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SECONDARY SCHOOLS IN ENGLAND: EXPLORING THE ROLE OF SOCIAL CLASS, GENDER AND ETHNICITY

Mathematical Understanding of Infectious Disease Dynamics Systolic Computations

In China, lots of excellent maths students takes an active part in various maths contests and the best six senior high school students will be selected to form the IMO National Team to compete in the International Mathematical Olympiad. In the past ten years, China's IMO Team has achieved outstanding results — they have won the first place almost every year. The author is one of the senior coaches of China's IMO National Team, he is the headmaster of Shanghai senior high school which is one of the best high schools of China. In the past decade, the students of this school have won the IMO gold medals almost every year. The author attempts to use some common characteristics of sequence and mathematical induction to fundamentally connect Math Olympiad problems to particular branches of mathematics. In doing so, the author hopes to reveal the beauty and joy involved with math exploration and at the same time, attempts to arouse readers' interest of learning math and invigorate their courage to challenge themselves with difficult problems. Practice makes perfect! Get perfect with a thousand and one practice problems! 1,001 Geometry Practice Problems For Dummies gives you 1,001 opportunities to practice solving problems that deal with core geometry topics, such as points, lines, angles, and planes, as well as area and volume of shapes. You'll also find practice problems on more advanced topics, such as proofs, theorems, and postulates. The companion website gives you free online access to 500 practice problems and solutions. You can track your progress and ID where you should focus your study time. The online component works in conjunction with the book to help you polish your skills and build confidence. As the perfect companion to Geometry For Dummies or a stand-alone practice tool for students, this book & website will help you put your geometry

skills into practice, encouraging deeper understanding and retention. The companion website includes: Hundreds of practice problems Customizable practice sets for self-directed study Problems ranked as easy, medium, and hard Free one-year access to the online questions bank With 1,001 Geometry Practice Problems For Dummies, you'll get the practice you need to master geometry and gain confidence in the classroom. This highly regarded text is directed toward advanced undergraduates and graduate students in mathematics who are interested in developing a firm foundation in the theory of functions of a complex variable. The treatment departs from traditional presentations in its early development of a rigorous discussion of the theory of multiple-valued analytic functions on the basis of analytic continuation. Thus it offers an early introduction of Riemann surfaces, conformal mapping, and the applications of residue theory. M. A. Evgrafov focuses on aspects of the theory that relate to modern research and assumes an acquaintance with the basics of mathematical analysis derived from a year of advanced calculus. Starting with an introductory chapter containing the fundamental results concerning limits, continuity, and integrals, the book addresses analytic functions and their properties, multiple-valued analytic functions, singular points and expansion in series, the Laplace transform, harmonic and subharmonic functions, extremal problems and distribution of values, and other subjects. Chapters are largely self-contained, making this volume equally suitable for the classroom or independent study. As its title indicates, this book is intended to serve as a textbook for an introductory course in mathematical analysis. In preliminary form the book has been used in this way at the University of Michigan, Indiana University, and Texas A&M University, and has proved serviceable. In addition to its primary purpose as a textbook for a formal course, however, it is the authors' hope that this book will also prove of value to readers interested in studying mathematical analysis on their own. Indeed, we believe the wealth and variety of examples and exercises will be especially conducive to this end. A word on prerequisites. With what

mathematical background might a prospective reader hope to profit from the study of this book? Our conscious intent in writing it was to address the needs of a beginning graduate student in mathematics, or, to put matters slightly differently, a student who has completed an undergraduate program with a mathematics major. On the other hand, the book is very largely self-contained and should therefore be accessible to a lower classman whose interest in mathematical analysis has already been awakened. Major survey offers comprehensive, coherent discussions of analytic geometry, algebra, differential equations, calculus of variations, functions of a complex variable, prime numbers, linear and non-Euclidean geometry, topology, functional analysis, more. 1963 edition.

