

Methods And Techniques For Proving Inequalities Mathematical Olympiad

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Lecture Notes on Mathematical Olympiad Courses - Jiagu Xu 2010

Olympiad mathematics is not a collection of techniques of solving mathematical problems but a system for advancing mathematical education. This book is based on the lecture notes of the mathematical Olympiad training courses

conducted by the author in Singapore. Its scope and depth not only covers and exceeds the usual syllabus, but introduces a variety concepts and methods in modern mathematics. In each lecture, the concepts, theories and methods are taken as the core. The examples are served to explain and enrich their intension and to

indicate their applications. Besides, appropriate number of test questions is available for reader's practice and testing purpose. Their detailed solutions are also conveniently provided. The examples are not very complicated so that readers can easily understand. There are many real competition questions included which students can use to verify their abilities. These test questions are from many countries, e.g. China, Russia, USA, Singapore, etc. In particular, the reader can find many questions from China, if he is interested in understanding mathematical Olympiad in China. This book serves as a useful textbook of mathematical Olympiad courses, or as a reference book for related teachers and researchers. Errata(s). Errata. Sample Chapter(s). Lecture 16: Quadratic Surd Expressions and Their Operations (183k). Request Inspection Copy. Contents.: Volume 2: Congruence of Integers; Decimal Representation of Integers; Pigeonhole Principle; Linear Inequality and System of Linear

Inequalities; Inequalities with Absolute Values; Geometric Inequalities; Solutions to Testing Questions; and other chapters. Readership: Mathematics students, school teachers, college lecturers, university professors; mathematics enthusiasts.

The Probabilistic Method - Noga Alon

2016-01-26

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.

Weapons of Math Destruction - Cathy O'Neil
2017-09-05

NEW YORK TIMES BESTSELLER • A former Wall Street quant sounds the alarm on Big Data and the mathematical models that threaten to rip apart our social fabric—with a new afterword “A manual for the twenty-first-century citizen . . . relevant and urgent.”—Financial Times

NATIONAL BOOK AWARD LONGLIST • NAMED ONE OF THE BEST BOOKS OF THE YEAR BY The New York Times Book Review • The Boston Globe • Wired • Fortune • Kirkus Reviews • The Guardian • Nature • On Point We live in the age of the algorithm. Increasingly, the decisions that affect our lives—where we go to school, whether we can get a job or a loan, how much we pay for

health insurance—are being made not by humans, but by machines. In theory, this should lead to greater fairness: Everyone is judged according to the same rules. But as mathematician and data scientist Cathy O'Neil reveals, the mathematical models being used today are unregulated and uncontestable, even when they're wrong. Most troubling, they reinforce discrimination—propping up the lucky, punishing the downtrodden, and undermining our democracy in the process. Welcome to the dark side of Big Data.

Combinatorial Mathematics - Douglas B. West
2020-07-16

This long-awaited textbook is the most comprehensive introduction to a broad swath of combinatorial and discrete mathematics. The text covers enumeration, graphs, sets, and methods, and it includes both classical results and more recent developments. Assuming no prior exposure to combinatorics, it explains the basic material for graduate-level students in

mathematics and computer science. Optional more advanced material also makes it valuable as a research reference. Suitable for a one-year course or a one-semester introduction, this textbook prepares students to move on to more advanced material. It is organized to emphasize connections among the topics, and facilitate instruction, self-study, and research, with more than 2200 exercises (many accompanied by hints) at various levels of difficulty. Consistent notation and terminology are used throughout, allowing for a discussion of diverse topics in a unified language. The thorough bibliography, containing thousands of citations, makes this a valuable source for students and researchers alike.

Methods and Techniques for Proving Inequalities

- Yong Su 2015

In China, lots of excellent maths students take an active interest 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 won the first place almost every year. The authors are coaches of China's IMO National Team, whose students have won many gold medals many times in IMO. This book is part of the Mathematical Olympiad Series which discusses several aspects related to maths contests, such as algebra, number theory, combinatorics, graph theory and geometry. The book explains many basic techniques for proving inequalities such as direct comparison, method of magnifying and reducing, substitution method, construction method, and so on.

