A Discrete Transition To Advanced Mathematics Solutions

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Introduction to Applied Linear Algebra

What sort of mathematics do I need for computer science? In response to this frequently asked question, a pair of professors at the University of California at San Diego created this text. Its sources are two of the university's most basic courses: Discrete Mathematics, and Mathematics for Algorithm and System Analysis. Intended for use by sophomores in the first of a two-quarter sequence, the text assumes some familiarity with calculus. Topics include Boolean functions and computer arithmetic; logic; number theory and cryptography; sets and functions; equivalence and order; and induction, sequences, and series. Multiple choice questions for review appear throughout the text. Original 2005 edition. Notation Index. Subject Index.

Advanced Number Theory with Applications

Primarily an introduction to the theory of stochastic processes at the undergraduate or beginning graduate level, the primary objective of this book is to initiate students in the art of stochastic modelling. However it is motivated by significant applications and progressively brings the student to the borders of contemporary research. Examples are from a wide range of domains, including operations research and electrical engineering. Researchers and students in these areas as well as in physics, biology and the social sciences will find this book of interest.

Dynamics of Cancer

Because they incorporate both time- and event-driven dynamics, stochastic hybrid systems (SHS) have become ubiquitous in a variety of fields, from mathematical finance to biological processes to communication networks to engineering. Comprehensively integrating numerous cutting-edge studies, Stochastic Hybrid Systems presents a captivating treatment of some of the most ambitious types of dynamic systems. Cohesively edited by leading experts in the field, the book introduces the theoretical basics, computational methods, and applications of SHS. It first discusses the underlying principles behind SHS and the main design limitations of SHS. Building on these fundamentals, the authoritative contributors present methods for computer calculations that apply SHS analysis and synthesis techniques in practice. The book concludes with examples of systems encountered in a wide range of application areas, including molecular biology, communication networks, and air traffic management. It also explains how to resolve practical problems associated with these systems. Stochastic Hybrid Systems achieves an ideal balance between a theoretical treatment of SHS and practical considerations. The book skillfully explores the interaction of physical processes with computerized equipment in an uncertain environment, enabling a better understanding of sophisticated as well as everyday devices and processes.

Discrete Mathematical Structures for Computer Science

Intended for graduate courses or for independent study, this book presents the basic theory of fields. The first part begins with a discussion of polynomials over a ring, the division algorithm, irreducibility, field extensions, and embeddings. The second part is devoted to Galois theory. The third part of the book treats the theory of binomials. The book concludes with a chapter on families of binomials - the Kummer theory.

Field Theory

This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. For courses in Transition to Advanced Mathematics or Introduction to Proof. Meticulously crafted, student-friendly text that helps build mathematical maturity Mathematical Proofs: A Transition to Advanced Mathematics, 4th Edition introduces students to proof techniques, analyzing proofs, and writing proofs of their own that are not only mathematically correct but clearly written. Written in a student-friendly manner, it provides a solid introduction to such topics as relations, functions, and cardinalities of sets, as well as optional excursions into fields such as number theory, combinatorics, and calculus. The exercises receive consistent praise from users for their thoughtfulness and creativity. They help students progress from understanding and analyzing proofs and techniques to producing well-constructed proofs independently. This book is also an excellent reference for students to use in future courses when writing or reading proofs. 0134746759 / 9780134746753 Chartrand/Polimeni/Zhang, Mathematical Proofs: A Transition to Advanced Mathematics, 4/e

Rating Based Modeling of Credit Risk

Collecting the work of the foremost scientists in the field, Discrete-Event Modeling and Simulation: Theory and Applications presents the state of the art in modeling discrete-event systems using the discrete-event system specification (DEVS) approach. It introduces the latest advances, recent extensions of formal techniques, and real-world examples of various applications. The book covers many topics that pertain to several layers of the modeling and simulation architecture. It discusses DEVS model development support and the interaction of DEVS with other methodologies. It describes different forms of simulation supported by DEVS, the use of real-time DEVS simulation, the relationship between DEVS and graph transformation, the influence of DEVS variants on simulation performance, and interoperability and composability with emphasis on DEVS standardization. The text also examines extensions to DEVS, new formalisms, and abstractions of DEVS models as well as the theory and analysis behind real-world system identification and control. To support the generation and search of optimal models of a system, a framework is developed based on the system entity structure and its transformation to DEVS simulation models. In addition, the book explores numerous interesting examples that illustrate the use of DEVS to build successful applications, including optical network-on-chip, construction/building design, process control, workflow systems, and environmental models. A one-stop resource on advances in DEVS theory, applications, and methodology, this volume offers a sampling of the best research in the area, a broad picture of the DEVS landscape, and trend-setting applications enabled by the DEVS approach. It provides the basis for future research discoveries and encourages the development of new applications.