This edited volume examines new ways of teaching mathematics through a cross-cultural reciprocal learning project between sister schools in Canada and China. Situating teacher learning in the intersection of the two different school systems, curriculums, and cultures of mathematics learning and teaching in both nations, this volume offers teachers a unique and much-needed perspective on how practices between countries become more and more likely shaped by each other in the emerging global society. Born out of a comparative study project sponsored by the SSHRC, this volume compiles five years' worth of findings from reciprocal partnerships between researchers, teachers, school administrators, and students from both nations. Through the process of reciprocal learning and narrative inquiry, the research described in these chapters illuminates the unknown and shares newly-created mathematics education knowledge. Many key phenomena in physics and engineering are described as singularities in the solutions to the differential equations describing them. Examples covered thoroughly in this book include the formation of drops and bubbles, the propagation of a crack and the formation of a shock in a gas. Aimed at a broad audience, this book provides the mathematical tools for understanding singularities and explains the many common features in their mathematical structure. Part I introduces the main concepts and techniques, using the most elementary

mathematics possible so that it can be followed by readers with only a general background in differential equations. Parts II and III require more specialised methods of partial differential equations, complex analysis and asymptotic techniques. The book may be used for advanced fluid mechanics courses and as a complement to a general course on applied partial differential equations. The four sections in this Third International Handbook are concerned with: (a) social, political and cultural dimensions in mathematics education; (b) mathematics education as a field of study; (c) technology in the mathematics curriculum; and (d) international perspectives on mathematics education. These themes are taken up by 84 internationally-recognized scholars, based in 26 different nations. Each of section is structured on the basis of past, present and future aspects. The first chapter in a section provides historical perspectives (“How did we get to where we are now?”); the middle chapters in a section analyze present-day key issues and themes (“Where are we now, and what recent events have been especially significant?”); and the final chapter in a section reflects on policy matters (“Where are we going, and what should we do?”). Readership: Teachers, mathematics educators, ed.policy makers, mathematicians, graduate students, undergraduate students. Large set of authoritative, international authors.?

An essential book for anyone using Russian mathematical and scientific literature Russian-English Dictionary of Mathematics embraces all major branches of mathematics from elementary topics to advanced studies in topology and discrete mathematics. Terms from the newest branches of mathematics, such as the theories of games, trees, knots, and braids, are included as well. Containing more than 27,000 entries, Russian-English Dictionary of Mathematics is larger and provides a broader scope than any other bilingual mathematics dictionary now in use. Many adjectives and verbs are included, and a copious amount of synonyms are provided for various terms. Secondary terms are grouped under principal terms for easier reference. Russian-English Dictionary of Mathematics provides the most comprehensive vocabulary aid available for translators, readers, and

writers of Russian mathematical and scientific literature. In this well-illustrated book the authors, Sinan Kanbir, Ken Clements, and Nerida Ellerton, tackle a persistent, and universal, problem in school mathematics—why do so many middle-school and secondary-school students find it difficult to learn algebra well? What makes the book important are the unique features which comprise the design-research approach that the authors adopted in seeking a solution to the problem. The first unique feature is that the authors offer an overview of the history of school algebra. Despite the fact that algebra has been an important component of secondary-school mathematics for more than three centuries, there has never been a comprehensive historical analysis of factors influencing the teaching and learning of that component. The authors identify, through historical analysis, six purposes of school algebra: (a) algebra as a body of knowledge essential to higher mathematical and scientific studies, (b) algebra as generalized arithmetic, (c) algebra as a prerequisite for entry to higher studies, (d) algebra as offering a language and set of procedures for modeling real-life problems, (e) algebra as an aid to describing structural properties in elementary mathematics, and (f) algebra as a study of variables. They also raise the question whether school algebra represents a unidimensional trait. Kanbir, Clements and Ellerton offer an unusual hybrid theoretical framework for their intervention study (by which seventh-grade students significantly improved their elementary algebra knowledge and skills). Their theoretical frame combined Charles Sanders Peirce's triadic signifier-interpretant-signified theory, which is in the realm of semiotics, with Johann Friedrich Herbart's theory of apperception, and Ken Clements' and Gina Del Campo's theory relating to the need to expand modes of communications in mathematics classrooms so that students engage in receptive and expressive modes. Practicing classroom teachers formed part of the research team. This book appears in Springer's series on the "History of Mathematics Education." Not only does it include an important analysis of the history of school algebra, but it also adopts a

