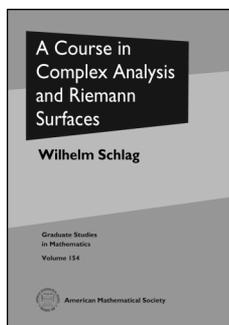


New Publications Offered by the AMS

To subscribe to email notification of new AMS publications, please go to <http://www.ams.org/bookstore-email>.

Analysis



A Course in Complex Analysis and Riemann Surfaces

Wilhelm Schlag, *University of Chicago, IL*

Complex analysis is a cornerstone of mathematics, making it an essential element of any area of study in graduate mathematics. Schlag's treatment of the subject emphasizes the intuitive geometric

underpinnings of elementary complex analysis that naturally lead to the theory of Riemann surfaces.

The book begins with an exposition of the basic theory of holomorphic functions of one complex variable. The first two chapters constitute a fairly rapid but comprehensive course in complex analysis. The third chapter is devoted to the study of harmonic functions on the disk and the half-plane, with an emphasis on the Dirichlet problem. Starting with the fourth chapter, the theory of Riemann surfaces is developed in some detail and with complete rigor. From the beginning, the geometric aspects are emphasized and classical topics such as elliptic functions and elliptic integrals are presented as illustrations of the abstract theory. The special role of compact Riemann surfaces is explained, and their connection with algebraic equations is established. The book concludes with three chapters devoted to three major results: the Hodge decomposition theorem, the Riemann-Roch theorem, and the uniformization theorem. These chapters present the core technical apparatus of Riemann surface theory at this level.

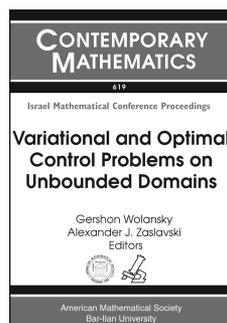
This text is intended as a fairly detailed yet fast-paced intermediate introduction to those parts of the theory of one complex variable that seem most useful in other areas of mathematics, including geometric group theory, dynamics, algebraic geometry, number theory, and functional analysis. More than seventy figures serve to illustrate concepts and ideas, and the many problems at the end of each chapter give the reader ample opportunity for practice and independent study.

Contents: From i to z : the basics of complex analysis; From z to the Riemann mapping theorem: some finer points of basic complex analysis; Harmonic functions; Riemann surfaces: definitions, examples, basic properties; Analytic continuation, covering surfaces, and algebraic functions; Differential forms on Riemann surfaces; The

theorems of Riemann-Roch, Abel, and Jacobi; Uniformization; Review of some basic background material; Bibliography; Index.

Graduate Studies in Mathematics, Volume 154

September 2014, approximately 393 pages, Hardcover, ISBN: 978-0-8218-9847-5, LC 2014009993, 2010 *Mathematics Subject Classification*: 30-01, 30F10, 30F15, 30F20, 30F30, 30F35, **AMS members US\$63.20**, List US\$79, Order code GSM/154



Variational and Optimal Control Problems on Unbounded Domains

Gershon Wolansky and Alexander J. Zaslavski, *Technion-Israel Institute of Technology, Haifa, Israel*, Editors

This volume contains the proceedings of the workshop on Variational and Optimal Control Problems on Unbounded Domains, held in memory of Arie Leizarowitz, from January 9–12, 2012, in Haifa, Israel.

The workshop brought together a select group of worldwide experts in optimal control theory and the calculus of variations, working on problems on unbounded domains.

The papers in this volume cover many different areas of optimal control and its applications. Topics include needle variations in infinite-horizon optimal control, Lyapunov stability with some extensions, small noise large time asymptotics for the normalized Feynman-Kac semigroup, linear-quadratic optimal control problems with state delays, time-optimal control of wafer stage positioning, second order optimality conditions in optimal control, state and time transformations of infinite horizon problems, turnpike properties of dynamic zero-sum games, and an infinite-horizon variational problem on an infinite strip.

This item will also be of interest to those working in applications.

This book is co-published with Bar-Ilan University (Ramat-Gan, Israel).

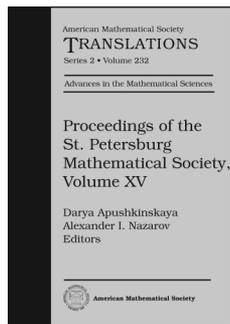
Contents: S. M. Aseev and V. M. Veliov, Needle variations in infinite-horizon optimal control; A. Berman, F. Goldberg, and R. Shorten, Comments on Lyapunov α -stability with some extensions; V. S. Borkar and K. S. Kumar, Small noise large time asymptotics for the normalized Feynman-Kac semigroup; Y. Dolgin and E. Zeheb, Linear constraints for convex approximation of the stability domain

