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KEY=THEORY - BREWER DIAZ

THE MATHEMATICAL THEORY OF COMMUNICATION

University of Illinois Press **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.**

MATHEMATICAL INTEREST THEORY: THIRD EDITION

American Mathematical Soc. **Mathematical Interest Theory provides an introduction to how investments grow over time. This is done in a mathematically precise manner. The emphasis is on practical applications that give the reader a concrete understanding of why the various relationships should be true. Among the modern financial topics introduced are: arbitrage, options, futures, and swaps. Mathematical Interest Theory is written for anyone who has a strong high-school algebra background and is interested in being an informed borrower or investor. The book is suitable for a mid-level or upper-level undergraduate course or a beginning graduate course. The content of the book, along with an understanding of probability, will provide a solid foundation for readers embarking on actuarial careers. The text has been suggested by the Society of Actuaries for people preparing for the Financial Mathematics exam. To that end, Mathematical Interest Theory includes more than 260 carefully worked examples. There are over 475 problems, and numerical answers are included in an appendix. A companion student solution manual has detailed solutions to the odd-numbered problems. Most of the examples involve computation, and detailed instruction is provided on how to use the Texas Instruments BA II Plus and BA II Plus Professional calculators to efficiently solve the problems. This Third Edition updates the previous edition to cover the material in the SOA study notes FM-24-17, FM-25-17, and FM-26-17.**

MATHEMATICAL INTEREST THEORY

MAA **Mathematical Interest Theory gives an introduction to how investments grow over time in a mathematically precise manner. The emphasis is on practical applications that give the reader a concrete understanding of why the various relationships should be true. Among the modern financial topics introduced are: arbitrage, options, futures, and swaps. The content of the book, along with an understanding of probability, will provide a solid foundation for readers embarking on actuarial careers.Mathematical Interest Theory includes more than 240 carefully worked examples. There are over 430 problems, and numerical answers are included in an appendix. A companion student solution manual has detailed solutions to the odd-numbered problems. Key Features • Detailed instruction on how to use the Texas Instruments BA II Plus and BA II Plus professional calculators. • Examples are worked out with the problem and solution delineated so that the reader can think about the problem before reading the solution presented in the text • Key formulas, facts and algorithms placed in boxes so that they stand out in the text, and new terms printed in boldface as they are introduced • Descriptive titles are given for the examples in the book,(i.e., "Finding a(t) from ?t" or "Finding a bond's yield rate")to help students skimming the book quickly find relevant material.• Exercises feature applied financial questions, • Writing activities for each chapter introduce each homework set.**

MATHEMATICAL THEORY OF DIFFRACTION

Springer Science & Business Media **A. Sommerfeld's "Mathematische Theorie der Diffraction" marks a milestone in optical theory, full of insights that are still relevant today. In a stunning tour de force, Sommerfeld derives the first mathematically rigorous solution of an optical diffraction problem. Indeed, his diffraction analysis is a surprisingly rich and complex mix of pure and applied mathematics, and his often-cited diffraction solution is presented only as an application of a much more general set of mathematical results. This complete translation, reflecting substantial scholarship, is the first publication in English of Sommerfeld's original work. The extensive notes by the translators are rich in historical background and provide many technical details for the reader.**

AN INTRODUCTION TO THE MATHEMATICAL THEORY OF INVERSE PROBLEMS

Springer Science & Business Media **Following Keller [119] we call two problems inverse to each other if the for mulation of each of them requires full or partial knowledge of the other. By this definition, it is obviously arbitrary which of the two problems we call the direct and which we call the inverse problem. But usually, one of the problems has been studied earlier and, perhaps, in more detail. This one is usually called the direct problem, whereas the other is the inverse problem. However, there is often another, more important difference between these two problems. Hadamard (see [91]) introduced the concept of a well-posed problem, originating from the philosophy that the mathematical model of a physical problem has to have the properties of uniqueness, existence, and stability of the solution. If one of the properties fails to hold, he called the problem ill-posed. It turns out that many interesting and important inverse in science lead to ill-posed problems, while the corresponding di problems rect problems are well-posed. Often, existence and uniqueness can be forced by enlarging or reducing the solution space (the space of "models"). For restoring stability, however, one has to change the topology of the spaces, which is in many cases impossible because of the presence of measurement errors. At first glance, it seems to be impossible to compute the solution of a problem numerically if the solution of the problem does not depend continuously on the data, i. e. , for the case of ill-posed problems.**