theoretical frame which relies more on “theories from the past,” than on contemporary theories in the field of mathematics education. The results of the well-designed classroom intervention are sufficiently impressive that the study might have created and illuminated a pathway for future researchers to take. The Hauptvermutung is the conjecture that any two triangulations of a polyhedron are combinatorially equivalent. The conjecture was formulated at the turn of the century, and until its resolution was a central problem of topology. Initially, it was verified for low-dimensional polyhedra, and it might have been expected that further development of high-dimensional topology would lead to a verification in all dimensions. However, in 1961 Milnor constructed high-dimensional polyhedra with combinatorially inequivalent triangulations, disproving the Hauptvermutung in general. These polyhedra were not manifolds, leaving open the Hauptvermutung for manifolds. The development of surgery theory led to the disproof of the high-dimensional manifold Hauptvermutung in the late 1960's. Unfortunately, the published record of the manifold Hauptvermutung has been incomplete, as was forcefully pointed out by Novikov in his lecture at the Browder 60th birthday conference held at Princeton in March 1994. This volume brings together the original 1967 papers of Casson and Sullivan, and the 1968/1972 'Princeton notes on the Hauptvermutung' of Armstrong, Rourke and Cooke, making this work physically accessible. These papers include several other results which have become part of the folklore but of which proofs have never been published. My own contribution is intended to serve as an introduction to the Hauptvermutung, and also to give an account of some more recent developments in the area. In preparing the original papers for publication, only minimal changes of punctuation etc. An introduction to the mathematical theory and financial models developed and used on Wall Street Providing both a theoretical and practical approach to the underlying mathematical theory behind financial models, Measure, Probability, and Mathematical Finance: A Problem-Oriented Approach presents important concepts and results in

measure theory, probability theory, stochastic processes, and stochastic calculus. Measure theory is indispensable to the rigorous development of probability theory and is also necessary to properly address martingale measures, the change of numeraire theory, and LIBOR market models. In addition, probability theory is presented to facilitate the development of stochastic processes, including martingales and Brownian motions, while stochastic processes and stochastic calculus are discussed to model asset prices and develop derivative pricing models. The authors promote a problem-solving approach when applying mathematics in real-world situations, and readers are encouraged to address theorems and problems with mathematical rigor. In addition, *Measure, Probability, and Mathematical Finance* features: A comprehensive list of concepts and theorems from measure theory, probability theory, stochastic processes, and stochastic calculus Over 500 problems with hints and select solutions to reinforce basic concepts and important theorems Classic derivative pricing models in mathematical finance that have been developed and published since the seminal work of Black and Scholes *Measure, Probability, and Mathematical Finance: A Problem-Oriented Approach* is an ideal textbook for introductory quantitative courses in business, economics, and mathematical finance at the upper-undergraduate and graduate levels. The book is also a useful reference for readers who need to build their mathematical skills in order to better understand the mathematical theory of derivative pricing models. *Mathematical and Statistical Estimation Approaches in Epidemiology* compiles theoretical and practical contributions of experts in the analysis of infectious disease epidemics in a single volume. Recent collections have focused in the analyses and simulation of deterministic and stochastic models whose aim is to identify and rank epidemiological and social mechanisms responsible for disease transmission. The contributions in this volume focus on the connections between models and disease data with emphasis on the application of mathematical and statistical approaches that