of a polynomial in coefficients space; **V. Y. Glizer**, Singular solution of an infinite horizon linear-quadratic optimal control problem with state delays; **I. Ioslovich** and **P.-O. Gutman**, Time-optimal control of wafer stage positioning using simplified models; **J. Kogan** and **Y. Malinovsky**, Robust stability and monitoring threshold functions; **E. Ocaña** and **P. Cartigny**, One dimensional singular calculus of variations in infinite horizon and applications; **N. P. Osmolovskii**, Second order optimality conditions in optimal control problems with mixed inequality type constraints on a variable time interval; **I. Shafrir** and **I. Yudovich**, An infinite-horizon variational problem on an infinite strip; **D. Wenzke**, **V. Lykina**, and **S. Pickenhain**, State and time transformations of infinite horizon optimal control problems; **A. J. Zaslavski**, Turnpike properties of approximate solutions of discrete-time optimal control problems on compact metric spaces; **A. J. Zaslavski**, Turnpike theory for dynamic zero-sum games.

Contemporary Mathematics, Volume 619

August 2014, 247 pages, Softcover, ISBN: 978-1-4704-1077-3, LC 2013045474, 2010 *Mathematics Subject Classification*: 34-XX, 35-XX, 49-XX, 60-XX, 68-XX, 78-XX, 90-XX, 91-XX, 92-XX, 93-XX, **AMS members US\$72.80**, List US\$91, Order code CONM/619

Differential Equations



Proceedings of the St. Petersburg Mathematical Society, Volume XV

Advances in Mathematical Analysis of Partial Differential Equations

Darya Apushkinskaya, *Universität des Saarlandes, Saarbrücken, Germany*, and **Alexander I. Nazarov**, *Steklov Mathematical Institute, St. Petersburg, Russia, and St. Petersburg State University, Russia*, Editors

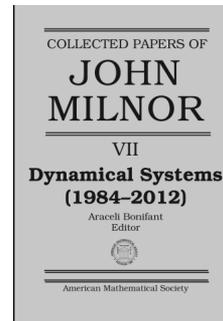
This book presents the proceedings of the international workshop, “Advances in Mathematical Analysis of Partial Differential Equations” held at the Institut Mittag-Leffler, Stockholm, Sweden, July 9–13, 2012, dedicated to the memory of the outstanding Russian mathematician Olga A. Ladyzhenskaya. The volume contains papers that engage a wide set of modern topics in the theory of linear and nonlinear partial differential equations and applications, including variational and free boundary problems, mathematical problems of hydrodynamics, and magneto-geostrophic equations.

Contents: **H. B. da Veiga**, On singular parabolic p -Laplacian systems under non-smooth external forces. Regularity up to the boundary; **S. Boccia** and **N. V. Krylov**, On the fundamental matrix solution for higher-order parabolic systems; **N. V. Filimonenkova** and **N. M. Ivochkina**, On variational ground of the m -Hessian operators; **S. Friedlander**, **W. Rusin**, and **V. Vicol**, The magneto-geostrophic equations: a survey; **M. Fuchs**, Variations on Liouville’s theorem in the setting of stationary flows of generalized Newtonian

fluids in the plane; **A. V. Fursikov**, On the normal-type parabolic system corresponding to the three-dimensional Helmholtz system; **M. Del Mar Gonzalez**, **M. Gualdani**, and **H. Shahgholian**, A discrete Bernoulli free boundary problem; **S. Hildebrandt** and **F. Sauvigny**, On Plateau’s problem in Riemannian manifolds; **H. Kim** and **M. Safonov**, The boundary Harnack principle for second order elliptic equations in John and uniform domains; **V. Kozlov** and **A. Nazarov**, Oblique derivative problem for non-divergence parabolic equations with time-discontinuous coefficients; **T. P. Pukhnachev**, Singular solutions of Navier-Stokes equations; **G. A. Seregin** and **T. N. Shilkin**, The local regularity theory for the Navier–Stokes equations near the boundary; **V. A. Solonnikov**, L_p -theory of free boundary problems of magnetohydrodynamics in simply connected domains.

American Mathematical Society Translations—Series 2, Volume 232

August 2014, approximately 229 pages, Hardcover, ISBN: 978-1-4704-1551-8, 2010 *Mathematics Subject Classification*: 35B05, 35B65, 35J60, 35K20, 35K41, 35Q35, 35R35, 76D03, 76D05, **AMS members US\$96**, List US\$120, Order code TRANS2/232



Collected Papers of John Milnor

VII. Dynamical Systems (1984–2012)

Araceli Bonifant, *University of Rhode Island, Kingston, RI*, Editor

This volume is the seventh in the series “Collected Papers of John Milnor.” Together with the preceding Volume VI, it contains

all of Milnor’s papers in dynamics, through the year 2012. Most of the papers are in holomorphic dynamics; however, there are two in real dynamics and one on cellular automata. Two of the papers are published here for the first time.