Directed Polymers in Random Environments

This text includes an eclectic blend of math: number theory, analysis, and algebra, with logic as an extra.

A Transition to Advanced Mathematics

A Transition to Advanced Mathematics: A Survey Course promotes the goals of a "bridge'' course in mathematics, helping to lead students from courses in the calculus sequence (and other courses where they solve problems that involve mathematical calculations) to theoretical upper-level mathematics courses (where they will have to prove theorems and grapple with mathematical abstractions). The text simultaneously promotes the goals of a ``survey'' course, describing the intriguing questions and insights fundamental to many diverse areas of mathematics, including Logic, Abstract Algebra, Number Theory, Real Analysis, Statistics, Graph Theory, and Complex Analysis. The main objective is "to bring about a deep change in the mathematical character of students -- how they think and their fundamental perspectives on the world of mathematics." This text promotes three major mathematical traits in a meaningful, transformative way: to develop an ability to communicate with precise language, to use mathematically sound reasoning, and to ask probing questions about mathematics. In short, we hope that working through A Transition to Advanced Mathematics encourages students to become mathematicians in the fullest sense of the word. A Transition to Advanced Mathematics has a number of distinctive features that enable this transformational experience. Embedded Questions and Reading Questions

illustrate and explain fundamental concepts, allowing students to test their understanding of ideas independent of the exercise sets. The text has extensive, diverse Exercises Sets; with an average of 70 exercises at the end of section, as well as almost 3,000 distinct exercises. In addition, every chapter includes a section that explores an application of the theoretical ideas being studied. We have also interwoven embedded reflections on the history, culture, and philosophy of mathematics throughout the text.

Discrete Mathematics

Discrete probability theory and the theory of algorithms have become close partners over the last ten years, though the roots of this partnership go back much longer. The papers in this volume address the latest developments in this active field. They are from the IMA Workshops "Probability and Algorithms" and "The Finite Markov Chain Renaissance." They represent the current thinking of many of the world's leading experts in the field. Researchers and graduate students in probability, computer science, combinatorics, and optimization theory will all be interested in this collection of articles. The techniques developed and surveyed in this volume are still undergoing rapid development, and many of the articles of the collection offer an expositionally pleasant entree into a research area of growing importance.

Discrete Mathematics with Ducks

The onset of cancer presents one of the most fundamental problems in modern biology. In Dynamics of Cancer, Steven Frank produces the first comprehensive analysis of how particular genetic and environmental causes influence the age of onset. The book provides a unique conceptual and historical framework for understanding the causes of cancer and other diseases that increase with age. Using a novel quantitative framework of reliability and multistage breakdown, Frank unifies molecular, demographic, and evolutionary levels of analysis. He interprets a wide variety of observations on the age of cancer onset, the genetic and environmental causes of disease, and the organization of tissues with regard to stem cell biology and somatic mutation. Frank uses new quantitative methods to tackle some of the classic problems in cancer biology and aging: how the rate of increase in the incidence of lung cancer declines after individuals quit smoking, the distinction between the dosage of a chemical carcinogen and the time of exposure, and the role of inherited genetic variation in familial patterns of cancer. This is the only book that presents a full analysis of the age of cancer onset. It is a superb teaching tool and a rich source of ideas for new and experienced researchers. For cancer biologists, population geneticists, evolutionary biologists, and demographers interested in aging, this book provides new insight into disease progression, the inheritance of predisposition to disease, and the evolutionary processes that have shaped organismal design.