quantify model and data uncertainty. The book is aimed at public health experts, applied mathematicians and scientists in the life and social sciences, particularly graduate or advanced undergraduate students, who are interested not only in building and connecting models to data but also in applying and developing methods that quantify uncertainty in the context of infectious diseases. Chowell and Brauer open this volume with an overview of the classical disease transmission models of Kermack-McKendrick including extensions that account for increased levels of epidemiological heterogeneity. Their theoretical tour is followed by the introduction of a simple methodology for the estimation of, the basic reproduction number, R_0 . The use of this methodology is illustrated, using regional data for 1918–1919 and 1968 in uenza pandemics. The focus of this book is the fundamental influence of the cyphering tradition on mathematics education in North American colleges, schools, and apprenticeship training classes between 1607 and 1861. It is the first book on the history of North American mathematics education to be written from that perspective. The principal data source is a set of 207 handwritten cyphering books that have never previously been subjected to careful historical analysis. Mathematicians do not work in isolation. They stand in a long and time honored tradition. They write papers and (sometimes) books, they read the publications of fellow workers in the field, and they meet other mathematicians at conferences all over the world. In this way, in contact with colleagues far away and nearby, from the past (via their writings) and from the present, scientific results are obtained which are recognized as valid. And that—remarkably enough—regardless of ethnic background, political inclination or religion. In this process, some distinguished individuals play a special and striking role. They assume a position of leadership. They guide the people working with them through uncharted territory, thereby making a lasting imprint on the field. So- thing which can only be accomplished through a combination of rare talents: - usually broad knowledge, unfailing intuition and a certain kind of charisma that binds people together.

All of this is present in Israel Gohberg, the man to whom this book is dedicated, on the occasion of his 80th birthday. This comes to the foreground unmistakably from the contributions from those who worked with him or whose life was affected by him.

Gohberg's exceptional qualities are also apparent from the articles written by himself, sometimes jointly with others, that are reproduced in this book. Among these are stories of his life, some dealing with mathematical aspects, others of a more general nature. Also included are reminiscences paying tribute to a close colleague who is not among us anymore, speeches or reviews highlighting the work and personality of a friend or esteemed colleague, and responses to the laudatio's connected with the several honorary degrees that were bestowed upon him. The 20th anniversary edition of this groundbreaking and bestselling volume offers powerful examples of the mathematics that can develop the thinking of elementary school children. Studies of teachers in the U.S. often document insufficient subject matter knowledge in mathematics. Yet, these studies give few examples of the knowledge teachers need to support teaching, particularly the kind of teaching demanded by reforms in mathematics education. *Knowing and Teaching Elementary Mathematics* describes the nature and development of the knowledge that elementary teachers need to become accomplished mathematics teachers, and suggests why such knowledge seems more common in China than in the United States, despite the fact that Chinese teachers have less formal education than their U.S. counterparts. Teachers' knowledge is a mirror that reflects the mathematics they teach and were taught. Along with the original studies of U.S. and Chinese teachers' mathematical understanding, this 20th anniversary edition includes a new preface and a 2013 journal article by Ma, "A Critique of the Structure of U.S. Elementary School Mathematics" that describe differences in U.S. and Chinese elementary mathematics. These are augmented by a new series editor's introduction and two key journal articles that frame and contextualize this seminal work. Strong math skills

are essential to success in school and life. Math Practice Simplified - Primary Concepts is designed to increase understanding of beginning concepts, such as counting, writing numerals, telling time, counting money, measuring, and basic adding and subtracting. Although this book is developmentally appropriate for use as enrichment for five-year-olds and practice for six-year-olds, it can be adapted to serve the needs of other students. Students who complete this book successfully are likely to build a solid foundation for mathematics, increase self-esteem, and improve performance on standardized tests. Concepts in this eBook are based on Principles and Standards for School Mathematics as identified by the National Council of Teachers of Mathematics. Answers are provided at the back of the book. The Institute for Mathematical Sciences at the National University of Singapore hosted a research program on Mathematical Modeling of Infectious Diseases: Dynamics and Control from 15 August to 9 October 2005. As part of the program, tutorials for graduate students and junior researchers were given by leading experts in the field. This book is the result of a joint venture between Professor Akio Kawauchi, Osaka City University, well-known for his research in knot theory, and the Osaka study group of mathematics education, founded by Professor Hirokazu Okamori and now chaired by his successor Professor Tomoko Yanagimoto, Osaka Kyoiku University. The seven chapters address the teaching and learning of knot theory from several perspectives. Readers will find an extremely clear and concise introduction to the fundamentals of knot theory, an overview of curricular developments in Japan, and in particular a series of teaching experiments at all levels which not only demonstrate the creativity and the professional expertise of the members of the study group, but also give a lively impression of students' learning processes. In addition the reports show that elementary knot theory is not just a preparation for advanced knot theory but also an excellent means to develop spatial thinking. The book can be highly recommended for several reasons: First of all, and that is the main intention of the book, it serves as a comprehensive text