MATHEMATICAL THEORY OF ENTROPY

Cambridge University Press **This excellent 1981 treatment of the mathematical theory of entropy gives an accessible exposition its application to other fields.**

MATHEMATICAL METHODS IN RISK THEORY

Springer Science & Business Media **From the reviews: "The huge literature in risk theory has been carefully selected and supplemented by personal contributions of the author, many of which appear here for the first time. The result is a systematic and very readable book, which takes into account the most recent developments of the field. It will be of great interest to the actuary as well as to the statistician . . ." -- Math. Reviews Vol. 43**

MATHEMATICS OF FINANCE

AN INTUITIVE INTRODUCTION

Springer Nature **This textbook invites the reader to develop a holistic grounding in mathematical finance, where concepts and intuition play as important a role as powerful mathematical tools. Financial interactions are characterized by a vast amount of data and uncertainty; navigating the inherent dangers and hidden opportunities requires a keen understanding of what techniques to apply and when. By exploring the conceptual foundations of options pricing, the author equips readers to choose their tools with a critical eye and adapt to emerging challenges. Introducing the basics of gambles through realistic scenarios, the text goes on to build the core financial techniques of Puts, Calls, hedging, and arbitrage. Chapters on modeling and probability lead into the centerpiece: the Black–Scholes equation. Omitting the mechanics of solving Black–Scholes itself, the presentation instead focuses on an in-depth analysis of its derivation and solutions. Advanced topics that follow include the Greeks, American options, and embellishments. Throughout, the author presents topics in an engaging conversational style. "Intuition breaks" frequently prompt students to set aside mathematical details and think critically about the relevance of tools in context. Mathematics of Finance is ideal for undergraduates from a variety of backgrounds, including mathematics, economics, statistics, data science, and computer science. Students should have experience with the standard calculus sequence, as well as a familiarity with differential equations and probability. No financial expertise is assumed of student or instructor; in fact, the text's deep connection to mathematical ideas makes it suitable for a math capstone course. A complete set of the author's lecture videos is available on YouTube, providing a comprehensive supplementary resource for a course or independent study.**

MATHEMATICAL THEORY OF STATISTICS

STATISTICAL EXPERIMENTS AND ASYMPTOTIC DECISION THEORY

Walter de Gruyter **The series is devoted to the publication of monographs and high-level textbooks in mathematics, mathematical methods and their applications. Apart from covering important areas of current interest, a major aim is to make topics of an interdisciplinary nature accessible to the non-specialist. The works in this series are addressed to advanced students and researchers in mathematics and theoretical physics. In addition, it can serve as a guide for lectures and seminars on a graduate level. The series de Gruyter Studies in Mathematics was founded ca. 30 years ago by the late Professor Heinz Bauer and Professor Peter Gabriel with the aim to establish a series of monographs and textbooks of high standard, written by scholars with an international reputation presenting current fields of research in pure and applied mathematics. While the editorial board of the Studies has changed with the years, the aspirations of the Studies are unchanged. In times of rapid growth of mathematical knowledge carefully written monographs and textbooks written by experts are needed more than ever, not least to pave the way for the next generation of mathematicians. In this sense the editorial board and the publisher of the Studies are devoted to continue the Studies as a service to the mathematical community. Please submit any book proposals to Niels Jacob.**