A Short Course in Discrete Mathematics

Discrete-Time and Discrete-Space Dynamical Systems provides a systematic characterization of the similarities and differences of several types of discrete-time

and discrete-space dynamical systems, including: Boolean control networks; nondeterministic finite-transition systems; finite automata; labelled Petri nets; and cellular automata. The book's perspective is primarily based on topological properties though it also employs semitensor-product and graph-theoretic methods where appropriate. It presents a series of fundamental results: invertibility, observability, detectability, reversiblity, etc., with applications to systems biology. Academic researchers with backgrounds in applied mathematics, engineering or computer science and practising engineers working with discrete-time and discrete-space systems will find this book a helpful source of new understanding for this increasingly important class of systems. The basic results to be found within are of fundamental importance for further study of related problems such as automated synthesis and safety control in cyber-physical systems using formal methods.

A Transition to Advanced Mathematics

Pure and Applied Mathematics, Volume 74: Radiative Transfer on Discrete Spaces presents the geometrical structure of natural light fields. This book describes in detail with mathematical precision the radiometric interactions of light-scattering media in terms of a few well established principles. Organized into four parts encompassing 15 chapters, this volume begins with an overview of the derivations of the practical formulas and the arrangement of formulas leading to numerical solution procedures of radiative transfer problems in plane-parallel media. This text then constructs radiative transfer theory in three ways. Other chapters consider the development of discrete radiative transfer theory from the local interaction principle. This book discusses as well the development of continuous radiative transfer theory. The final chapter deals with the task of formulating a mathematical foundation for radiative transfer theory. This book is a valuable resource for researchers in the field of radiative transfer theory whose interests transcend the physical and numerical aspects of the interaction of light with matter.

Introducing Survival and Event History Analysis

DISCRETE MATHEMATICS WITH APPLICATIONS, 5th Edition, Metric Edition explains complex, abstract concepts with clarity and precision and provides a strong foundation for computer science and upper-level mathematics courses of the computer age. Author Susanna Epp presents not only the major themes of discrete mathematics, but also the reasoning that underlies mathematical thought. Students develop the ability to think abstractly as they study the ideas of logic and proof. While learning about such concepts as logic circuits and computer addition, algorithm analysis, recursive thinking, computability, automata, cryptography and combinatorics, students discover that the ideas of discrete mathematics underlie and are essential to today's science and technology.

Markov Chains

A TRANSITION TO ADVANCED MATHEMATICS helps students make the transition from calculus to more proofs-oriented mathematical study. The most successful text of its kind, the 7th edition continues to provide a firm foundation in major

concepts needed for continued study and guides students to think and express themselves mathematically to analyze a situation, extract pertinent facts, and draw appropriate conclusions. The authors place continuous emphasis throughout on improving students' ability to read and write proofs, and on developing their critical awareness for spotting common errors in proofs. Concepts are clearly explained and supported with detailed examples, while abundant and diverse exercises provide thorough practice on both routine and more challenging problems. Students will come away with a solid intuition for the types of mathematical reasoning they'll need to apply in later courses and a better understanding of how mathematicians of all kinds approach and solve problems. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

Discrete-Time and Discrete-Space Dynamical Systems

Analyzing the phase transition from diffusive to localized behavior in a model of directed polymers in a random environment, this volume places particular emphasis on the localization phenomenon. The main questionis: What does the path of a random walk look like if rewards and penalties are spatially randomly distributed?This model, which provides a simplified version of stretched elastic chains pinned by random impurities, has attracted much research activity, but it (and its relatives) still holds many secrets, especially in high dimensions. It has non-gaussian scaling limits and it belongs to the so-called KPZ universality class when the space is one-dimensional. Adopting a Gibbsian approach, using general and powerful tools from probability theory, the discrete model is studied in full generality. Presenting the state-of-the art from different perspectives, and written in the form of a first course on the subject, this monograph is aimed at researchers in probability or statistical physics, but is also accessible to masters and Ph.D. students.

Discrete Probability and Algorithms

The strong algorithmic emphasis of Discrete Mathematics is independent of a specific programming language, allowing students to concentrate on foundational problem-solving and analytical skills. Instructors get the topical breadth and organizational flexibility to tailor the course to the level and interests of their students. Algorithms are presented in English, eliminating the need for knowledge of a particular programming language. Computational and algorithmic exercise sets follow each chapter section and supplementary exercises and computer projects are included in the end-of-chapter material. This Fifth Edition features a new Chapter 3 covering matrix codes, error correcting codes, congruence, Euclidean algorithm and Diophantine equations, and the RSA algorithm. MARKET: Intended for use in a one-semester introductory course in discrete mathematics.