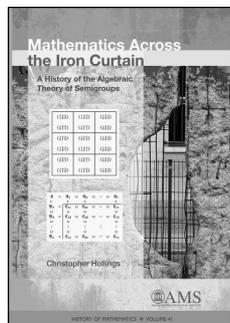
The papers in this volume provide important and fundamental material in real and complex dynamical systems. Many have become classics, and have inspired further research in the field. Some of the questions addressed here continue to be important in current research. In some cases, there have been minor corrections or clarifications, as well as references to more recent work which answers questions raised by the author. The volume also includes an index to facilitate searching the book for specific topics.

Contents: Introduction; Notes on surjective cellular automaton-maps (Unpublished manuscript of 1984); Tsujii’s monotonicity proof for real quadratic maps (Unpublished manuscript of 2000); Local connectivity of Julia sets: Expository lectures (2000); On rational maps with two critical points (2000); Periodic orbits, external rays and the Mandelbrot set: An expository account (2000); Pasting together Julia sets—A worked out example of mating (2004); On Lattès maps (2006); with **A. Bonifant** and **M. Dabija**, Elliptic curves as attractors in \mathbb{P}^2 , Part I: Dynamics (2007); with **A. Bonifant**, Schwarzian derivatives and cylinder maps (2008); Cubic polynomial maps with periodic critical orbit, Part I (2009); with **A. Bonifant** and **J. Kiwi**, Cubic polynomial maps with periodic critical orbit, Part II: Escape regions (2010); with **A. Bonifant** and **J. Kiwi**, Errata for “Cubic polynomial maps with periodic critical orbit, Part II: Escape regions” (2010); with an appendix by **A. Poirier**, Hyperbolic components (2012); Index.

Collected Works, Volume 19

August 2014, approximately 594 pages, Hardcover, ISBN: 978-1-4704-0937-1, LC 2014012208, 2010 *Mathematics Subject Classification*: 37-02, 37B15, 37B40, 37C70, 32H50, 37F10, 37F45, 37F50, 30D05, 14H52, **AMS members US\$100**, List US\$125, Order code CWORKS/19.7

General Interest



Mathematics across the Iron Curtain

A History of the Algebraic Theory of Semigroups

Christopher Hollings

The theory of semigroups is a relatively young branch of mathematics, with most of the major results having appeared after the Second World War. This book describes the evolution of (algebraic) semigroup theory

from its earliest origins to the establishment of a full-fledged theory.

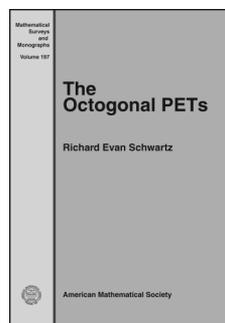
Semigroup theory might be termed 'Cold War mathematics' because of the time during which it developed. There were thriving schools on both sides of the Iron Curtain, although the two sides were not always able to communicate with each other, or even gain access to the other's publications. A major theme of this book is the comparison of the approaches to the subject of mathematicians in East and West, and the study of the extent to which contact between the two sides was possible.

Contents: Algebra at the beginning of the twentieth century; Communication between East and West; Anton Kazimirovich Sushkevich; Unique factorisation in semigroups; Embedding semigroups in groups; The Rees Theorem; The French school of 'demi-groupes'; The expansion of the theory in the 1940s and 1950s; The post-Sushkevich Soviet school; The development of inverse semigroups; Matrix representations of semigroups; Books, seminars, conferences, and journals; Basic theory; Notes; Bibliography; List of abbreviations of journal titles; Name index; Subject index.

History of Mathematics, Volume 41

August 2014, approximately 449 pages, Hardcover, ISBN: 978-1-4704-1493-1, LC 2014008281, 2010 *Mathematics Subject Classification*: 01A60, 20-03, **AMS members US\$87.20**, List US\$109, Order code HMATH/41

Geometry and Topology



The Octagonal PETs

Richard Evan Schwartz, *Brown University, Providence, RI*

A polytope exchange transformation is a (discontinuous) map from a polytope to itself that is a translation wherever it is defined. The 1-dimensional examples, interval exchange transformations, have been studied fruitfully for many years and have deep connections to other areas of mathematics, such as Teichmüller theory.

This book introduces a general method for constructing polytope exchange transformations in higher dimensions and then studies the simplest example of the construction in detail. The simplest case is a 1-parameter family of polygon exchange transformations that turns out to be closely related to outer billiards on semi-regular octagons. The 1-parameter family admits a complete renormalization scheme, and this structure allows for a fairly complete analysis both of the system and of outer billiards on semi-regular octagons. The material in this book was discovered through computer experimentation. On the other hand, the proofs are traditional, except for a few rigorous computer-assisted calculations.