INTRODUCTION TO THE ECONOMICS AND MATHEMATICS OF FINANCIAL MARKETS

MIT Press **An innovative textbook for use in advanced undergraduate and graduate courses; accessible to students in financial mathematics, financial engineering and economics. Introduction to the Economics and Mathematics of Financial Markets fills the longstanding need for an accessible yet serious textbook treatment of financial economics. The book provides a rigorous overview of the subject, while its flexible presentation makes it suitable for use with different levels of undergraduate and graduate students. Each chapter presents mathematical models of financial problems at three different degrees of sophistication: single-period, multi-period, and continuous-time. The single-period and multi-period models require only basic calculus and an introductory probability/statistics course, while an advanced undergraduate course in probability is helpful in understanding the continuous-time models. In this way, the material is given complete coverage at different levels; the less advanced student can stop before the more sophisticated mathematics and still be able to grasp the general principles of financial economics. The book is divided into three parts. The first part provides an introduction to basic securities and financial market organization, the concept of interest rates, the main mathematical models, and quantitative ways to measure risks and rewards. The second part treats option pricing and hedging; here and throughout the book, the authors emphasize the Martingale or probabilistic approach. Finally, the third part examines equilibrium models—a subject often neglected by other texts in financial mathematics, but included here because of the qualitative insight it offers into the behavior of market participants and pricing.**

THE THEORY OF INTEREST

THE MATHEMATICAL THEORY OF RELATIVITY

Eddington's The Mathematical Theory of Relativity is arguably the first comprehensive treatise on the mathematical and physical foundations of general relativity. As Prof. Ashtekar explained it in his excellent and informative Foreword "it is comprehensive on three fronts: Eddington systematically introduces the tools of differential geometry, explains the (then known) physical consequences of the theory with admirable clarity, and discusses in detail the conceptual underpinning of general relativity." The new publication of Eddington's book is justified not only by its historical value, but also by the fact that it still provides an original and detailed introduction to the deep physical ideas of general relativity and its mathematical formalism, whose "treatment throughout the monograph is clear, sharp and at the same time pedagogical" (from the Foreword). Eddington's enlightening exposition of general relativity "carries interesting lessons for contemporary researchers in gravitational science at all stages of their career. It is therefore fortunate that the Minkowski Institute Press is making this historic monograph easily available once again" (from the Foreword). NOTE: This book is not a re-publication of the scanned pages of the original publication; the text has been typeset in LaTeX.

INTRODUCTION TO THE THEORY OF GAMES

Courier Corporation **This comprehensive overview of the mathematical theory of games illustrates applications to situations involving conflicts of interest, including economic, social, political, and military contexts. Advanced calculus a prerequisite. Includes 51 figures and 8 tables. 1952 edition.**

MATHEMATICAL METHODS FOR FINANCIAL MARKETS

Springer Science & Business Media **Mathematical finance has grown into a huge area of research which requires a large number of sophisticated mathematical tools. This book simultaneously introduces the financial methodology and the relevant mathematical tools in a style that is mathematically rigorous and yet accessible to practitioners and mathematicians alike. It interlaces financial concepts such as arbitrage opportunities, admissible strategies, contingent claims, option pricing and default risk with the mathematical theory of Brownian motion, diffusion processes, and Lévy processes. The first half of the book is devoted to continuous path processes whereas the second half deals with discontinuous processes. The extensive bibliography comprises a wealth of important references and the author index enables readers quickly to locate where the reference is cited within the book, making this volume an invaluable tool both for students and for those at the forefront of research and practice.**

NETWORKING OF THEORIES AS A RESEARCH PRACTICE IN MATHEMATICS EDUCATION

Springer **How can we deal with the diversity of theories in mathematics education? This was the main question that led the authors of this book to found the Networking Theories Group. Starting from the shared assumption that the existence of different theories is a resource for mathematics education research, the authors have explored the possibilities of interactions between theories, such as contrasting, coordinating, and locally integrating them. The book explains and illustrates what it means to network theories; it presents networking as a challenging but fruitful research practice and shows how the Group dealt with this challenge considering five theoretical approaches, namely the approach of Action, Production, and Communication (APC), the Theory of Didactical Situations (TDS), the Anthropological Theory of the Didactic (ATD), the approach of Abstraction in Context (AiC), and the Theory of Interest-Dense Situations (IDS). A synthetic presentation of each theory and their connections shows how the activity of networking generates questions at the theoretical, methodological and practical levels and how the work on these questions leads to both theoretical and practical progress. The core of the book consists of four new networking case studies which illustrate what exactly can be gained by this approach and what kind of difficulties might arise.**