Russian Mathematics Education -

Inequalities - Zdravko Cvetkovski 2012-01-06

This work is about inequalities which play an important role in mathematical Olympiads. It contains 175 solved problems in the form of exercises and, in addition, 310 solved problems.

The book also covers the theoretical background of the most important theorems and techniques required for solving inequalities. It is written for all middle and high-school students, as well as for graduate and undergraduate students. School teachers and trainers for mathematical competitions will also gain benefit from this book.

Special Secondary Schools For The Mathematically Talented: An International Panorama - Bruce R Vogeli 2015-08-28

A review of 100 special schools for the mathematically talented students in twenty nations. Appendices contain sample syllabi, tests and documents.

Putnam and Beyond - Răzvan Gelca 2017-09-19

This book takes the reader on a journey through the world of college mathematics, focusing on some of the most important concepts and results in the theories of polynomials, linear algebra, real analysis, differential equations, coordinate geometry, trigonometry, elementary number

theory, combinatorics, and probability. Preliminary material provides an overview of common methods of proof: argument by contradiction, mathematical induction, pigeonhole principle, ordered sets, and invariants. Each chapter systematically presents a single subject within which problems are clustered in each section according to the specific topic. The exposition is driven by nearly 1300 problems and examples chosen from numerous sources from around the world; many original contributions come from the authors. The source, author, and historical background are cited whenever possible. Complete solutions to all problems are given at the end of the book. This second edition includes new sections on quadratic polynomials, curves in the plane, quadratic fields, combinatorics of numbers, and graph theory, and added problems or theoretical expansion of sections on polynomials, matrices, abstract algebra, limits of sequences and functions, derivatives and their applications,

Stokes' theorem, analytical geometry, combinatorial geometry, and counting strategies. Using the W.L. Putnam Mathematical Competition for undergraduates as an inspiring symbol to build an appropriate math background for graduate studies in pure or applied mathematics, the reader is eased into transitioning from problem-solving at the high school level to the university and beyond, that is, to mathematical research. This work may be used as a study guide for the Putnam exam, as a text for many different problem-solving courses, and as a source of problems for standard courses in undergraduate mathematics. Putnam and Beyond is organized for independent study by undergraduate and graduate students, as well as teachers and researchers in the physical sciences who wish to expand their mathematical horizons.

*Sequences And Mathematical Induction:in
Mathematical Olympiad And Competitions (2nd
Edition) - Zhigang Feng 2019-10-08*

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.

Central European Olympiad, A: The Mathematical Duel - Geretschlager Robert

2017-11-29

This book contains the most interesting problems from the first 24 years of the "Mathematical Duel," an annual international mathematics competition between the students of four schools: the Gymnázium Mikuláše Koperníka in Bílovec, Czech Republic, the Akademicki Zespół Szkół Ogólnokształcących in Chorzów, Poland, the Bundesrealgymnasium Kepler in Graz, Austria and the Gymnázium Jakuba Škody in Přerov, Czech Republic. The problems are presented by topic, grouped under the headings Geometry, Combinatorics, Number Theory and Algebra, which is typical for olympiad-style competitions. Above all, it is of interest to students preparing for mathematics competitions as well as teachers looking for material to prepare their students, as well as mathematically interested enthusiasts from all

walks of life looking for an intellectual challenge.

Contents: Introduction

Number Theory Algebra Combinatorics Geometry

4! Years of Problems Readership: General public,

students and teachers preparing for olympiad-

style mathematical competitions

Keywords: Mathematics Competition; Problem

Solving Review: Key Features: The wide selection

of problems makes it especially interesting for

students and teachers preparing for olympiad-

style mathematical competitions

The participants in this particular competition range in age from

13 to 18, and the problems are created with this

wide range in mind

Any interested reader is bound to find something interesting to suit their

own level of experience

Methods and Techniques for Proving Inequalities

- Yong Su 2015-10-06

In China, lots of excellent maths students take

an active interest in various maths contests and

the best six senior high school students will be

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Probability and Expectation - Zun Shan

2016-07-14

In China, lots of excellent students who are good at maths take 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, whose students have won many gold medals many times in IMO. This book is part of the Mathematical Olympiad Series which discusses several aspects related to maths contests, such as algebra, number theory, combinatorics, graph theory and geometry. This book will, in an interesting problem-solving way, explain what probability theory is: its concepts, methods and meanings; particularly, two important concepts — probability and mathematical expectation (briefly expectation) — are emphasized. It consists of 65 problems, appended by 107 exercises and their answers.