for teaching and learning knot theory. Moreover it provides a model for cooperation between mathematicians and mathematics educators based on substantial mathematics. And finally it is a thorough introduction to the Japanese art of lesson studies—again in the context of substantial mathematics. Eminently readable, completely elementary treatment begins with linear spaces and ends with analytic geometry, covering multilinear forms, tensors, linear transformation, and more. 250 problems, most with hints and answers. 1972 edition. This two-volume work presents state-of-the-art mathematical theories and results on infinite-dimensional dynamical systems. Inertial manifolds, approximate inertial manifolds, discrete attractors and the dynamics of small dissipation are discussed in detail. The unique combination of mathematical rigor and physical background makes this work an essential reference for researchers and graduate students in applied mathematics and physics. The main emphasis in the first volume is on the existence and properties for attractors and inertial manifolds. This volume highlights the use of modern analytical tools and methods such as the geometric measure method, center manifold theory in infinite dimensions, the Melnikov method, spectral analysis and so on for infinite-dimensional dynamical systems. The second volume includes the properties of global attractors, the calculation of discrete attractors, structures of small dissipative dynamical systems, and the existence and stability of solitary waves. Contents Discrete attractor and approximate calculation Some properties of global attractor Structures of small dissipative dynamical systems Existence and stability of solitary waves This volume presents original research articles and extended surveys related to the mathematical interest and work of Jean-Michel Bismut. His outstanding contributions to probability theory and global analysis on manifolds have had a profound impact on several branches of mathematics in the areas of control theory, mathematical physics and arithmetic geometry.

Contributions by: K. Behrend N. Bergeron S. K. Donaldson J. Dubédat B. Duplantier G. Faltings E. Getzler G. Kings R. Mazzeo J. Millson C.

Moeglin W. Müller R. Rhodes D. Rössler S. Sheffield A. Telesman G. Tian K-I. Yoshikawa H. Weiss W. Werner

The collection is a valuable resource for graduate students and researchers in these fields. This two-volume work presents state-of-the-art mathematical theories and results on infinite-dimensional dynamical systems. Inertial manifolds, approximate inertial manifolds, discrete attractors and the dynamics of small dissipation are discussed in detail. The unique combination of mathematical rigor and physical background makes this work an essential reference for researchers and graduate students in applied mathematics and physics. The main emphasis in the first volume is on the mathematical analysis of attractors and inertial manifolds. This volume deals with the existence of global attractors, inertial manifolds and with the estimation of Hausdorff fractal dimension for some dissipative nonlinear evolution equations in modern physics. Known as well as many new results about the existence, regularity and properties of inertial manifolds and approximate inertial manifolds are also presented in the first volume. The second volume will be devoted to modern analytical tools and methods in infinite-dimensional dynamical systems.