FINANCIAL MATHEMATICS FOR ACTUARIAL SCIENCE

THE THEORY OF INTEREST

CRC Press **Financial Mathematics for Actuarial Science: The Theory of Interest is concerned with the measurement of interest and the various ways interest affects what is often called the time value of money (TVM). Interest is most simply defined as the compensation that a borrower pays to a lender for the use of capital. The goal of this book is to provide the mathematical understandings of interest and the time value of money needed to succeed on the actuarial examination covering interest theory Key Features Helps prepare students for the SOA Financial Mathematics Exam Provides mathematical understanding of interest and the time value of money needed to succeed in the actuarial examination covering interest theory Contains many worked examples, exercises and solutions for practice Provides training in the use of calculators for solving problems A complete solutions manual is available to faculty adopters online**

INTRODUCTION TO REPRESENTATION THEORY

American Mathematical Soc. **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.**

MATHEMATICS AND COMPUTATION

A THEORY REVOLUTIONIZING TECHNOLOGY AND SCIENCE

Princeton University Press **An introduction to computational complexity theory, its connections and interactions with mathematics, and its central role in the natural and social sciences, technology, and philosophy Mathematics and Computation provides a broad, conceptual overview of computational complexity theory—the mathematical study of efficient computation. With important practical applications to computer science and industry, computational complexity theory has evolved into a highly interdisciplinary field, with strong links to most mathematical areas and to a growing number of scientific endeavors. Avi Wigderson takes a sweeping survey of complexity theory, emphasizing the field's insights and challenges. He explains the ideas and motivations leading to key models, notions, and results. In particular, he looks at algorithms and complexity, computations and proofs, randomness and interaction, quantum and arithmetic computation, and cryptography and learning, all as parts of a cohesive whole with numerous cross-influences. Wigderson illustrates the immense breadth of the field, its beauty and richness, and its diverse and growing interactions with other areas of mathematics. He ends with a comprehensive look at the theory of computation, its methodology and aspirations, and the unique and fundamental ways in which it has shaped and will further shape science, technology, and society. For further reading, an extensive bibliography is provided for all topics covered. Mathematics and Computation is useful for undergraduate and graduate students in mathematics, computer science, and related fields, as well as researchers and teachers in these fields. Many parts require little background, and serve as an invitation to newcomers seeking an introduction to the theory of computation. Comprehensive coverage of computational complexity theory, and beyond High-level, intuitive exposition, which brings conceptual clarity to this central and dynamic scientific discipline Historical accounts of the evolution and motivations of central concepts and models A broad view of the theory of computation's influence on science, technology, and society Extensive bibliography**

STUDENT SOLUTION MANUAL FOR MATHEMATICAL INTEREST THEORY

American Mathematical Soc. **This manual is written to accompany Mathematical Interest Theory, by Leslie Jane Federer Vaaler and James Daniel. It includes detailed solutions to the odd-numbered problems. There are solutions to 239 problems, and sometimes more than one way to reach the answer is presented. In keeping with the presentation of the text, calculator discussions for the Texas Instruments BA II Plus or BA II Plus Professional calculator is typeset in a different font from the rest of the text.**