Problems And Solutions In Mathematical Olympiad (High School 2) - Shi-xiong Liu

2022-04-08

The series is edited by the head coaches of

China's IMO National Team. Each volume, catering to different grades, is contributed by the senior coaches of the IMO National Team. The Chinese edition has won the award of Top 50 Most Influential Educational Brands in China. The series is created in line with the mathematics cognition and intellectual development levels of the students in the corresponding grades. All hot mathematics topics of the competition are included in the volumes and are organized into chapters where concepts and methods are gradually introduced to equip the students with necessary knowledge until they can finally reach the competition level. In each chapter, well-designed problems including those collected from real competitions are provided so that the students can apply the skills and strategies they have learned to solve these problems. Detailed solutions are provided selectively. As a feature of the series, we also include some solutions generously offered by the members of Chinese national team and national

training team.

Equations and Inequalities - Jiri Herman
2012-12-06

A look at solving problems in three areas of classical elementary mathematics: equations and systems of equations of various kinds, algebraic inequalities, and elementary number theory, in particular divisibility and diophantine equations. In each topic, brief theoretical discussions are followed by carefully worked out examples of increasing difficulty, and by exercises which range from routine to rather more challenging problems. While it emphasizes some methods that are not usually covered in beginning university courses, the book nevertheless teaches techniques and skills which are useful beyond the specific topics covered here. With approximately 330 examples and 760 exercises. [Advances in Intelligent, Interactive Systems and Applications](#) - Fatos Xhafa 2019-01-16
This book presents the proceedings of the International Conference on Intelligent,

Interactive Systems and Applications (IISA2018), held in Hong Kong, China on June 29-30, 2018. It consists of contributions from diverse areas of intelligent interactive systems (IIS), such as: autonomous systems; pattern recognition and vision systems; e-enabled systems; mobile computing and intelligent networking; Internet & cloud computing; intelligent systems and applications. The book covers the latest ideas and innovations from both the industrial and academic worlds, and shares the best practices in the fields of computer science, communication engineering and latest applications of IOT and its use in industry. It also discusses key research outputs, providing readers with a wealth of new ideas and food for thought.

Applied Mathematics Reviews - George A Anastassiou 2000-06-09

Applied mathematics connects the mathematical theory to the reality by solving real world problems and shows the power of the science of mathematics, greatly improving our lives.

Therefore it plays a very active and central role in the scientific world. This volume contains 14 high quality survey articles — incorporating original results and describing the main research activities of contemporary applied mathematics — written by top people in the field. The articles have been written in review style, so that the researcher can have a quick and thorough view of what is happening in the main subfields of applied mathematics.

Contents: Two Contemporary Computational Concepts in Numerical Analysis (I K Argyros) On the Simultaneous Approximation of Functions and Their Derivatives (T Kilgore) Copositive Polynomial Approximation Revisited (Y K Hu & X M Yu) Sampling Theory and Function Spaces (H-J Schmeisser & W Sickel) Evaluating Statistical Functionals by Means of Projections onto Convex Cones in Hilbert Spaces: Part I and II (T Rychlik) Extrapolation: From Calculation of π to Finite Element Method of Partial Differential Equations (X-P Shen) A Survey on Scaling

Function Interpolation and Approximation (E-B Lin) and other papers. Readership: Applied mathematicians, statisticians, economists and engineers. Keywords: Singular Integrals; Numerical Analysis; Convolution Operators; Approximation of Functions; Minimal Projection; Fuzzy Control; Sampling Theory; Stable Financial Modelling; Ill-Posed Problems; Finite Element Method Automated Inequality Proving and Discovering - Bican Xia 2016-06-21

