flexible and operative symbolism in the sixteenth and seventeenth centuries, algebra entered into a dynamic period characterized by the analytic geometry that could evaluate curves represented by equations in two variables, thereby solving problems in the physics of motion. This new symbolism freed mathematicians to study equations of degrees higher than two and three, ultimately leading to the present abstract era. Taming the Unknown follows algebra's remarkable growth through different epochs around the globe.

The St. Petersburg School of Number Theory - Boris Nikolaevich Delone

"With a Foreword written for the English edition, this volume will appeal to a broad mathematical audience, including mathematical historians and mathematicians working in number theory."--BOOK JACKET.

Logic's Lost Genius - Eckart Menzler-Trott 2016-05-05

Gerhard Gentzen (1909-1945) is the founder of modern structural proof theory. His lasting methods, rules, and structures resulted not only in the technical mathematical discipline called "proof theory" but also in verification programs that are essential in computer science. The appearance, clarity, and elegance of Gentzen's work on natural deduction, the sequent calculus, and ordinal proof theory continue to be impressive even today. The present book gives the first comprehensive, detailed, accurate scientific biography expounding the life and work of Gerhard Gentzen, one of our greatest logicians, until his arrest and death in Prague in 1945. Particular emphasis in the book is put on the conditions of scientific research, in this case mathematical logic, in National Socialist Germany, the ideological fight for "German logic", and their mutual protagonists. Numerous hitherto unpublished sources, family documents, archival material, interviews, and letters, as well as Gentzen's lectures for the mathematical public, make this book an indispensable source of information on this important mathematician, his work, and his time. The volume is completed by two deep substantial essays by Jan von Plato and Craig Smoryński on Gentzen's proof theory; its relation to the ideas of Hilbert, Brouwer, Weyl, and Gödel; and its development up to the present day. Smoryński explains the Hilbert program in more than the usual slogan form and shows why consistency is important. Von Plato shows in detail the benefits of Gentzen's program. This important book is a self-contained starting point for any work on Gentzen and his logic. The book is accessible to a wide audience with different backgrounds and is suitable for general readers, researchers, students, and teachers.

The Scientific Legacy of Poincare - Éric Charpentier 2010

Henri Poincare (1854-1912) was one of the greatest scientists of his time, perhaps the last one to have mastered and expanded almost all areas in mathematics and theoretical physics. In this book, twenty world experts

present one part of Poincaré's extraordinary work. Each chapter treats one theme, presenting Poincaré's approach, and achievements.

Pioneering Women in American Mathematics - Judy Green 2009-01
More than 14 percent of the PhD's awarded in the United States during the first four decades of the twentieth century went to women, a proportion not achieved again until the 1980s. This book is the result of a study in which the authors identified all of the American women who earned PhD's in mathematics before 1940, and collected extensive biographical and bibliographical information about each of them. By reconstructing as complete a picture as possible of this group of women, Green and LaDuke reveal insights into the larger scientific and cultural communities in which they lived and worked. The book contains an extended introductory essay, as well as biographical entries for each of the 228 women in the study. The authors examine family backgrounds, education, careers, and other professional activities. They show that there were many more women earning PhD's in mathematics before 1940 than is commonly thought. Extended biographies and bibliographical information are available from the companion website for the book: www.ams.org/bookpages/hmath-34. The material will be of interest to researchers, teachers, and students in mathematics, history of mathematics, history of science, women's studies, and sociology. The data presented about each of the 228 individual members of the group will support additional study and analysis by scholars in a large number of disciplines.

The Mathematics of Frobenius in Context - Thomas Hawkins 2013-07-23
Frobenius made many important contributions to mathematics in the latter part of the 19th century. Hawkins here focuses on his work in linear algebra and its relationship with the work of Burnside, Cartan, and Molien, and its extension by Schur and Brauer. He also discusses the Berlin school of mathematics and the guiding force of Weierstrass in that school, as well as the fundamental work of d'Alembert, Lagrange, and Laplace, and of Gauss, Eisenstein and Cayley that laid the groundwork for Frobenius's work in linear algebra. The book concludes with a discussion of Frobenius's contribution to the theory of stochastic matrices.