INTRODUCTION TO PROBABILITY

American Mathematical Soc. **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. The text is also**

recommended for use in discrete probability courses. The material is organized so that the discrete and continuous probability discussions are presented in a separate, but parallel, manner. This organization does not emphasize an overly rigorous or formal view of probability and therefore offers some strong pedagogical value. Hence, the discrete discussions can sometimes serve to motivate the more abstract continuous probability discussions. Features: Key ideas are developed in a somewhat leisurely style, providing a variety of interesting applications to probability and showing some nonintuitive ideas. Over 600 exercises provide the opportunity for practicing skills and developing a sound understanding of ideas. Numerous historical comments deal with the development of discrete probability. The text includes many computer programs that illustrate the algorithms or the methods of computation for important problems. The book is a beautiful introduction to probability theory at the beginning level. The book contains a lot of examples and an easy development of theory without any sacrifice of rigor, keeping the abstraction to a minimal level. It is indeed a valuable addition to the study of probability theory. --Zentralblatt MATH

MATHEMATICAL FINANCE. THEORY

Società Editrice Esculapio The aim of these two books is to provide the basic theoretical concepts and the best practice concerning the mathematical finance which is unescapable to understand the way modern financial markets operate. Thanks to these fundamental concepts, which are completely concentrated on a deterministic modelization of the markets, students are ready to approach more advanced courses focused on the modern area of financial math where the deterministic assumption is left and stochastic assumptions concerning the evolution of the involved variables are included.

THEORY OF INTEREST

McGraw-Hill Higher Education The third edition of The Theory of Interest is significantly revised and expanded from previous editions. The text covers the basic mathematical theory of interest as traditionally developed. The book is a thorough treatment of the mathematical theory and practical applications of compound interest, or mathematics of finance. The pedagogical approach of the second edition has been retained in the third edition. The textbook narrative emphasizes both the importance of conceptual understanding and the ability to apply the techniques to practical problems. The third edition has considerable updates that make this book relevant to students in this course area.

MATHEMATICS FOR MACHINE LEARNING

Cambridge University Press 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.

SYNTHETIC PHILOSOPHY OF CONTEMPORARY MATHEMATICS

MIT Press A panoramic survey of the vast spectrum of modern and contemporary mathematics and the new philosophical possibilities they suggest. A panoramic survey of the vast spectrum of modern and contemporary mathematics and the new philosophical possibilities they suggest, this book gives the inquisitive non-specialist an insight into the conceptual transformations and intellectual orientations of modern and contemporary mathematics. The predominant analytic approach, with its focus on the formal, the elementary and the foundational, has effectively divorced philosophy from the real practice of mathematics and the profound conceptual shifts in the discipline over the last century. The first part discusses the specificity of modern (1830-1950) and contemporary (1950 to the present) mathematics, and reviews the failure of mainstream philosophy of mathematics to address this specificity. Building on the work of the few exceptional thinkers to have engaged with the "real mathematics" of their era (including Lautman, Deleuze, Badiou, de Lorenzo and Châtelet), Zalamea challenges philosophy's self-imposed ignorance of the "making of mathematics." In the second part, thirteen detailed case studies examine the greatest creators in the field, mapping the central advances accomplished in mathematics over the last half-century, exploring in vivid detail the characteristic creative gestures of modern master Grothendieck and contemporary creators including Lawvere, Shelah, Connes, and Freyd. Drawing on these concrete examples, and oriented by a unique philosophical constellation (Peirce, Lautman, Merleau-Ponty), in the third part Zalamea sets out the program for a sophisticated new epistemology, one that will avail itself of the powerful conceptual instruments forged by the mathematical mind, but which have until now remained largely neglected by philosophers.

AN ELEMENTARY INTRODUCTION TO MATHEMATICAL FINANCE

Cambridge University Press This textbook on the basics of option pricing is accessible to readers with limited mathematical training. It is for both professional traders and undergraduates studying the basics of finance. Assuming no prior knowledge of probability, Sheldon M. Ross offers clear, simple explanations of arbitrage, the Black-Scholes option pricing formula, and other topics such as utility functions, optimal portfolio selections, and the capital assets pricing model. Among the many new features of this third edition are new chapters on Brownian motion and geometric Brownian motion, stochastic order relations and stochastic dynamic programming, along with expanded sets of exercises and references for all the chapters.