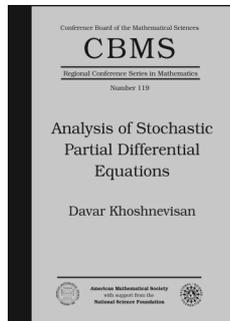
This item will also be of interest to those working in differential equations.

Contents: Introduction; *Friends of the octagonal PETs*: Background; Multigraph PETs; The alternating grid system; Outer billiards on semiregular octagons; Quarter turn compositions; *Renormalization and symmetry*: Elementary properties; Orbit stability and combinatorics; Bilateral symmetry; Proof of the main theorem; The renormalization map; Properties of the tiling; *Metric properties*: The filling lemma; The covering lemma; Further geometric results; Properties of the limit set; Hausdorff convergence; Recurrence relations; Hausdorff dimension bounds; *Topological properties*: Controlling the limit set; The arc case; Further symmetries of the tiling; The forest case; The Cantor set case; Dynamics in the arc case; *Computational details*: Computational methods; The calculations; The raw data; Bibliography.

Mathematical Surveys and Monographs, Volume 197

July 2014, 212 pages, Hardcover, ISBN: 978-1-4704-1522-8, LC 2014006823, 2010 *Mathematics Subject Classification*: 37E20, 37E05, 37E15, **AMS members US\$72**, List US\$90, Order code SURV/197

Probability and Statistics



Analysis of Stochastic Partial Differential Equations

Davar Khoshnevisan, *University of Utah, Salt Lake City, UT*

The general area of stochastic PDEs is interesting to mathematicians because it contains an enormous number of challenging open problems. There is also a

great deal of interest in this topic because it has deep applications in disciplines that range from applied mathematics, statistical mechanics, and theoretical physics, to theoretical neuroscience, theory of complex chemical reactions [including polymer science], fluid dynamics, and mathematical finance.

The stochastic PDEs that are studied in this book are similar to the familiar PDE for heat in a thin rod, but with the additional restriction that the external forcing density is a two-parameter stochastic process, or what is more commonly the case, the forcing is a “random noise,” also known as a “generalized random field.” At several points in the lectures, there are examples that highlight the phenomenon that stochastic PDEs are not a subset of PDEs. In fact, the introduction of noise in some partial differential equations can bring about not a small perturbation but truly fundamental changes to the system that the underlying PDE is attempting to describe.

The topics covered include a brief introduction to the stochastic heat equation, structure theory for the linear stochastic heat equation, and an in-depth look at intermittency properties of the solution to semilinear stochastic heat equations. Specific topics include stochastic integrals à la Norbert Wiener, an infinite-dimensional Itô-type stochastic integral, an example of a parabolic Anderson model, and intermittency fronts.

There are many possible approaches to stochastic PDEs. The selection of topics and techniques presented here are informed by the guiding example of the stochastic heat equation.

This item will also be of interest to those working in differential equations.

A co-publication of the AMS and CBMS.

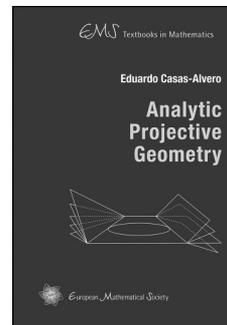
Contents: Prelude; Wiener integrals; A linear heat equation; Walsh-Dalang integrals; A non-linear heat equation; Intermezzo: A parabolic Anderson model; Intermittency; Intermittency fronts; Intermittency islands; Correlation length; Some special integrals; A Burkholder-Davis-Gundy inequality; Regularity theory; Bibliography.

CBMS Regional Conference Series in Mathematics, Number 119

July 2014, 116 pages, Softcover, ISBN: 978-1-4704-1547-1, LC 2014003696, 2010 *Mathematics Subject Classification*: 60H15; 35R60, 60H30, **All Individuals US\$29.60**, List US\$37, Institutional member US\$29.60, Order code CBMS/119

New AMS-Distributed Publications

Geometry and Topology



Analytic Projective Geometry

Eduardo Casas-Alvero, *Universitat de Barcelona, Spain*

Projective geometry is concerned with the properties of figures that are invariant by projecting and taking sections. It is considered one of the most beautiful parts of geometry and plays a central role because its specializations cover the whole

of the affine, Euclidean and non-Euclidean geometries. The natural extension of projective geometry is projective algebraic geometry, a rich and active field of research. The results and techniques of projective geometry are intensively used in computer vision.

This book contains a comprehensive presentation of projective geometry, over the real and complex number fields, and its applications to affine and Euclidean geometries. It covers central topics such as linear varieties, cross ratio, duality, projective transformations, quadrics and their classifications—projective, affine and metric—as well as the more advanced and less usual spaces of quadrics, rational normal curves, line complexes and the classifications of collineations, pencils of quadrics and correlations.