Lie Groups - Daniel Bump 2013-10-01
This book is intended for a one-year graduate course on Lie groups and Lie algebras. The book goes beyond the representation theory of compact Lie groups, which is the basis of many texts, and provides a carefully chosen range of material to give the student the bigger picture. The book is organized to allow different paths through the material depending on one's interests. This second edition has substantial new material, including improved discussions of underlying principles, streamlining of some proofs, and many results and topics that were not in the first edition. For compact Lie groups, the book covers the Peter-Weyl theorem, Lie algebra, conjugacy of maximal tori, the Weyl group, roots and weights, Weyl character formula, the fundamental group and more. The book continues with the study of complex analytic groups and general noncompact Lie groups, covering the Bruhat decomposition, Coxeter groups, flag varieties, symmetric spaces, Satake diagrams, embeddings of Lie groups and spin. Other topics that are treated are symmetric function theory, the representation theory of the symmetric group, Frobenius-Schur duality and $GL(n) \times GL(m)$ duality with many applications including some in random matrix theory, branching rules, Toeplitz determinants, combinatorics of tableaux, Gelfand pairs, Hecke algebras, the "philosophy of cusp forms" and the cohomology of Grassmannians. An appendix introduces the reader to the use of Sage mathematical software for Lie group computations.

Pioneers of Representation Theory - Charles W. Curtis

The year 1897 was marked by two important mathematical events: the publication of the first paper on representations of finite groups by Ferdinand Georg Frobenius (1849-1917) and the appearance of the first treatise in English on the theory of finite groups by William Burnside (1852-1927). Burnside soon developed his own approach to representations of finite groups. In the next few years, working independently, Frobenius and Burnside explored the new subject and its applications to finite group theory. They were soon joined in this enterprise by Issai Schur (1875-1941) and some years later, by Richard Brauer (1901-1977). These mathematicians' pioneering research is the subject of this book. It presents an account of the early history of representation theory through an analysis of the published work of the principals and others with whom the principals' work was interwoven. Also included are biographical sketches and enough mathematics to enable readers to follow the development of the subject. An introductory chapter contains some of the results involving characters of finite abelian

groups by Lagrange, Gauss, and Dirichlet, which were part of the mathematical tradition from which Frobenius drew his inspiration. This book presents the early history of an active branch of mathematics. It includes enough detail to enable readers to learn the mathematics along with the history. The volume would be a suitable text for a course on representations of finite groups, particularly one emphasizing an historical point of view. Co-published with the London Mathematical Society. Members of the LMS may order directly from the AMS at the AMS member price. The LMS is registered with the Charity Commissioners.

Representation Theory - Amritanshu Prasad 2015-02-05

This book discusses the representation theory of symmetric groups, the theory of symmetric functions and the polynomial representation theory of general linear groups. The first chapter provides a detailed account of necessary representation-theoretic background. An important highlight of this book is an innovative treatment of the Robinson-Schensted-Knuth correspondence and its dual by extending Viennot's geometric ideas. Another unique feature is an exposition of the relationship between these correspondences, the representation theory of symmetric groups and alternating groups and the theory of symmetric functions. Schur algebras are introduced very naturally as algebras of distributions on general linear groups. The treatment of Schur-Weyl duality reveals the directness and simplicity of Schur's original treatment of the subject. In addition, each exercise is assigned a difficulty level to test readers' learning. Solutions and hints to most of the exercises are provided at the end.

Mathematics across the Iron Curtain - Christopher Hollings 2014-07-16

The theory of semigroups is a relatively young branch of mathematics, with most of the major results having appeared after the Second World War. This book describes the evolution of (algebraic) semigroup theory from its earliest origins to the establishment of a full-fledged theory. Semigroup theory might be termed 'Cold War mathematics' because of the time during which it developed. There were thriving schools on both sides of the Iron Curtain, although the two sides were not always able to communicate with each other, or even gain access to the other's publications. A major theme of this book is the comparison of the approaches to the subject of mathematicians in East and West, and the study of the extent to which contact between the two sides was possible.