CRITICAL RACE THEORY IN MATHEMATICS EDUCATION

Routledge Critical Race Theory in Mathematics Education brings together scholarship that uses critical race theory (CRT) to provide a comprehensive understanding of race, racism, social justice, and experiential knowledge of African Americans' mathematics education. CRT has gained traction within the educational research sphere, and this book extends and applies this framework to chronicle the paths of mathematics educators who advance and use CRT. This edited collection brings together scholarship that addresses the racial challenges thrusted upon Black learners and the gatekeeping nature of the discipline of mathematics. Across the ten chapters, scholars expand the uses of CRT in mathematics education and share insights with stakeholders regarding the racialized experiences of mathematics students and educators. Collectively, the volume explains how researchers, practitioners, and policymakers can use CRT to examine issues of race, racism, and other forms of oppression in mathematics education for Black children and adults.

MATHEMATICAL THEORY OF ELASTIC EQUILIBRIUM

RECENT RESULTS

Springer Science & Business Media It is not my intention to present a treatise of elasticity in the follow ing pages. The size of the volume would not permit it, and, on the other hand, there are already excellent treatises. Instead, my aim is to develop some subjects not considered in the best known treatises of elasticity but nevertheless basic, either from the physical or the analytical point of view, if one is to establish a complete theory of elasticity. The material presented here is taken from original papers, generally very recent, and concerning, often, open questions still being studied by mathematicians. Most of the problems are from the theory of finite deformations [non-linear theory], but a part of this book concerns the theory of small deformations [linear theory], partly for its interest in many practical questions and partly because the analytical study of the theory of finite strain may be based on the infinitesimal one.

FUNDAMENTALS OF ACTUARIAL MATHEMATICS

John Wiley & Sons Provides a comprehensive coverage of both the deterministic and stochastic models of life contingencies, risk theory, credibility theory, multi-state models, and an introduction to modern mathematical finance. New edition restructures the material to fit into modern computational methods and provides several spreadsheet examples throughout. Covers the syllabus for the Institute of Actuaries subject CT5, Contingencies Includes new chapters covering stochastic investments returns, universal life insurance. Elements of option pricing and the Black-Scholes formula will be introduced.

MATHEMATICAL CONTROL THEORY

DETERMINISTIC FINITE DIMENSIONAL SYSTEMS

Springer Science & Business Media Geared primarily to an audience consisting of mathematically advanced undergraduate or beginning graduate students, this text may additionally be used by engineering students interested in a rigorous, proof-oriented systems course that goes beyond the classical frequency-domain material and more applied courses. The minimal mathematical background required is a working knowledge of linear algebra and differential equations. The book covers what constitutes the common core of control theory and is unique in its emphasis on foundational aspects. While covering a wide range of topics written in a standard theorem/proof style, it also develops the necessary techniques from scratch. In this second edition, new chapters and sections have been added, dealing with time optimal control of linear systems, variational and numerical approaches to nonlinear control, nonlinear controllability via Lie-algebraic methods, and controllability of recurrent nets and of linear systems with bounded controls.

THE MATHEMATICS IN OUR HANDS

HOW GESTURES CONTRIBUTE TO CONSTRUCTING MATHEMATICAL KNOWLEDGE

Springer In her empirical study, Christina Krause investigates how gestures can contribute to epistemic processes in social interactions. She expands the traditional speech-based approach to analyzing social processes of constructing mathematical knowledge by employing a multimodal perspective. Adopting a semiotic approach, she takes into account two functions of gestures as signs used by the participants of the social interaction: the representational function concerns the ways in which gestures take part in referring to a mathematical object in processes of knowledge construction and the epistemic function relates to the ways in which they can contribute to the performance of collective epistemic

actions. The results of this study reveal that gestures influence the epistemic process significantly more than previously thought and indicate factors underlying this influence.