This is the first book that focuses on practical algorithms for polynomial inequality proving and discovering. It is a summary of the work by the authors and their collaborators on automated inequality proving and discovering in recent years. Besides brief introduction to some classical results and related work in corresponding chapters, the book mainly focuses on the algorithms initiated by the authors and their collaborators, such as real root counting, real root classification, improved CAD

projection, dimension-decreasing algorithm, difference substitution, and so on. All the algorithms were rigorously proved and the implementations are demonstrated by lots of examples in various backgrounds such as algebra, geometry, biological science, and computer science. Contents: Preface Basics of Elimination Method Zero Decomposition of Polynomial System Triangularization of Semi-Algebraic System Real Root Counting Real Root Isolation Real Root Classification Open Weak CAD Dimension-Decreasing Algorithm SOS Decomposition Successive Difference Substitution Proving Inequalities Beyond the Tarski Model Readership: Researchers and graduate students in computational real algebraic geometry, optimization and artificial intelligence.

Algebraic Inequalities - Hayk Sedrakyan 2018-07-05

This unique collection of new and classical problems provides full coverage of algebraic

inequalities. Many of the exercises are presented with detailed author-prepared-solutions, developing creativity and an arsenal of new approaches for solving mathematical problems. Algebraic Inequalities can be considered a continuation of the book Geometric Inequalities: Methods of Proving by the authors. This book can serve teachers, high-school students, and mathematical competitors. It may also be used as supplemental reading, providing readers with new and classical methods for proving algebraic inequalities.

Inequalities - Radmila Bulajich Manfrino

2010-01-01

This book is intended for the Mathematical Olympiad students who wish to prepare for the study of inequalities, a topic now of frequent use at various levels of mathematical competitions.

In this volume we present both classic inequalities and the more useful inequalities for confronting and solving optimization problems.

An important part of this book deals with

geometric inequalities and this fact makes a big difference with respect to most of the books that deal with this topic in the mathematical olympiad. The book has been organized in four chapters which have each of them a different character. Chapter 1 is dedicated to present basic inequalities. Most of them are numerical inequalities generally lacking any geometric meaning. However, where it is possible to provide a geometric interpretation, we include it as we go along. We emphasize the importance of some of these inequalities, such as the inequality between the arithmetic mean and the geometric mean, the Cauchy-Schwarz inequality, the rearrangement inequality, the Jensen inequality, the Muirhead theorem, among others. For all these, besides giving the proof, we present several examples that show how to use them in mathematical olympiad problems. We also emphasize how the substitution strategy is used to deduce several inequalities.

(1988). - I. J. Schoenberg 1988-06

These seleeta contain 761 of the more than 2600 pages of I. J. Schoenberg's published articles. The selection made and the grouping in which the papers are presented here reflect most strongly Schoenberg's wishes. The first volume of these seleeta is drawn from Schoenberg's remarkable work on Number Theory, Positive Definite Functions and Metric Geometry, Real and Complex Analysis, and on the Landau Problem. Schoenberg's fundamental papers on Total Positivity and Variation Diminution, on Pólya Frequency functions and sequences, and on Splines, especially Cardinal Splines, make up the second volume. In addition, various commentaries have been provided. Lettered references in these refer to items listed alphabetically at the end of each commentary. Numbered references refer to the list of Schoenberg's publications to be found in each volume. Those included in these seleeta are starred. It has been an honor to have been entrusted with the editorial work for these

seleeta. I am grateful to the writers of the various commentaries for their illuminating contributions and to Richard Askey for solid advice.

Concentration Inequalities - Stéphane Boucheron 2013-02-07

Describes the interplay between the probabilistic structure (independence) and a variety of tools ranging from functional inequalities to transportation arguments to information theory. Applications to the study of empirical processes, random projections, random matrix theory, and threshold phenomena are also presented.

Selected Problems of the Vietnamese Mathematical Olympiad (1962-2009) - Hai Chau Le 2010

Vietnam has actively organized the National Competition in Mathematics and since 1962, the Vietnamese Mathematical Olympiad (VMO). On the global stage, Vietnam has also competed in the International Mathematical Olympiad (IMO)

since 1974 and constantly emerged as one of the top ten. To inspire and further challenge readers, we have gathered in this book selected problems of the VMO from 1962 to 2008. A number of Selection Test problems are also included to aid in the formation and training of a national team for IMO. The book is highly useful for high school students and teachers, coaches and instructors preparing for mathematical olympiads, as well as non-experts simply interested in having the edge over their opponents in mathematical competitions.