Tensor-Valued Random Fields for Continuum Physics - Anatoliy Malyarenko 2018-12-06

Presents a complete description of homogenous and isotropic tensor-valued random fields, including the problems of continuum physics, mathematical tools and applications.

A Course in Analytic Number Theory - Marius Overholt 2014-12-30

This book is an introduction to analytic number theory suitable for beginning graduate students. It covers everything one expects in a first course in this field, such as growth of arithmetic functions, existence of primes in arithmetic progressions, and the Prime Number Theorem. But it also covers more challenging topics that might be used in a second course, such as the Siegel-Walfisz theorem, functional equations of L-functions, and the explicit formula of von Mangoldt. For students with an interest in Diophantine analysis, there is a chapter on the Circle Method and Waring's Problem. Those with an interest in algebraic number theory may find the chapter on the analytic theory of number fields of interest, with proofs of the Dirichlet unit theorem, the analytic class number formula, the functional equation of the Dedekind zeta function, and the Prime Ideal Theorem. The exposition is both clear and precise, reflecting careful attention to the needs of the reader. The text includes extensive historical notes, which occur at the ends of the chapters. The exercises range from introductory problems and standard problems in analytic number theory to interesting original problems that will challenge the reader. The author has made an effort to provide clear explanations for the techniques of analysis used. No background in analysis beyond rigorous calculus and a first course in complex function theory is assumed.

The Case of Academician Nikolai Nikolaevich Luzin - Sergei S. Demidov 2016-05-25

The Soviet school, one of the glories of twentieth-century mathematics, faced a serious crisis in the summer of 1936. It was suffering from internal strains due to generational conflicts between the young talents and the old establishment. At the same time, Soviet leaders (including Stalin himself) were bent on "Sovietizing" all of science in the USSR by requiring scholars to publish their works in Russian in the Soviet Union, ending the nearly universal practice of publishing in the West. A

campaign to "Sovietize" mathematics in the USSR was launched with an attack on Nikolai Nikolaevich Luzin, the leader of the Soviet school of mathematics, in Pravda. Luzin was fortunate in that only a few of the most ardent ideologues wanted to destroy him utterly. As a result, Luzin, though humiliated and frightened, was allowed to make a statement of public repentance and then let off with a relatively mild reprimand. A major factor in his narrow escape was the very abstractness of his research area (descriptive set theory), which was difficult to incorporate into a propaganda campaign aimed at the broader public. The present book contains the transcripts of five meetings of the Academy of Sciences commission charged with investigating the accusations against Luzin, meetings held in July of 1936. Ancillary material from the Soviet press of the time is included to place these meetings in context.

The Collected Papers of William Burnside: Commentary on

Burnside's life and work ; Papers 1883-1899 - William Burnside 2004

William Burnside was one of the three most important algebraists who were involved in the transformation of group theory from its nineteenth-century origins to a deep twentieth-century subject. Building on work of earlier mathematicians, they were able to develop sophisticated tools for solving difficult problems. All of Burnside's papers are reproduced here, organized chronologically and with a detailed bibliography. Walter Feit has contributed a foreword, and a collection of introductory essays are included to provide a commentary on Burnside's work and set it in perspective along with a modern biography that draws on archive material.

Pearls from a Lost City - Roman Duda 2014-08-07

The fame of the Polish school at Lvov rests with the diverse and fundamental contributions of Polish mathematicians working there during the interwar years. In particular, despite material hardship and without a notable mathematical tradition, the school made major contributions to what is now called functional analysis. The results and names of Banach, Kac, Kuratowski, Mazur, Nikodym, Orlicz, Schauder, Sierpiński, Steinhaus, and Ulam, among others, now appear in all the standard textbooks. The vibrant joie de vivre and singular ambience of Lvov's once scintillating social scene are evocatively recaptured in personal recollections. The heyday of the famous Scottish Café-- unquestionably the most mathematically productive cafeteria of all time-- and its precious Scottish Book of highly influential problems are described in detail, revealing the special synergy of scholarship and camaraderie that permanently elevated Polish mathematics from utter obscurity to global prominence. This chronicle of the Lvov school--its legacy and the tumultuous historical events which defined its lifespan-- will appeal equally to mathematicians, historians, or general readers seeking a cultural and institutional overview of key aspects of twentieth-century Polish mathematics not described anywhere else in the extant English-language literature.