Contents

Attractor and its dimension estimation
Inertial manifold
The approximate inertial manifold

This book is essential reading in the sociology of education, social policy and mathematics education. It is for teachers, principals, superintendents, school leaders and policymakers. For too long, many children have not achieved their best potential in mathematics at both primary and secondary schools. Although scholarly interest in students' attitudes towards mathematics and achievement in mathematics has increased, there is scant research which explores the explanatory potential of Bourdieu's trilogy of habitus, cultural capital and social field in investigating students' attitudes towards mathematics. The content is based on a rich empirical study of 1106 students aged 14-16 and gives a detailed account drawing on both quantitative and qualitative data to show the intersection of social class, gender and ethnicity on students' aspiration, attitudes towards mathematics and mathematical achievement

at GCSE in secondary schools in England. ALAN J. BISHOP Monash University, Clayton, Victoria, Australia RATIONALE Mathematics Education is becoming a well-documented field with many books, journals and international conferences focusing on a variety of aspects relating to theory, research and practice. That documentation also reflects the fact that the field has expanded enormously in the last twenty years. At the 8th International Congress on Mathematics Education (ICME) in Seville, Spain, for example, there were 26 specialist Working Groups and 26 special ist Topic Groups, as well as a host of other group activities. In 1950 the 'Commission Internationale pour l'Etude et l' Amelioration de l'Enseignement des Mathematiques' (CIEAEM) was formed and twenty years ago another active group, the 'International Group for the Psychology of Mathematics Education' (PME), began at the third ICME at Karlsruhe in 1976. Since then several other specialist groups have been formed, and are also active through regular conferences and publications, as documented in Edward Jacobsen's Chapter 34 in this volume. ALAN 1. BISHOP The first International Handbook on Mathematics Education was published by Kluwer Academic Publishers in 1996. However, most of the writing for that handbook was done in 1995 and generally reflected the main research and development foci prior to 1994. There were four sections, 36 chapters, and some 150 people contributed to the final volume either as author, reviewer, editor, or critical friend. The task was a monumental one, attempting to cover the major research and practice developments in the international field of mathematics education as it appeared to the contributors in 1995. Inevitably there were certain omissions, some developments were only starting to emerge, and some literatures were only sketchy and speculative. However that Handbook has had to be reprinted three times, so it clearly fulfilled a need and I personally hope that it lived up to what I wrote in its Introduction: The Handbook thus attempts not merely to present a description of the international 'state-of-the-field', but also to offer synthetic and reflective overviews on the different directions being taken by the field, on the gaps

existing in our present knowledge, on the current problems being faced, and on the future possibilities for development. (Bishop et al. , 1996) Since that time there has been even more activity in our field, and now seems a good time to take stock again, to reflect on what has happened since 1995, and to create a second Handbook with the same overall goals. This monograph is devoted to a new method of parallel computing which uses VLSI technology in an efficient manner. By this method, data are fed to the cells of a systolic processor and results are obtained instantly. Some theoretical and algorithmic questions which arise in the design of hardware and software for systolic processing are considered. Special attention is devoted to the complexity of VLSI, complexity of algorithms, parallel algorithms, relations between graphs of algorithms and graphs of processors, parallel programming languages, and the use of systolic algorithms for vector programming. The book is unique for its inclusion of a library of systolic algorithms for solving problems from twelve branches of computer science, and will be useful for designers of hardware and software for parallel processing.

Nonlinear Dynamics: A Two-Way Trip from Physics to Math provides readers with the mathematical tools of nonlinear dynamics to tackle problems in all areas of physics. The selection of topics emphasizes bifurcation theory and topological analysis of dynamical systems. The book includes real-life problems and experiments as well as exercises and worked examples to test understanding.

Peterson's Graduate Programs in Mathematics contains a wealth of information on colleges and universities that offer graduate work in Applied Mathematics, Applied Statistics, Biomathematics, Biometry, Biostatistics, Computational Sciences, Mathematical and Computational Finance, Mathematics, and Statistics. The institutions listed include those in the United States, Canada, and abroad that are accredited by U.S. accrediting bodies. Up-to-date information, collected through *Peterson's Annual Survey of Graduate and Professional Institutions*, provides valuable information on degree offerings, professional accreditation, jointly offered degrees, part-time

and evening/weekend programs, postbaccalaureate distance degrees, faculty, students, degree requirements, entrance requirements, expenses, financial support, faculty research, and unit head and application contact information. Readers will find helpful links to in-depth descriptions that offer additional detailed information about a specific program or department, faculty members and their research, and much more. In addition, there are valuable articles on financial assistance, the graduate admissions process, advice for international and minority students, and facts about accreditation, with a current list of accrediting agencies.