Two appendices are devoted to the projective foundations of perspective and to the projective models of plane non-Euclidean geometries. The book uses modern language, is based on linear algebra, and provides complete proofs. Exercises are proposed at the end of each chapter; many of them are beautiful classical results.

The material in this book is suitable for courses on projective geometry for undergraduate students, with a working knowledge of a standard first course on linear algebra. The text is a valuable guide to graduate students and researchers working in areas using or related to projective geometry, such as algebraic geometry and computer vision, and to anyone looking for an advanced view of geometry as a whole.

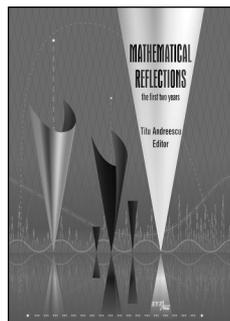
A publication of the European Mathematical Society (EMS). Distributed within the Americas by the American Mathematical Society.

Contents: Projective spaces and linear varieties; Projective coordinates and cross ratio; Affine geometry; Duality; Projective transformations; Quadric hypersurfaces; Classification and properties of quadrics; Further properties of quadrics; Projective spaces of quadrics; Metric geometry of quadrics; Three projective classifications; Appendix A. Perspective (for artists); Appendix B. Models of non-Euclidean geometries; Bibliography; Symbols; Index.

EMS Textbooks in Mathematics, Volume 15

May 2014, 636 pages, Hardcover, ISBN: 978-3-03719-138-5, 2010 *Mathematics Subject Classification*: 51-01, 51N15, 51N10, 51N20, **AMS members US\$62.40**, List US\$78, Order code EMSTEXT/15

Math Education



Mathematical Reflections: The First Two Years

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, Editor

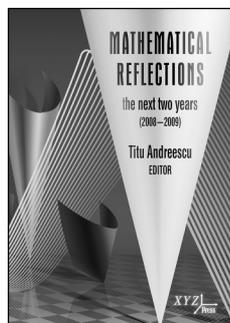
This book is aimed at high school students, participants in math competitions, undergraduates, as well as anyone who has a fire for mathematics. Many of the problems, solutions, and articles were submitted by passionate readers. They require creativity, experience, and comprehensive mathematical knowledge. The junior section features introductory problems. The senior and Olympiad sections are for students preparing for USAMO or the IMO. The graduate section offers college students a unique opportunity to solve non-routine problems in areas such as linear algebra, calculus, or graph theory.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Problems; Solutions; Articles; Problem author index; Article author index.

XYZ Series, Volume 10

August 2011, 619 pages, Hardcover, ISBN: 978-0-9799269-2-1, 2010 *Mathematics Subject Classification*: 00A05, 00A07, 97U40, 97D50, **AMS members US\$55.96**, List US\$69.95, Order code XYZ/10



Mathematical Reflections: The Next Two Years (2008-2009)

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, Editor

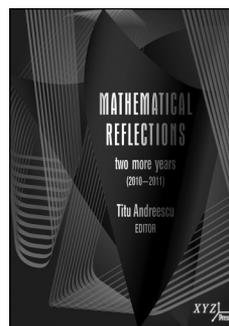
This book is a compilation and revision of the 2008 and 2009 volumes from the online journal of the same name. This book is aimed at high school students, participants in math competitions, undergraduates, and anyone who has a fire for mathematics. Many of the problems, solutions, and articles were submitted by passionate readers and all require creativity, experience, and comprehensive mathematical knowledge. This book is a great resource for students training for advanced national and international mathematics competitions such as USAMO and IMO.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Problems; Solutions; articles; Problem author index; Article author index.

XYZ Series, Volume 11

August 2012, 507 pages, Hardcover, ISBN: 978-0-9799269-6-9, 2010 *Mathematics Subject Classification*: 00A05, 00A07, 97U40, 97D50, **AMS members US\$55.96**, List US\$69.95, Order code XYZ/11



Mathematical Reflections: Two More Years (2010-2011)

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, Editor

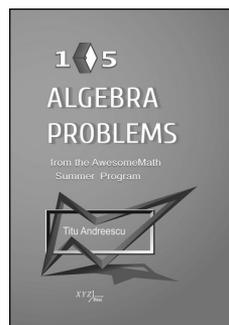
This book is a compilation and revision of the 2010 and 2011 volumes from the online journal of the same name. This book is aimed at high school students, participants in math competitions, undergraduates, and anyone who has a fire for mathematics. Many of the problems, solutions, and articles were submitted by passionate readers and all require creativity, experience, and comprehensive mathematical knowledge. This book is a great resource for students training for advanced national and international mathematics competitions such as USAMO and IMO.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Problems; Solutions; Articles; Problem author index; Article author index.