The Life and Times of the Central Limit Theorem - William J. Adams 2009-11-25

About the First Edition: The study of any topic becomes more meaningful if one also studies the historical development that resulted in the final theorem. ... This is an excellent book on mathematics in the making. -- Philip Peak, *The Mathematics Teacher*, May, 1975 I find the book very interesting. It contains valuable information and useful references. It can be recommended not only to historians of science and mathematics but also to students of probability and statistics. --Wei-Ching Chang, *Historica Mathematica*, August, 1976 In the months since I wrote ... I have read it from cover to cover at least once and perused it here and there a number of times. I still find it a very interesting and worthwhile contribution to the history of probability and statistics. --Churchill Eisenhart, past president of the American Statistical Association, in a letter to the author, February 3, 1975 The name Central Limit Theorem covers a wide variety of results involving the determination of necessary and sufficient conditions under which sums of independent random variables, suitably standardized, have cumulative distribution functions close to the Gaussian distribution. As the name Central Limit Theorem suggests, it is a centerpiece of probability theory which also carries over to statistics. Part One of *The Life and Times of the Central Limit Theorem, Second Edition* traces its fascinating history from seeds sown by Jacob Bernoulli to use of integrals of $\exp(x^2)$ as an approximation tool, the development of the theory of errors of observation, problems in mathematical astronomy, the emergence of the hypothesis of elementary errors, the fundamental work of Laplace, and the emergence of an abstract Central Limit Theorem through the work of Chebyshev, Markov and Lyapunov. This closes the classical period of the life of the Central Limit Theorem, 1713-1901. The second part of the

book includes papers by Feller and Le Cam, as well as comments by Doob, Trotter, and Pollard, describing the modern history of the Central Limit Theorem (1920-1937), in particular through contributions of Lindeberg, Cramer, Levy, and Feller. The Appendix to the book contains four fundamental papers by Lyapunov on the Central Limit Theorem, made available in English for the first time.

The War of Guns and Mathematics - David Aubin 2014-10-07

For a long time, World War I has been shortchanged by the historiography of science. Until recently, World War II was usually considered as the defining event for the formation of the modern relationship between science and society. In this context, the effects of the First World War, by contrast, were often limited to the massive deaths of promising young scientists. By focusing on a few key places (Paris, Cambridge, Rome, Chicago, and others), the present book gathers studies representing a broad spectrum of positions adopted by mathematicians about the conflict, from militant pacifism to military, scientific, or ideological mobilization. The use of mathematics for war is thoroughly examined. This book suggests a new vision of the long-term influence of World War I on mathematics and mathematicians.

Continuities and discontinuities in the structure and organization of the mathematical sciences are discussed, as well as their images in various milieux. Topics of research and the values with which they were defended are scrutinized. This book, in particular, proposes a more in-depth evaluation of the issue of modernity and modernization in mathematics. The issue of scientific international relations after the war is revisited by a close look at the situation in a few Allied countries (France, Britain, Italy, and the USA). The historiography has emphasized the place of Germany as the leading mathematical country before WWI and the absurdity of its postwar ostracism by the Allies. The studies presented here help explain how dramatically different prewar situations, prolonged interaction during the war, and new international postwar organizations led to attempts at redrafting models for mathematical developments.

Episodes in the History of Modern Algebra (1800-1950) - Jeremy J. Gray 2011-08-31

Algebra, as a subdiscipline of mathematics, arguably has a history going back some 4000 years to ancient Mesopotamia. The history, however, of what is recognized today as high school algebra is much shorter, extending back to the sixteenth century, while the history of what practicing mathematicians call "modern algebra" is even shorter still. The present volume provides a glimpse into the complicated and often convoluted history of this latter conception of algebra by juxtaposing twelve episodes in the evolution of modern algebra from the early nineteenth-century work of Charles Babbage on functional equations to Alexandre Grothendieck's mid-twentieth-century metaphor of a "rising sea" in his categorical approach to algebraic geometry. In addition to considering the technical development of various aspects of algebraic thought, the historians of modern algebra whose work is united in this volume explore such themes as the changing aims and organization of the subject as well as the often complex lines of mathematical communication within and across national boundaries. Among the specific algebraic ideas considered are the concept of divisibility and the introduction of non-commutative algebras into the study of number theory and the emergence of algebraic geometry in the twentieth century. The resulting volume is essential reading for anyone interested in the history of modern mathematics in general and modern algebra in particular. It will be of particular interest to mathematicians and historians of mathematics.