Applied Mathematics Reviews - George A. Anastassiou 2000

Applied mathematics connects the mathematical theory to the reality by solving real world problems and shows the power of the science of mathematics, greatly improving our lives.

Therefore it plays a very active and central role in the scientific world. This volume contains 14 high quality survey articles -- incorporating original results and describing the main

research activities of contemporary applied mathematics -- written by top people in the field. The articles have been written in review style, so that the researcher can have a quick and thorough view of what is happening in the main subfields of applied mathematics.

The Cauchy-Schwarz Master Class - J.

Michael Steele 2004-04-26

This 2004 book presents a fascinating collection of problems related to the Cauchy-Schwarz inequality and coaches readers through solutions.

Problems of Number Theory in Mathematical Competitions - Hong-Bing Yu 2010

Number theory is an important research field of mathematics. In mathematical competitions, problems of elementary number theory occur frequently. These problems use little knowledge and have many variations. They are flexible and diverse. In this book, the author introduces some basic concepts and methods in elementary

number theory via problems in mathematical competitions. Readers are encouraged to try to solve the problems by themselves before they read the given solutions of examples. Only in this way can they truly appreciate the tricks of problem-solving.

Russian Mathematics Education - Alexander Karp 2011

This anthology, consisting of two volumes, is intended to equip background researchers, practitioners and students of international mathematics education with intimate knowledge of mathematics education in Russia. Volume I, entitled Russian Mathematics Education: History and World Significance, consists of several chapters written by distinguished authorities from Russia, the United States and other nations. It examines the history of mathematics education in Russia and its relevance to mathematics education throughout the world. The second volume, entitled Russian Mathematics Education: Programs and Practices

will examine specific Russian programs in mathematics, their impact and methodological innovations. Although Russian mathematics education is highly respected for its achievements and was once very influential internationally, it has never been explored in depth. This publication does just that.

Problem-Solving Strategies - Arthur Engel 2008-01-19

A unique collection of competition problems from over twenty major national and international mathematical competitions for high school students. Written for trainers and participants of contests of all levels up to the highest level, this will appeal to high school teachers conducting a mathematics club who need a range of simple to complex problems and to those instructors wishing to pose a "problem of the week", thus bringing a creative atmosphere into the classrooms. Equally, this is a must-have for individuals interested in solving difficult and challenging problems. Each chapter

starts with typical examples illustrating the central concepts and is followed by a number of carefully selected problems and their solutions. Most of the solutions are complete, but some merely point to the road leading to the final solution. In addition to being a valuable resource of mathematical problems and solution strategies, this is the most complete training book on the market.

Solving Problems in Geometry - Kim Hoo Hang 2017-05-19

This new volume of the Mathematical Olympiad Series focuses on the topic of geometry. Basic and advanced theorems commonly seen in Mathematical Olympiad are introduced and illustrated with plenty of examples. Special techniques in solving various types of geometrical problems are also introduced, while the authors elaborate extensively on how to acquire an insight and develop strategies in tackling difficult geometrical problems. This book is suitable for any reader with elementary

geometrical knowledge at the lower secondary level. Each chapter includes sufficient scaffolding and is comprehensive enough for the purpose of self-study. Readers who complete the chapters on the basic theorems and techniques would acquire a good foundation in geometry and may attempt to solve many geometrical problems in various mathematical competitions. Meanwhile, experienced contestants in Mathematical Olympiad competitions will find a large collection of problems pitched at competitions at the international level, with opportunities to practise and sharpen their problem-solving skills in geometry. Request Inspection Copy

Classical and New Inequalities in Analysis - Dragoslav S. Mitrinovic 2013-04-17

This volume presents a comprehensive compendium of classical and new inequalities as well as some recent extensions to well-known ones. Variations of inequalities ascribed to Abel, Jensen, Cauchy, Chebyshev, Hölder, Minkowski,

Stefferson, Gram, Fejér, Jackson, Hardy, Littlewood, Po'lya, Schwarz, Hadamard and a host of others can be found in this volume. The more than 1200 cited references include many from the last ten years which appear in a book for the first time. The 30 chapters are all devoted to inequalities associated with a given classical inequality, or give methods for the derivation of new inequalities. Anyone interested in equalities, from student to professional, will find their favorite inequality and much more.