Introduction to Discrete Mathematics via Logic and Proof

Introduction to Discrete Event Systems is a comprehensive introduction to the field of discrete event systems, offering a breadth of coverage that makes the material accessible to readers of varied backgrounds. The book emphasizes a unified

modeling framework that transcends specific application areas, linking the following topics in a coherent manner: language and automata theory, supervisory control, Petri net theory, Markov chains and queuing theory, discrete-event simulation, and concurrent estimation techniques. This edition includes recent research results pertaining to the diagnosis of discrete event systems, decentralized supervisory control, and interval-based timed automata and hybrid automata models.

Formal Methods for Discrete-Time Dynamical Systems

A groundbreaking introduction to vectors, matrices, and least squares for engineering applications, offering a wealth of practical examples.

Markov Chains

Modern and comprehensive, the new sixth edition of Zill's Advanced Engineering Mathematics is a full compendium of topics that are most often covered in engineering mathematics courses, and is extremely flexible to meet the unique needs of courses ranging from ordinary differential equations to vector calculus. A key strength of this best-selling text is Zill's emphasis on differential equation as mathematical models, discussing the constructs and pitfalls of each.

A Discrete Transition to Advanced Mathematics

This book is an accessible, practical and comprehensive guide for researchers from multiple disciplines including biomedical, epidemiology, engineering and the social sciences. Written for accessibility, this book will appeal to students and researchers who want to understand the basics of survival and event history analysis and apply these methods without getting entangled in mathematical and theoretical technicalities. Inside, readers are offered a blueprint for their entire research project from data preparation to model selection and diagnostics. Engaging, easy to read, functional and packed with enlightening examples, ‘hands-on’ exercises, conversations with key scholars and resources for both students and instructors, this text allows researchers to quickly master advanced statistical techniques. It is written from the perspective of the ‘user’, making it suitable as both a self-learning tool and graduate-level textbook. Also included are up-to-date innovations in the field, including advancements in the assessment of model fit, unobserved heterogeneity, recurrent events and multilevel event history models. Practical instructions are also included for using the statistical programs of R, STATA and SPSS, enabling readers to replicate the examples described in the text.

Discrete Probability Models and Methods

This book bridges fundamental gaps between control theory and formal methods. Although it focuses on discrete-time linear and piecewise affine systems, it also provides general frameworks for abstraction, analysis, and control of more general models. The book is self-contained, and while some mathematical knowledge is necessary, readers are not expected to have a background in formal methods or control theory. It rigorously defines concepts from formal methods, such as

transition systems, temporal logics, model checking and synthesis. It then links these to the infinite state dynamical systems through abstractions that are intuitive and only require basic convex-analysis and control-theory terminology, which is provided in the appendix. Several examples and illustrations help readers understand and visualize the concepts introduced throughout the book.

Advanced Engineering Mathematics

Exploring one of the most dynamic areas of mathematics, Advanced Number Theory with Applications covers a wide range of algebraic, analytic, combinatorial, cryptographic, and geometric aspects of number theory. Written by a recognized leader in algebra and number theory, the book includes a page reference for every citing in the bibliography and mo

The Mathematical Method

Praise for the Third Edition “Researchers of any kind of extremal combinatorics or theoretical computer science will welcome the new edition of this book.” - MAA Reviews Maintaining a standard of excellence that establishes The Probabilistic Method as the leading reference on probabilistic methods in combinatorics, the Fourth Edition continues to feature a clear writing style, illustrative examples, and illuminating exercises. The new edition includes numerous updates to reflect the most recent developments and advances in discrete mathematics and the connections to other areas in mathematics, theoretical computer science, and statistical physics. Emphasizing the methodology and techniques that enable problem-solving, The Probabilistic Method, Fourth Edition begins with a description of tools applied to probabilistic arguments, including basic techniques that use expectation and variance as well as the more advanced applications of martingales and correlation inequalities. The authors explore where probabilistic techniques have been applied successfully and also examine topical coverage such as discrepancy and random graphs, circuit complexity, computational geometry, and derandomization of randomized algorithms. Written by two well-known authorities in the field, the Fourth Edition features: Additional exercises throughout with hints and solutions to select problems in an appendix to help readers obtain a deeper understanding of the best methods and techniques New coverage on topics such as the Local Lemma, Six Standard Deviations result in Discrepancy Theory, Property B, and graph limits Updated sections to reflect major developments on the newest topics, discussions of the hypergraph container method, and many new references and improved results The Probabilistic Method, Fourth Edition is an ideal textbook for upper-undergraduate and graduate-level students majoring in mathematics, computer science, operations research, and statistics. The Fourth Edition is also an excellent reference for researchers and combinatorists who use probabilistic methods, discrete mathematics, and number theory. Noga Alon, PhD, is Baumritter Professor of Mathematics and Computer Science at Tel Aviv University. He is a member of the Israel National Academy of Sciences and Academia Europaea. A coeditor of the journal Random Structures and Algorithms, Dr. Alon is the recipient of the Polya Prize, The Gödel Prize, The Israel Prize, and the EMET Prize. Joel H. Spencer, PhD, is Professor of Mathematics and Computer Science at the Courant Institute of New York University. He is the cofounder and coeditor of the journal Random Structures and Algorithms and is a Sloane