Certain Number-Theoretic Episodes In Algebra, Second Edition - R Sivaramakrishnan 2019-03-19

The book attempts to point out the interconnections between number theory and algebra with a view to making a student understand certain basic concepts in the two areas forming the subject-matter of the book.

The Schur Complement and Its Applications - Fuzhen Zhang 2005-03-04

This book describes the Schur complement as a rich and basic tool in mathematical research and applications and discusses many significant results that illustrate its power and fertility. Coverage includes historical development, basic properties, eigenvalue and singular value inequalities, matrix inequalities in both finite and infinite dimensional settings, closure properties, and applications in statistics, probability, and numerical analysis.

A Station Favorable to the Pursuits of Science: Primary Materials in the History of Mathematics at the United States Military Academy - Joe Albree, David C. Arney, V. Frederick Rickey

This book reveals the rich collection of mathematical works located at

the nation's first military school, the U.S. Military Academy at West Point. It outlines the relevant history of the Academy, discusses the mathematics department and curriculum, and describes the development of the library during the nineteenth century. A major part of this book is an annotated catalog of the more than 1300 works published between 1496 and 1915 found in the West Point library. Mathematics and its instruction greatly influenced the development of the Academy, the technological growth of America's army, and the standards of the military profession. These events, in turn, were crucial to the overall development of mathematics, mechanics, and engineering during the nineteenth century in the United States. Three individuals played a prominent role in this chronicle: Sylvanus Thayer, Charles Davies, and Albert Church. Listed are rare and historically valuable works in a broad range of mathematical subjects. The collection clearly shows the strong European influence on the early Academy. Also listed are numerous textbooks by West Point faculty and graduates; significant contributions were made by these writers to algebra, geometry, calculus, descriptive geometry, mechanics, surveying, and mathematics education. This book provides an important resource for the general audience as well as for those in pursuit of more scholarly information. It contains many interesting photographs and valuable details about the West Point collection. It is a must-have for anyone interested in mathematical books and collections.

Mathematics Unbound - Karen Hunger Parshall

Although today's mathematical research community takes its international character very much for granted, this "global nature" is relatively recent, having evolved over a period of roughly 150 years—from the beginning of the nineteenth century to the middle of the twentieth century. During this time, the practice of mathematics changed from being centered on a collection of disparate national communities to being characterized by an international group of scholars for whom the goal of mathematical research and cooperation transcended national boundaries. Yet, the development of an international community was far from smooth and involved obstacles such as war, political upheaval, and national rivalries. Until now, this evolution has been largely overlooked by historians and mathematicians alike. This book addresses the issue by bringing together essays by twenty experts in the history of mathematics who have investigated the genesis of today's international mathematical community. This includes not only developments within component national mathematical communities, such as the growth of societies and journals, but also more wide-ranging political, philosophical, linguistic, and pedagogical issues. The resulting volume is essential reading for anyone interested in the history of modern mathematics. It will be of interest to mathematicians, historians of mathematics, and historians of science in general.

The Brauer-Hasse-Noether Theorem in Historical Perspective -

Peter Roquette 2006-03-30

The unpublished writings of Helmut Hasse, consisting of letters, manuscripts and other papers, are kept at the Handschriftenabteilung of the University Library at Göttingen. Hasse had an extensive correspondence; he liked to exchange mathematical ideas, results and methods freely with his colleagues. There are more than 8000 documents preserved. Although not all of them are of equal mathematical interest, searching through this treasure can help us to assess the development of Number Theory through the 1920s and 1930s. The present volume is largely based on the letters and other documents its author has found concerning the Brauer-Hasse-Noether Theorem in the theory of algebras; this covers the years around 1931. In addition to the documents from the literary estates of Hasse and Brauer in Göttingen, the author also makes use of some letters from Emmy Noether to Richard Brauer that are preserved at the Bryn Mawr College Library (Pennsylvania, USA).