100 YEARS OF MATH MILESTONES: THE PI MU EPSILON CENTENNIAL COLLECTION

American Mathematical Soc. **This book is an outgrowth of a collection of 100 problems chosen to celebrate the 100th anniversary of the undergraduate math honor society Pi Mu Epsilon. Each chapter describes a problem or event, the progress made, and connections to entries from other years or other parts of mathematics. In places, some knowledge of analysis or algebra, number theory or probability will be helpful. Put together, these problems will be appealing and accessible to energetic and enthusiastic math majors and aficionados of all stripes. Stephan Ramon Garcia is WM Keck Distinguished Service Professor and professor of mathematics at Pomona College. He is the author of four books and over eighty research articles in operator theory, complex analysis, matrix analysis, number theory, discrete geometry, and other fields. He has coauthored dozens of articles with students, including one that appeared in The Best Writing on Mathematics: 2015. He is on the editorial boards of Notices of the AMS, Proceedings of the AMS, American Mathematical Monthly, Involve, and Annals of Functional Analysis. He received four NSF research grants as principal investigator and five teaching awards from three different institutions. He is a fellow of the American Mathematical Society and was the inaugural recipient of the Society's Dolciani Prize for Excellence in Research. Steven J. Miller is professor of mathematics at Williams College and a visiting assistant professor at Carnegie Mellon University. He has published five books and over one hundred research papers, most with students, in accounting, computer science, economics, geophysics, marketing, mathematics, operations research, physics, sabermetrics, and statistics. He has served on numerous editorial boards, including the Journal of Number Theory, Notices of the AMS, and the Pi Mu Epsilon Journal. He is active in enrichment and supplemental curricular initiatives for elementary and secondary mathematics, from the Teachers as Scholars Program and VCTAL (Value of Computational Thinking Across Grade Levels), to numerous math camps (the Eureka Program, HCSSiM, the Mathematics League International Summer Program, PROMYS, and the Ross Program). He is a fellow of the American Mathematical Society, an at-large senator for Phi Beta Kappa, and a member of the Mount Greylock Regional School Committee, where he sees firsthand the challenges of applying mathematics.**

THE MATHEMATICAL THEORY OF COMMUNICATION

TOPICS IN THE THEORY OF NUMBERS

Springer Science & Business Media **Number theory, the branch of mathematics that studies the properties of the integers, is a repository of interesting and quite varied problems, sometimes impossibly difficult ones. In this book, the authors have gathered together a collection of problems from various topics in number theory that they find beautiful, intriguing, and from a certain point of view instructive.**

MODEL THEORY IN ALGEBRA, ANALYSIS AND ARITHMETIC

CETRARO, ITALY 2012, EDITORS: H. DUGALD MACPHERSON, CARLO TOFFALORI

Springer **Presenting recent developments and applications, the book focuses on four main topics in current model theory: 1) the model theory of valued fields; 2) undecidability in arithmetic; 3) NIP theories; and 4) the model theory of real and complex exponentiation. Young researchers in model theory will particularly benefit from the book, as will more senior researchers in other branches of mathematics.**

GUIDE TO INFORMATION SOURCES IN MATHEMATICS AND STATISTICS

Libraries Unlimited **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.**

METHODS OF MATHEMATICAL MODELLING

FRACTIONAL DIFFERENTIAL EQUATIONS

CRC Press **This book features original research articles on the topic of mathematical modelling and fractional differential equations. The contributions, written by leading researchers in the field, consist of chapters on classical and modern dynamical systems modelled by fractional differential equations in physics, engineering, signal processing, fluid mechanics, and bioengineering, manufacturing, systems engineering, and project management. The book offers theory and practical applications for the solutions of real-life problems and will be of interest to graduate level students, educators, researchers, and scientists interested in mathematical modelling and its diverse applications. Features Presents several recent developments in the theory and applications of fractional calculus Includes chapters on different analytical and numerical methods dedicated to several mathematical equations Develops methods for the mathematical models which are governed by fractional differential equations Provides methods for models in physics, engineering, signal processing, fluid mechanics, and bioengineering Discusses real-world problems, theory, and applications**