Functional Inequalities: New Perspectives and New Applications - Nassif Ghousseub

2013-04-09

"The book describes how functional inequalities are often manifestations of natural mathematical structures and physical phenomena, and how a few general principles validate large classes of analytic/geometric inequalities, old and new. This point of view leads to "systematic" approaches for proving the most basic inequalities, but also for improving them, and for

devising new ones--sometimes at will and often on demand. These general principles also offer novel ways for estimating best constants and for deciding whether these are attained in appropriate function spaces. As such, improvements of Hardy and Hardy-Rellich type inequalities involving radially symmetric weights are variational manifestations of Sturm's theory on the oscillatory behavior of certain ordinary differential equations. On the other hand, most geometric inequalities, including those of Sobolev and Log-Sobolev type, are simply expressions of the convexity of certain free energy functionals along the geodesics on the Wasserstein manifold of probability measures equipped with the optimal mass transport metric. Caffarelli-Kohn-Nirenberg and Hardy-Rellich-Sobolev type inequalities are then obtained by interpolating the above two classes of inequalities via the classical ones of Hölder. The subtle Moser-Onofri-Aubin inequalities on the two-dimensional sphere are connected to

Liouville type theorems for planar mean field equations."--Publisher's website.

How to Prove It - Daniel J. Velleman 2006-01-16

This new edition of Daniel J. Velleman's successful textbook contains over 200 new exercises, selected solutions, and an introduction to Proof Designer software.

Mathematical Olympiad In China

(2011-2014): Problems And Solutions - Bin Xiong 2018-03-22

The International Mathematical Olympiad (IMO) is a very important competition for high school students. China has taken part in the IMO 31 times since 1985 and has won the top ranking for countries 19 times, with a multitude of gold medals for individual students. The six students China has sent every year were selected from 60 students among approximately 300 students who took part in the annual China Mathematical Competition during the winter months. This book includes the problems and solutions of the most important mathematical competitions from 2010

to 2014 in China, such as China Mathematical Competition, China Mathematical Olympiad, China Girls' Mathematical Olympiad. These problems are almost exclusively created by the experts who are engaged in mathematical competition teaching and researching. Some of the solutions are from national training team and national team members, their wonderful solutions being the feature of this book. This book is useful to mathematics fans, middle school students engaged in mathematical competition, coaches in mathematics teaching and teachers setting up math elective courses.

Geometric Inequalities - Gangsong Leng 2015-10-21

In China, lots of excellent maths students take an active interest 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

won the first place almost every year. The author is one of the coaches of China's IMO National Team, whose students have won many gold medals many times in IMO. This book is part of the Mathematical Olympiad Series which discusses several aspects related to maths contests, such as algebra, number theory, combinatorics, graph theory and geometry. The book elaborates on Geometric Inequality problems such as inequality for the inscribed quadrilateral, the area inequality for special polygons, linear geometric inequalities, etc.

Proofs from THE BOOK - Martin Aigner
2013-06-29

According to the great mathematician Paul Erdős, God maintains perfect mathematical proofs in The Book. This book presents the authors candidates for such "perfect proofs," those which contain brilliant ideas, clever connections, and wonderful observations, bringing new insight and surprising perspectives to problems from number theory, geometry,

analysis, combinatorics, and graph theory. As a result, this book will be fun reading for anyone with an interest in mathematics.