XYZ Series, Volume 12

February 2014, 497 pages, Hardcover, ISBN: 978-0-9885622-4-0, 2010 *Mathematics Subject Classification*: 00A05, 00A07, 97U40, 97D50, **AMS members US\$55.96**, List US\$69.95, Order code XYZ/12



105 Algebra Problems from the AwesomeMath Summer Program

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*

The main purpose of this book is to provide an introduction to central topics in elementary algebra from a problem-solving point of view. While working with students who were preparing for various mathematics competitions or exams, the author observed that fundamental algebraic techniques were not part of their mathematical repertoire. Since algebraic skills are not only critical to algebra itself but also to numerous other mathematical fields, a lack of such knowledge can drastically hinder a student's performance. Taking the above observations into account, the author has put together this introductory book using both simple and challenging examples which shed light upon essential algebraic strategies and techniques, as well as their application in diverse meaningful problems. This work is the first volume in a series of such books.

The featured topics from elementary and classical algebra include factorizations, algebraic identities, inequalities, algebraic equations and systems of equations. More advanced concepts such as complex numbers, exponents and logarithms, as well as other topics, are

generally avoided. Nevertheless, some problems are constructed using properties of complex numbers which challenge and expose the reader to a broader spectrum of mathematics. Each chapter focuses on specific methods or strategies and provides an ample collection of accompanying problems that graduate in difficulty and complexity. In order to assist the reader with verifying mastery of the theoretical component, 105 problems are included in the last sections of the book, of which 52 are introductory and 53 are advanced.

All problems come together with solutions, many employing several approaches and providing the motivation behind the solutions offered.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Preface; Completing the square and quadratic equations; Factorizations and algebraic identities; Factoring expressions involving $a - b, b - c, c - a$; Factoring $a^3 + b^3 + c^3 - 3abc$; AM-GM and Hölder's inequality; Lagrange's identity and the Cauchy-Schwarz inequality; Making linear combinations; Fixed points and monotonicity; The floor function; Taking advantage of symmetry; Introductory problems; Advanced problems; Solutions to introductory problems; Solutions to advanced problems.

XYZ Series, Volume 2

July 2013, 200 pages, Hardcover, ISBN: 978-0-9799269-5-2, 2010 *Mathematics Subject Classification:* 00A05, 00A07, 97U40, 97D50, **AMS members US\$39.96**, List US\$49.95, Order code XYZ/2



Topics in Functional Equations

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, **Iurie Boreico**, *Stanford University, CA*, and **Oleg Mushkarov** and **Nikolai Nikolov**, *Bulgarian Academy of Sciences, Sofia, Bulgaria*

This book is a systematic and comprehensive approach to functional equations as a whole. Unlike in other branches of competitive mathematics, there is very little theory; instead, the methods and techniques utilized in solving these equations play the most important part. For this reason the book takes a highly practical path and includes lots of problems designed to teach students how to familiarize themselves with every strategy employed, as well as how to experiment in combining and manipulating different techniques.

This work contains all the important functional equations given at contests in recent years, classified by the way the equations are solved. It explains the reasoning behind each method and offers advice on how to invent meaningful solutions.

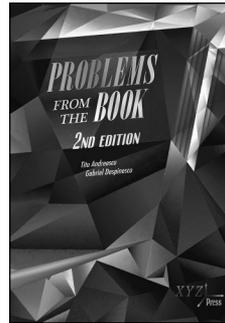
A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Cauchy's equations; Generalized Cauchy equations; Reducing to Cauchy; Substitutions; Symmetrization and additional variables; Iterations and recurrence relations; Constructive problems; The D'Alembert equation; The Aczél-Gołą-Schinzel equation; Arithmetic functional equations; Binary and other bases; Geometric functional equations; Approximating by linear functions; Extremal element method; Fixed points; Functional equations for polynomials;

Functional inequalities; Miscellaneous problems; Hints and solutions; Notation and abbreviations; Bibliography.

XYZ Series, Volume 7

August 2012, 505 pages, Hardcover, ISBN: 978-0-9799269-9-0, 2010 *Mathematics Subject Classification:* 00A07, 39B05, 97U40, 97D50, **AMS members US\$47.96**, List US\$59.95, Order code XYZ/7



Problems from the Book

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, and **Gabriel Dospinescu**, *Ecole Normale Supérieure de Lyon, France*