Greg Tang is back with his bestselling approach to addition and subtraction: problem solving. By solving challenges that encourage kids to "group" numbers rather than memorize formulas, even the most reluctant math learners are inspired to see math in a whole new way! Math Potatoes is full of Tang and Briggs' trademark humor, wit, and extraordinary creativity. Tang has proven over and over that math can be fun, and this new addition to his acclaimed series of mind-stretching math riddles is sure to be another hit.

Studies of teachers in the U.S. often document insufficient subject matter knowledge in mathematics. Yet, these studies give few examples of the knowledge teachers need to support teaching, particularly the kind of teaching demanded by recent reforms in mathematics education. *Knowing and Teaching Elementary Mathematics* describes the nature and development of the knowledge that elementary teachers need to become accomplished mathematics teachers, and suggests why such knowledge seems more common in China than in the United States, despite the fact that Chinese teachers have less formal education than their U.S. counterparts. The anniversary edition of this bestselling volume includes the original studies that compare U.S. and Chinese elementary school teachers' mathematical understanding and offers a powerful framework for grasping the mathematical content necessary to understand and develop the thinking of school children. Highlighting notable changes in the field and the author's work, this new edition includes an updated preface, introduction, and key journal articles

that frame and contextualize this seminal work. This book presents a history of mathematics between 1607 and 1865 in that part of mainland North America which is north of Mexico but excludes the present-day Canada and Alaska. Unlike most other histories of mathematics now available, the emphasis is on the gradual emergence of "mathematics for all" programs and associated changes in thinking which drove this emergence. The book takes account of changing ideas about intended, implemented and attained mathematics curricula for learners of all ages. It also pays attention to the mathematics itself, and to how it was taught and learned. This book provides a comprehensive introduction to the latest advances in the mathematical theory and computational tools for modeling high-dimensional data drawn from one or multiple low-dimensional subspaces (or manifolds) and potentially corrupted by noise, gross errors, or outliers. This challenging task requires the development of new algebraic, geometric, statistical, and computational methods for efficient and robust estimation and segmentation of one or multiple subspaces. The book also presents interesting real-world applications of these new methods in image processing, image and video segmentation, face recognition and clustering, and hybrid system identification etc. This book is intended to serve as a textbook for graduate students and beginning researchers in data science, machine learning, computer vision, image and signal processing, and systems theory. It contains ample illustrations, examples, and exercises and is made largely self-contained with three Appendices which survey basic concepts and principles from statistics, optimization, and algebraic-geometry used in this book. René Vidal is a Professor of Biomedical Engineering and Director of the Vision Dynamics and Learning Lab at The Johns Hopkins University. Yi Ma is Executive Dean and Professor at the School of Information Science and Technology at ShanghaiTech University. S. Shankar Sastry is Dean of the College of Engineering, Professor of Electrical Engineering and Computer Science and Professor of Bioengineering at the University of California, Berkeley. Winner of the AESA 2017 Critics' Choice Book

Award Mathematics Education offers both undergraduates and starting-graduate students in education an introduction to the connections that exist between mathematics and a critical orientation to education. This primer shows how concepts like race, class, gender, and language have real effects in the mathematics classroom, and prepares current and future mathematics teachers with a more critical math education that increases accessibility for all students. By refocusing math learning towards the goals of democracy and social and environmental crises, the book also introduces readers to broader contemporary school policy and reform debates and struggles. Mark Wolfmeyer shows future and current teachers how critical mathematics education can be put into practice with concrete strategies and examples in both formal and informal educational settings. With opportunities for readers to engage in deeper discussion through suggested activities, Mathematics Education's pedagogical features include: Study Questions for Teachers and Students Text Boxes with Examples of Critical Education in Practice Annotated List of Further Readings Glossary

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