Foundation Fellow. Dr. Spencer has written more than 200 published articles and is the coauthor of Ramsey Theory, Second Edition, also published by Wiley.

Book of Proof

This book prepares students for the more abstract mathematics courses that follow calculus. The author introduces students to proof techniques, analyzing proofs, and writing proofs of their own. It also provides a solid introduction to such topics as relations, functions, and cardinalities of sets, as well as the theoretical aspects of fields such as number theory, abstract algebra, and group theory.

Latent Class and Discrete Latent Trait Models

The standard latent class model, which has been popular among social scientists as an instrument for data reduction, is also a flexible tool for analyzing structural relationships between categorical variables and can be seen as a natural extension of the log-linear model in order to take measurement error into account. Among behavioural scientists latent trait models have been proposed as the preferable psychometric tools for measuring abilities in such a way that characteristics of items and individuals could be studied separately. However, what are the similarities and differences between the latent class model and latent trait models? Through a careful examination of these issues, Ton Heinen explores topics such as: ho

Radiative Transfer on Discrete Spaces

The emphasis in this book is placed on general models (Markov chains, random fields, random graphs), universal methods (the probabilistic method, the coupling method, the Stein-Chen method, martingale methods, the method of types) and versatile tools (Chernoff's bound, Hoeffding's inequality, Holley's inequality) whose domain of application extends far beyond the present text. Although the examples treated in the book relate to the possible applications, in the communication and computing sciences, in operations research and in physics, this book is in the first instance concerned with theory. The level of the book is that of a beginning graduate course. It is self-contained, the prerequisites consisting merely of basic calculus (series) and basic linear algebra (matrices). The reader is not assumed to be trained in probability since the first chapters give in considerable detail the background necessary to understand the rest of the book.

Discrete Mathematics with Applications, Metric Edition

Discover How to Apply DES to Problems Encountered in HTA Discrete event simulation (DES) has traditionally been used in the engineering and operations research fields. The use of DES to inform decisions about health technologies is still in its infancy. Written by specialists at the forefront of this area, Discrete Event Simulation for Health Technology Assessment is the first book to make all the central concepts of DES relevant for health technology assessment (HTA). Accessible to beginners, the book requires no prerequisites and describes the concepts with as little jargon as possible. The book first covers the essential

concepts and their implementation. It next provides a fully worked out example using both a widely available spreadsheet program (Microsoft Excel) and a popular specialized simulation package (Arena). It then presents approaches to analyze the simulations, including the treatment of uncertainty; tackles the development of the required equations; explains the techniques to verify that the models are as efficient as possible; and explores the indispensable topic of validation. The book also covers a variety of non-essential yet handy topics, such as the animation of a simulation and extensions of DES, and incorporates a real case study involving screening strategies for breast cancer surveillance. This book guides you in leveraging DES in your assessments of health technologies. After reading the chapters in sequence, you will be able to construct a realistic model designed to help in the assessment of a new health technology.