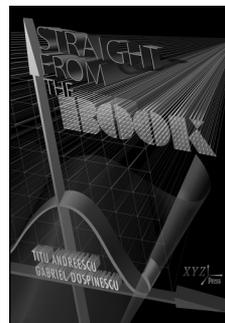
The authors provide a combination of enthusiasm and experience, which will delight any reader. In this volume, they present innumerable beautiful results, intriguing problems, and ingenious solutions. The problems range from elementary gems to deep truths. A truly delightful and highly instructive book, this will prepare the engaged reader not only for any mathematics competition they may enter but also for a lifetime of mathematical enjoyment. This book is a must for the bookshelves of both aspiring and seasoned mathematicians.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Some useful substitutions; Always Cauchy-Schwarz...; Look at the exponent; Primes and squares; T2's lemma; Some classical problems in extremal graph theory; Complex combinatorics; Formal series revisited; A brief introduction to algebraic number theory; Arithmetic properties of polynomials; Lagrange interpolation formula; Higher algebra in combinatorics; Geometry and numbers; The smaller, the better; Density and regular distribution; The digit sum of a positive integer; At the border of analysis and number theory; Quadratic reciprocity; Solving elementary inequalities using integrals; Pigeonhole principle revisited; Some useful irreducibility criteria; Cycles, paths, and other ways; Some special applications of polynomials; Bibliography; Index.

XYZ Series, Volume 13

August 2010, 571 pages, Hardcover, ISBN: 978-0-9799269-0-7, 2010 *Mathematics Subject Classification:* 00A05, 00A07, 97U40, 97D50, **AMS members US\$55.96**, List US\$69.95, Order code XYZ/13



Straight from the Book

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, and **Gabriel Dospinescu**, *Ecole Normale Supérieure de Lyon, France*

This book is a compilation of many suggestions, much advice, and even more hard work. Its main objective is to provide solutions to the problems which were originally proposed in the first 12 chapters of *Problems from the Book*. The volume is far more than a collection of solutions. The solutions are used as motivation for the introduction of some very clear

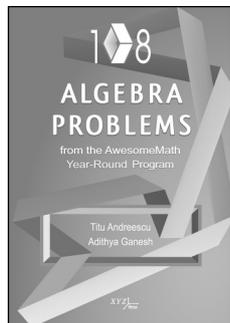
mathematical expositions. This is absolutely state-of-the-art material. Everyone who loves mathematics and mathematical thinking should acquire this book.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Some useful substitutions; Always Cauchy-Schwarz...; Look at the exponent; Primes and squares; T_2 's lemma; Some classical problems in extremal graph theory; Complex combinatorics; Formal series revisited; A little introduction to algebraic number theory; Arithmetic properties of polynomials; Lagrange interpolation formula; Higher algebra in combinatorics; Bibliography.

XYZ Series, Volume 6

August 2012, 590 pages, Hardcover, ISBN: 978-0-9799269-3-8, 2010 *Mathematics Subject Classification*: 00A05, 00A07, 97U40, 97D50, **AMS members US\$55.96**, List US\$69.95, Order code XYZ/6



108 Algebra Problems from the AwesomeMath Year-Round Program

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, and **Adithya Ganesh**, *Massachusetts Institute of Technology, Cambridge, MA*

The book covers many classical topics in elementary algebra, including factoring, quadratic functions, irrational expressions, Vieta's relations, equations and systems of equations, inequalities, sums and products, and polynomials. Expanding upon the previous work in the series, *105 Problems in Algebra from the AwesomeMath Summer Program*, this book features additional more advanced topics, including exponents and logarithms, complex numbers, and trigonometry.

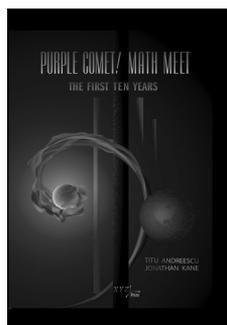
The special section on trigonometric substitutions and more explores seemingly algebraic problems with natural geometric and trigonometric interpretations. To give the reader practice with the strategies and techniques discussed in each of the chapters, the authors have included 108 diverse problems, of which 54 are introductory and 54 are advanced. Solutions to all of these problems are provided, in which different approaches are compared.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Let's factor; Quadratic functions; Systems of equations; Vieta's relations and symmetry; Exponents and logarithms; Irrational expressions; Complex numbers; More inequalities; Sums and products; Polynomials; Trigonometric substitutions and more; Introductory problems; Advanced problems; Solutions to introductory problems; Solutions to advanced problems.

XYZ Series, Volume 5

February 2014, 210 pages, Hardcover, ISBN: 978-0-9885622-7-1, 2010 *Mathematics Subject Classification*: 00A05, 00A07, 97U40, 97D50, **AMS members US\$39.96**, List US\$49.95, Order code XYZ/5



Purple Comet! Math Meet

The First Ten Years

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, and **Jonathan Kane**, *Chair of AIME Committee, Madison, WI*

This book is a comprehensive compilation of all the problems and solutions from the 2003 to 2012 Purple Comet! Math Meet contests for middle and high school students. The problems featured not only employ an extensive range of mathematical concepts from algebra, geometry, number theory, and combinatorics but also encourage team collaboration.