Guide to Information Sources in Mathematics and Statistics -

Martha A. Tucker 2004

Publisher description: This book is a reference for librarians, mathematicians, and statisticians involved in college and research level mathematics and statistics in the 21st century. Part I is a historical survey of the past 15 years tracking this huge transition in scholarly communications in mathematics. Part II of the book is the bibliography of resources recommended to support the disciplines of mathematics and statistics. These resources are grouped by material type. Publication dates range from the 1800's onwards. Hundreds of electronic resources—some online, both dynamic and static, some in fixed media, are listed among the paper resources. A majority of listed electronic resources are free.

[The Noether Theorems](#) - Yvette Kosmann-Schwarzbach 2010-11-17

In 1915 and 1916 Emmy Noether was asked by Felix Klein and David Hilbert to assist them in understanding issues involved in any attempt to formulate a general theory of relativity, in particular the new ideas of Einstein. She was consulted particularly over the difficult issue of the form a law of conservation of energy could take in the new theory, and she succeeded brilliantly, finding two deep theorems. But between 1916 and 1950, the theorem was poorly understood and Noether's name disappeared almost entirely. People like Klein and Einstein did little more than mention her name in the various popular or historical accounts they wrote. Worse, earlier attempts which had been eclipsed by Noether's achievements were remembered, and sometimes figure in quick historical accounts of the time. This book carries a translation of Noether's original paper into English, and then describes the strange history of its reception and the responses to her work. Ultimately the theorems became decisive in a shift from basing fundamental physics on conservation laws to basing it on symmetries, or at the very least, in thoroughly explaining the connection between these two families of ideas. The real significance of this book is that it shows very clearly how long it took before mathematicians and physicists began to recognize the seminal importance of Noether's results. This book is thoroughly researched and provides careful documentation of the textbook literature. Kosmann-Schwarzbach has thus thrown considerable light on this slow dance in which the mathematical tools necessary to study symmetry properties and conservation laws were apparently provided long before the orchestra arrives and the party begins.

Introduction to Representation Theory - Pavel I. Etingof 2011

Very roughly speaking, representation theory studies symmetry in linear spaces. It is a beautiful mathematical subject which has many applications, ranging from number theory and combinatorics to geometry, probability theory, quantum mechanics, and quantum field theory. The goal of this book is to give a "holistic" introduction to representation theory, presenting it as a unified subject which studies representations of associative algebras and treating the representation theories of groups, Lie algebras, and quivers as special cases. Using this approach, the book covers a number of standard topics in the representation theories of these structures. Theoretical material in the book is supplemented by many problems and exercises which touch upon a lot of additional topics; the more difficult exercises are provided with hints. The book is designed as a textbook for advanced undergraduate and beginning graduate students. It should be accessible to students with a strong background in linear algebra and a basic knowledge of abstract algebra.

The New Era in American Mathematics, 1920-1950 - Karen Hunger

Parshall 2022-02-22

A meticulously researched history on the development of American mathematics in the three decades following World War I. As the Roaring Twenties lurched into the Great Depression, to be followed by the scourge of Nazi Germany and World War II, American mathematicians pursued their research, positioned themselves collectively within American science, and rose to global mathematical hegemony. How did they do it? The New Era in American Mathematics, 1920-1950 explores the institutional, financial, social, and political forces that shaped and supported this community in the first half of the twentieth century. In doing so, Karen Hunger Parshall debunks the widely held view that American mathematics only thrived after European émigrés fled to the shores of the United States. Drawing from extensive archival and primary-source research, Parshall uncovers the key players in American mathematics who worked together to effect change and she looks at their research output over the course of three decades. She highlights the educational, professional, philanthropic, and governmental entities that bolstered progress. And she uncovers the strategies implemented by American mathematicians in their quest for the advancement of knowledge. Throughout, she considers how geopolitical circumstances shifted the course of the discipline. Examining how the American mathematical community asserted itself on the international stage, The New Era in American Mathematics, 1920-1950 shows the way one nation became the focal point for the field.