The Combined Finite-Discrete Element Method

This textbook introduces discrete mathematics by emphasizing the importance of reading and writing proofs. Because it begins by carefully establishing a familiarity with mathematical logic and proof, this approach suits not only a discrete mathematics course, but can also function as a transition to proof. Its unique, deductive perspective on mathematical logic provides students with the tools to more deeply understand mathematical methodology—an approach that the author has successfully classroom tested for decades. Chapters are helpfully organized so that, as they escalate in complexity, their underlying connections are easily identifiable. Mathematical logic and proofs are first introduced before moving onto more complex topics in discrete mathematics. Some of these topics include: Mathematical and structural induction Set theory Combinatorics Functions, relations, and ordered sets Boolean algebra and Boolean functions Graph theory Introduction to Discrete Mathematics via Logic and Proof will suit intermediate undergraduates majoring in mathematics, computer science, engineering, and related subjects with no formal prerequisites beyond a background in secondary mathematics.

Temporal Logics in Computer Science

From the reviews: J. Neveu, 1962 in Zentralblatt fr Mathematik, 92. Band Heft 2, p. 343: "Ce livre crit par l'un des plus minents spcialistes en la matire, est un expos trs dtaill de la thorie des processus de Markov dfinis sur un espace dnombrable d'tats et homognes dans le temps (chaines stationnaires de Markov)." N. Jain, 2008 in Selected Works of Kai Lai Chung, edited by Farid AitSahlia (University of Florida, USA), Elton Hsu (Northwestern University, USA), & Ruth Williams (University of California-San Diego, USA), Chapter 1, p. 15: "This monograph deals with countable state Markov chains in both discrete time (Part I) and continuous time (Part II). Much of Kai Lai's fundamental work in the field is included in this monograph. Here, for the first time, Kai Lai gave a systematic exposition of the subject which includes classification of states, ratio ergodic theorems, and limit theorems for functionals of the chain."

Discrete-Event Modeling and Simulation

This book, suitable for numerate biologists and for applied statisticians, provides the foundations of likelihood, Bayesian and MCMC methods in the context of genetic analysis of quantitative traits. Although a number of excellent texts in these areas have become available in recent years, the basic ideas and tools are typically described in a technically demanding style and contain much more detail than necessary. Here, an effort has been made to relate biological to statistical parameters throughout, and the book includes extensive examples that illustrate the developing argument.

Introduction to Discrete Event Systems

Discrete Event Simulation for Health Technology Assessment

As the title indicates, this book is intended for courses aimed at bridging the gap between lower-level mathematics and advanced mathematics. The text provides a careful introduction to techniques for writing proofs and a logical development of topics based on intuitive understanding of concepts. The authors utilize a clear writing style and a wealth of examples to develop an understanding of discrete mathematics and critical thinking skills. While including many traditional topics, the text offers innovative material throughout. Surprising results are used to motivate the reader. The last three chapters address topics such as continued fractions, infinite arithmetic, and the interplay among Fibonacci numbers, Pascal's triangle, and the golden ratio, and may be used for independent reading assignments. The treatment of sequences may be used to introduce epsilon-delta proofs. The selection of topics provides flexibility for the instructor in a course designed to spark the interest of students through exciting material while preparing them for subsequent proof-based courses.

Spin-Crossover Materials

A comprehensive, modern and technically precise exposition of the theory and main applications of temporal logics in computer science.

Likelihood, Bayesian, and MCMC Methods in Quantitative Genetics

Mathematical Proofs

In the last decade rating-based models have become very popular in credit risk management. These systems use the rating of a company as the decisive variable to evaluate the default risk of a bond or loan. The popularity is due to the straightforwardness of the approach, and to the upcoming new capital accord (Basel II), which allows banks to base their capital requirements on internal as well as external rating systems. Because of this, sophisticated credit risk models are being developed or demanded by banks to assess the risk of their credit portfolio better by recognizing the different underlying sources of risk. As a consequence, not only default probabilities for certain rating categories but also the probabilities

of moving from one rating state to another are important issues in such models for risk management and pricing. It is widely accepted that rating migrations and default probabilities show significant variations through time due to macroeconomics conditions or the business cycle. These changes in migration behavior may have a substantial impact on the value-at-risk (VAR) of a credit portfolio or the prices of credit derivatives such as collateralized debt obligations (D+CDOs). In Rating Based Modeling of Credit Risk the authors develop a much more sophisticated analysis of migration behavior. Their contribution of more sophisticated techniques to measure and forecast changes in migration behavior as well as determining adequate estimators for transition matrices is a major contribution to rating based credit modeling. Internal ratings-based systems are widely used in banks to calculate their value-at-risk (VAR) in order to determine their capital requirements for loan and bond portfolios under Basel II One aspect of these ratings systems is credit migrations, addressed in a systematic and comprehensive way for the first time in this book The book is based on in-depth work by Trueck and Rachev