Analytic Inequalities - Nicholas D. Kazarinoff
2014-08-19

Mathematical analysis is largely a systematic study and exploration of inequalities — but for students the study of inequalities often remains a foreign country, difficult of access. This book is a passport to that country, offering a background on inequalities that will prepare undergraduates (and even high school students) to cope with the concepts of continuity, derivative, and integral. Beginning with explanations of the algebra of inequalities and conditional inequalities, the text introduces a pair of ancient theorems and their applications. Explorations of inequalities and calculus cover the number e , examples from the calculus, and approximations by polynomials. The final sections present modern theorems, including Bernstein's proof of the Weierstrass

approximation theorem and the Cauchy, Bunyakovskii, Hölder, and Minkowski inequalities. Numerous figures, problems, and examples appear throughout the book, offering students an excellent foundation for further studies of calculus.

Elimination Practice - Dongming Wang

2004-02-19

With a software library included, this book provides an elementary introduction to polynomial elimination in practice. The library Epsilon, implemented in Maple and Java, contains more than 70 well-documented functions for symbolic elimination and decomposition with polynomial systems and geometric reasoning. The book presents the functionality, implementation, and performance of Epsilon and demonstrates the usefulness of the elimination tool by a number of selected applications, together with many examples and illustrations. The reader will find Epsilon an efficient tool, applicable to a wide range of

problems in science, engineering, and industry, and this book an accessible exposition and a valuable reference for elimination theory, methods, and practice. Contents: Polynomial Elimination at Work The Epsilon Library The CharSets Package The TriSys and SiSys Modules The GEOTHER Environment Relevant Elimination Tools Solving Polynomial Systems Automated Theorem Proving and Discovering in Geometry Symbolic Geometric Computation Selected Problems in Computer Mathematics Readership: Researchers and graduate students in symbolic mathematical computation, geometric reasoning and modeling, as well as mathematical software engineers. Keywords: Symbolic Computation; Mathematical Software; Elimination Method; Polynomial System; Computer Algebra; Geometric Reasoning; Surface Modeling Reviews: "This book is a treasure ... it will be welcomed by all those who are active in the area of elimination methods and will also attract new people to the

exciting field of elimination methods, which is one of the oldest and, at the same time, one of the most topical areas in mathematics with a high future potential in all other areas of mathematics as well as in a wide range of applications in science, engineering, economy, etc." Bruno Buchberger Professor of Computer Mathematics Johannes Kepler University, Austria

Risk and Uncertainty Reduction by Using Algebraic Inequalities - Michael T. Todinov
2020-06-02

This book covers the application of algebraic inequalities for reliability improvement and for uncertainty and risk reduction. It equips readers with powerful domain-independent methods for reducing risk based on algebraic inequalities and demonstrates the significant benefits derived from the application for risk and uncertainty reduction. Algebraic inequalities: • Provide a powerful reliability improvement, risk and uncertainty reduction method that

transcends engineering and can be applied in various domains of human activity • Present an effective tool for dealing with deep uncertainty related to key reliability-critical parameters of systems and processes • Permit meaningful interpretations which link abstract inequalities with the real world • Offer a tool for determining tight bounds for the variation of risk-critical parameters and complying the design with these bounds to avoid failure • Allow optimising designs and processes by minimising the deviation of critical output parameters from their specified values and maximising their performance This book is primarily for engineering professionals and academic researchers in virtually all existing engineering disciplines.

Combinatorial Extremization - Yuefeng Feng
2016

In China, lots of excellent students who are good at maths 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 coaches of China's IMO National Team, whose students have won many gold medals many times in IMO. This book is part of the Mathematical Olympiad Series which discusses several aspects related to maths contests, such as algebra, number theory, combinatorics, graph theory and geometry. The book elaborates on methods of discrete extremization, such as inequality control, repeated extremum, partial adjustment, exploiting symmetry, polishing transform, space estimates, etc.

Basics of Olympiad Inequalities - Samin

Riasat 2019-07-20

More than a decade ago I published some notes on inequalities on the WWW with the same title as this book aimed for mathematical olympiad preparation. I do not have specific data on how widespread it became. However, search results on the WWW, publication data on ResearchGate and occasional emails from teachers and students gave me evidence that it had indeed spread worldwide. While I was greatly overwhelmed and humbled that so many people across the world read my notes and presumably found them useful, I also felt it necessary to write a more detailed and improved version. This culminated in the publication of this book. While the main topics from the original notes have not changed, this book does contain more details and explanations. I therefore hope that it will be even more useful to everyone.