Lectures on Number Theory - Peter Gustav Lejeune Dirichlet

This volume is a translation of Dirichlet's Vorlesungen über Zahlentheorie which includes nine supplements by Dedekind and an introduction by John Stillwell, who translated the volume. Lectures on Number Theory is the first of its kind on the subject matter. It covers most of the topics that are standard in a modern first course on number theory, but also includes Dirichlet's famous results on class numbers and primes in arithmetic progressions. The book is suitable as a textbook, yet

it also offers a fascinating historical perspective that links Gauss with modern number theory.

Research in History and Philosophy of Mathematics - Maria Zack
2016-12-15

This volume contains seventeen papers that were presented at the 2015 Annual Meeting of the Canadian Society for History and Philosophy of Mathematics/La Société Canadienne d'Histoire et de Philosophie des Mathématiques, held in Washington, D.C. In addition to showcasing rigorously reviewed modern scholarship on an interesting variety of general topics in the history and philosophy of mathematics, this meeting also honored the memories of Jacqueline (Jackie) Stedall and Ivor Grattan-Guinness; celebrated the Centennial of the Mathematical Association of America; and considered the importance of mathematical communities in a special session. These themes and many others are explored in these collected papers, which cover subjects such as New evidence that the Latin translation of Euclid's Elements was based on the Arabic version attributed to al-Ḥajjāj Work done on the arc rampant in the seventeenth century The history of numerical methods for finding roots of nonlinear equations An original play featuring a dialogue between George Boole and Augustus De Morgan that explores the relationship between them Key issues in the digital preservation of mathematical material for future generations A look at the first twenty-five years of The American Mathematical Monthly in the context of the evolving American mathematical community The growth of Math Circles and the unique ways they are being implemented in the United States Written by leading scholars in the field, these papers will be accessible to not only mathematicians and students of the history and philosophy of mathematics, but also anyone with a general interest in mathematics.

A Tour of Representation Theory - Martin Lorenz 2018

Representation theory investigates the different ways in which a given algebraic object--such as a group or a Lie algebra--can act on a vector space. Besides being a subject of great intrinsic beauty, the theory enjoys the additional benefit of having applications in myriad contexts outside pure mathematics, including quantum field theory and the study of molecules in chemistry. Adopting a panoramic viewpoint, this book offers an introduction to four different flavors of representation theory: representations of algebras, groups, Lie algebras, and Hopf algebras. A separate part of the book is devoted to each of these areas and they are all treated in sufficient depth to enable and hopefully entice the reader to pursue research in representation theory. The book is intended as a textbook for a course on representation theory, which could immediately follow the standard graduate abstract algebra course, and for subsequent more advanced reading courses. Therefore, more than 350 exercises at various levels of difficulty are included. The broad range of topics covered will also make the text a valuable reference for researchers in algebra and related areas and a source for graduate and postgraduate students wishing to learn more about representation theory by self-study.

Group Matrices, Group Determinants and Representation Theory - Kenneth W. Johnson 2019-11-08

This book sets out an account of the tools which Frobenius used to discover representation theory for nonabelian groups and describes its modern applications. It provides a new viewpoint from which one can examine various aspects of representation theory and areas of application, such as probability theory and harmonic analysis. For example, the focal objects of this book, group matrices, can be thought of as a generalization of the circulant matrices which are behind many important algorithms in information science. The book is designed to appeal to several audiences, primarily mathematicians working either in group representation theory or in areas of mathematics where representation theory is involved. Parts of it may be used to introduce undergraduates to representation theory by studying the appealing pattern structure of group matrices. It is also intended to attract readers who are curious about ideas close to the heart of group representation theory, which do not usually appear in modern accounts, but which offer new perspectives.