AN INTRODUCTION TO MEASURE THEORY

American Mathematical Soc. **This is a graduate text introducing the fundamentals of measure theory and integration theory, which is the foundation of modern real analysis. The text focuses first on the concrete setting of Lebesgue measure and the Lebesgue integral (which in turn is motivated by the more classical concepts of Jordan measure and the Riemann integral), before moving on to abstract measure and integration theory, including the standard convergence theorems, Fubini's theorem, and the Carathéodory extension theorem. Classical differentiation theorems, such as the Lebesgue and Rademacher differentiation theorems, are also covered, as are connections with probability theory. The material is intended to cover a quarter or semester's worth of material for a first graduate course in real analysis. There is an emphasis in the text on tying together the abstract and the concrete sides of the subject, using the latter to illustrate and motivate the former. The central role of key principles (such as Littlewood's three principles) as providing guiding intuition to the subject is also emphasized. There are a large number of exercises throughout that develop key aspects of the theory, and are thus an integral component of the text. As a supplementary section, a discussion of general problem-solving strategies in analysis is also given. The last three sections discuss optional topics related to the main matter of the book.**

INTRODUCTION TO INSURANCE MATHEMATICS

TECHNICAL AND FINANCIAL FEATURES OF RISK TRANSFERS

Springer **This second edition expands the first chapters, which focus on the approach to risk management issues discussed in the first edition, to offer readers a better understanding of the risk management process and the relevant quantitative phases. In the following chapters the book examines life insurance, non-life insurance and pension plans, presenting the technical and financial aspects of risk transfers and insurance without the use of complex mathematical tools. The book is written in a comprehensible style making it easily accessible to advanced undergraduate and graduate students in Economics, Business and Finance, as well as undergraduate students in Mathematics who intend starting on an actuarial qualification path. With the systematic inclusion of practical topics, professionals will find this text useful when working in insurance and pension related areas, where investments, risk analysis and financial reporting play a major role.**

MATHEMATICAL PROBLEMS AND PROOFS

COMBINATORICS, NUMBER THEORY, AND GEOMETRY

Springer Science & Business Media **A gentle introduction to the highly sophisticated world of discrete mathematics, Mathematical Problems and Proofs presents topics ranging from elementary definitions and theorems to advanced topics -- such as cardinal numbers, generating functions, properties of Fibonacci numbers, and Euclidean algorithm. This excellent primer illustrates more than 150 solutions and proofs, thoroughly explained in clear language. The generous historical references and anecdotes interspersed throughout the text create interesting intermissions that will fuel readers' eagerness to inquire further about the topics and some of our greatest mathematicians. The author guides readers through the process of solving enigmatic proofs and problems, and assists them in making the transition from problem solving to theorem proving. At once a requisite text and an enjoyable read, Mathematical Problems and Proofs is an excellent entrée to discrete mathematics for advanced students interested in mathematics, engineering, and science.**

THERMODYNAMIC FORMALISM

THE MATHEMATICAL STRUCTURE OF EQUILIBRIUM STATISTICAL MECHANICS

Cambridge University Press **Reissued in the Cambridge Mathematical Library this classic book outlines the theory of thermodynamic formalism which was developed to describe the properties of certain physical systems consisting of a large number of subunits. It is aimed at mathematicians interested in ergodic theory, topological dynamics, constructive quantum field theory, the study of certain differentiable dynamical systems, notably Anosov diffeomorphisms and flows. It is also of interest to theoretical physicists concerned with the conceptual basis of equilibrium statistical mechanics. The level of the presentation is generally advanced, the objective being to provide an efficient research tool and a text for use in graduate teaching. Background material on mathematics has been collected in appendices to help the reader. Extra material is given in the form of updates of problems that were open at the original time of writing and as a new preface specially written for this new edition by the author.**