The Probabilistic Method

Discrete Mathematics with Ducks, Second Edition is a gentle introduction for students who find the proofs and abstractions of mathematics challenging. At the same time, it provides stimulating material that instructors can use for more advanced students. The first edition was widely well received, with its whimsical writing style and numerous exercises and materials that engaged students at all levels. The new, expanded edition continues to facilitate effective and active learning. It is designed to help students learn about discrete mathematics through problem-based activities. These are created to inspire students to understand mathematics by actively practicing and doing, which helps students better retain what they've learned. As such, each chapter contains a mixture of discovery-based activities, projects, expository text, in-class exercises, and homework problems. The author's lively and friendly writing style is appealing to both instructors and students alike and encourages readers to learn. The book's light-hearted approach to the subject is a guiding principle and helps students learn mathematical abstraction. Features: The book's Try This! sections encourage students to construct components of discussed concepts, theorems, and proofs Provided sets of discovery problems and illustrative examples reinforce learning Bonus sections can be used by instructors as part of their regular curriculum, for projects, or for further study

Mathematical Proofs

This book explores discrete-time dynamic optimization and provides a detailed introduction to both deterministic and stochastic models. Covering problems with finite and infinite horizon, as well as Markov renewal programs, Bayesian control models and partially observable processes, the book focuses on the precise modelling of applications in a variety of areas, including operations research, computer science, mathematics, statistics, engineering, economics and finance. Dynamic Optimization is a carefully presented textbook which starts with discrete-time deterministic dynamic optimization problems, providing readers with the tools for sequential decision-making, before proceeding to the more complicated

stochastic models. The authors present complete and simple proofs and illustrate the main results with numerous examples and exercises (without solutions). With relevant material covered in four appendices, this book is completely self-contained.

Dynamic Optimization

The phenomenon of spin-crossover has a large impact on the physical properties of a solid material, including its colour, magnetic moment, and electrical resistance. Some materials also show a structural phase change during the transition. Several practical applications of spin-crossover materials have been demonstrated including display and memory devices, electrical and electroluminescent devices, and MRI contrast agents. Switchable liquid crystals, nanoparticles, and thin films of spin-crossover materials have also been achieved. Spin-Crossover Materials: Properties and Applications presents a comprehensivesurvey of recent developments in spin-crossover research, highlighting the multidisciplinary nature of this rapidly expanding field. Following an introductory chapter which describes the spin-crossover phenomenon and historical development of the field, the book goes on to cover a wide range of topics including Spin-crossover in mononuclear, polynuclear and polymeric complexes Structure: function relationships in molecular spin-crossover materials Charge-transfer-induced spin-transitions Reversible spin-pairing in crystalline organic radicals Spin-state switching in solution Spin-crossover compounds in multifunctional switchable materials and nanotechnology Physical and theoretical methods for studying spin-crossover materials Spin-Crossover Materials: Properties and Applications is a valuable resource for academic researchers working in the field of spin-crossover materials and topics related to crystal engineering, solid state chemistry and physics, and molecular materials. Postgraduate students will also find this book useful as a comprehensive introduction to the field.

Stochastic Hybrid Systems

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.

Discrete Mathematics and Its Applications

The combined finite discrete element method is a relatively new computational tool aimed at problems involving static and / or dynamic behaviour of systems involving a large number of solid deformable bodies. Such problems include fragmentation using explosives (e.g rock blasting), impacts, demolition (collapsing buildings), blast loads, digging and loading processes, and powder technology. The combined finite-discrete element method - a natural extension of both discrete and finite element methods - allows researchers to model problems involving the

deformability of either one solid body, a large number of bodies, or a solid body which fragments (e.g. in rock blasting applications a more or less intact rock mass is transformed into a pile of solid rock fragments of different sizes, which interact with each other). The topic is gaining in importance, and is at the forefront of some of the current efforts in computational modeling of the failure of solids. * Accompanying source codes plus input and output files available on the Internet * Important applications such as mining engineering, rock blasting and petroleum engineering * Includes practical examples of applications areas Essential reading for postgraduates, researchers and software engineers working in mechanical engineering.