A History of Mathematics in the United States and Canada - David E. Zitarelli 2022-07-28

This is the first truly comprehensive and thorough history of the development of a mathematical community in the United States and Canada. This second volume starts at the turn of the twentieth century with a mathematical community that is firmly established and traces its growth over the next forty years, at the end of which the American mathematical community is pre-eminent in the world. In the preface to the first volume of this work Zitarelli reveals his animating philosophy, □

find that the human factor lends life and vitality to any subject. □ History of mathematics, in the Zitarelli conception, is not just a collection of abstract ideas and their development. It is a community of people and practices joining together to understand, perpetuate, and advance those ideas and each other. Telling the story of mathematics means telling the stories of these people: their accomplishments and triumphs; the institutions and structures they built; their interpersonal and scientific interactions; and their failures and shortcomings. One of the most hopeful developments of the period 1900□1941 in American mathematics was the opening of the community to previously excluded populations. Increasing numbers of women were welcomed into mathematics, many of whom□including Anna Pell Wheeler, Olive Hazlett, and Mayme Logsdon□are profiled in these pages. Black mathematicians were often systemically excluded during this period, but, in spite of the obstacles, Elbert Frank Cox, Dudley Woodard, David Blackwell, and others built careers of significant accomplishment that are described here. The effect on the substantial community of European immigrants is detailed through the stories of dozens of individuals. In clear and compelling prose Zitarelli, Dumbaugh, and Kennedy spin a tale accessible to experts, general readers, and anyone interested in the history of science in North America.

Kolmogorov in Perspective - 2000

The editorial board for the History of Mathematics series has selected for this volume a series of translations from two Russian publications, Kolmogorov in Remembrance and Mathematics and its Historical Development. This book, Kolmogorov in Perspective, includes articles written by Kolmogorov's students and colleagues and his personal accounts of shared experiences and lifelong mathematical friendships. The articles combine to give an excellent personal and scientific biography of this important mathematician. There is also an extensive bibliography with the complete list of Kolmogorov's work.

Emmy Noether - Mathematician Extraordinaire - David E. Rowe
2021-01-09

Although she was famous as the "mother of modern algebra," Emmy Noether's life and work have never been the subject of an authoritative scientific biography. Emmy Noether - Mathematician Extraordinaire represents the most comprehensive study of this singularly important mathematician to date. Focusing on key turning points, it aims to provide an overall interpretation of Noether's intellectual development while offering a new assessment of her role in transforming the mathematics of the twentieth century. Hermann Weyl, her colleague before both fled to the United States in 1933, fully recognized that Noether's dynamic school was the very heart and soul of the famous Göttingen community. Beyond her immediate circle of students, Emmy Noether's lectures and seminars drew talented mathematicians from all over the world. Four of the most important were B.L. van der Waerden, Pavel Alexandrov, Helmut Hasse, and Olga Taussky. Noether's classic papers on ideal theory inspired van der Waerden to recast his research in algebraic geometry. Her lectures on group theory motivated Alexandrov to develop links between point set topology and combinatorial methods. Noether's vision for a new approach to algebraic number theory gave Hasse the impetus to pursue a line of research that led to the Brauer-Hasse-Noether Theorem, whereas her abstract style clashed with Taussky's approach to classical class field theory during a difficult time when both were trying to find their footing in a foreign country. Although similar to Proving It Her Way: Emmy Noether, a Life in Mathematics, this lengthier study addresses mathematically minded readers. Thus, it presents a detailed analysis of Emmy Noether's work with Hilbert and Klein on mathematical problems connected with Einstein's theory of relativity. These efforts culminated with her famous paper "Invariant Variational Problems," published one year before she joined the Göttingen faculty in 1919.

Contributions to Probability and Statistics: Applications and Challenges -

Actions of Groups - John McCleary 2022-12-31

An undergraduate text with an active learning approach introducing representation theory and Galois theory topics using group actions.

Pioneers of Representation Theory: Frobenius, Burnside, Schur, and Brauer - Charles W. Curtis 1999

The AMS History of Mathematics series is one of the most popular items for bookstore sales. These books feature colorful, attractive covers that are perfect for face out displays. The topics will appeal to a broad audience in the mathematical and scientific communities.

Representations of the Infinite Symmetric Group - Alexei Borodin