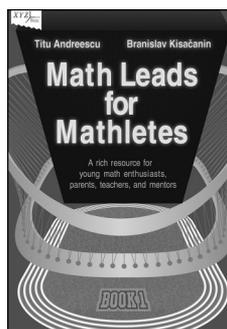
Any student interested in mathematics—whether looking to prepare for contests or, even more importantly, to sharpen math problem-solving skills—would cherish and enjoy this unique and pertinent collection of meaningful problems and solutions.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Problems; Solutions; Appendix.

XYZ Series, Volume 1

April 2013, 340 pages, Hardcover, ISBN: 978-0-9799269-1-4, 2010 *Mathematics Subject Classification*: 00A05, 00A07, 97U40, 97D50, **AMS members US\$39.96**, List US\$49.95, Order code XYZ/1



Math Leads for Mathletes

A Rich Resource for Young Math Enthusiasts, Parents, Teachers, and Mentors

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, and **Branislav Kisačanić**, *Interphase Corporation, Plano, TX*

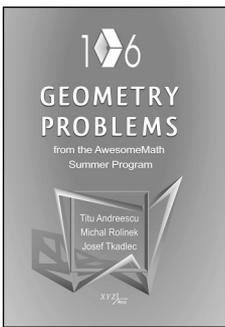
The topics contained in this book are best suited for advanced fourth and fifth graders as well as for extremely talented third graders or for anyone preparing for AMC 8 or similar mathematics contests. The concepts and problems presented could be used as enrichment material by teachers, parents, math coaches, or in math clubs and circles.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Part 1. Concepts, exercises, and problems; Part 2. Solutions to exercises and problems.

XYZ Series, Volume 9

February 2014, 220 pages, Hardcover, ISBN: 978-0-9885622-6-4, 2010 *Mathematics Subject Classification*: 00A05, 00A07, 97U40, 97D50, **AMS members US\$47.96**, List US\$59.95, Order code XYZ/9



106 Geometry Problems from the AwesomeMath Summer Program

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, **Michal Rolinek**, *Institute of Science and Technology, Klosterneuburg, Austria*, and **Josef Tkadlec**, *Charles University, Prague, Czech Republic*

This book contains 106 geometry problems used in the AwesomeMath Summer Program to train and test top middle and high school students from the U.S. and around the world. Just as the camp offers both introductory and advanced courses, this book also builds up the material gradually.

The authors begin with a theoretical chapter where they familiarize the reader with basic facts and problem-solving techniques. Then they proceed to the main part of the work, the problem sections.

The problems are a carefully selected and balanced mix which offers a vast variety of flavors and difficulties, ranging from AMC and AIME levels to high-end IMO problems. Out of thousands of Olympiad problems from around the globe, the authors chose those which best illustrate the featured techniques and their applications. The problems meet the authors' demanding taste and fully exhibit the enchanting beauty of classical geometry. For every problem, they provide a detailed solution and strive to pass on the intuition and motivation behind it. Many problems have multiple solutions.

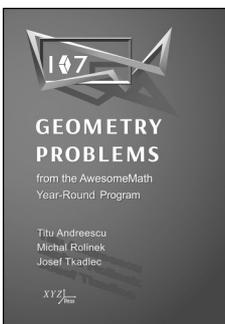
Directly experiencing Olympiad geometry both as contestants and instructors, the authors are convinced that a neat diagram is essential to efficiently solve a geometry problem. Their diagrams do not contain anything superfluous, yet emphasize the key elements and benefit from a good choice of orientation. Many of the proofs should be legible only from looking at the diagrams.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Foundations of geometry; Introductory problems; Advanced problems; Solutions to introductory problems; Solutions to advanced problems; Further reading; Index.

XYZ Series, Volume 3

July 2013, 174 pages, Hardcover, ISBN: 978-0-9799269-4-5, 2010 *Mathematics Subject Classification:* 00A05, 00A07, 97U40, 97D50, **AMS members US\$39.96**, List US\$49.95, Order code XYZ/3



107 Geometry Problems from the AwesomeMath Year-Round Program

Titu Andreescu, *University of Texas at Dallas, Richardson, TX*, **Michal Rolinek**, *Institute of Science and Technology, Klosterneuburg, Austria*, and **Josef Tkadlec**, *Charles University, Prague, Czech Republic*

This book contains 107 geometry problems used in the AwesomeMath Year-Round Program. The problems offer additional challenges for

those who have progressed through the 106 Geometry Problems from the AwesomeMath Summer Camp publication. The book begins with a theoretical chapter, where the authors review basic facts and familiarize the reader with some more advanced techniques. The authors then proceed to the main part of the work, the problem sections. The problems are a carefully selected and balanced mix which offers a vast variety of flavors and difficulties, ranging from AMC and AIME levels to high-end IMO problems. Out of thousands of Olympiad problems from around the globe the authors chose those which best illustrate the featured techniques and their applications. The problems meet the authors' demanding taste and fully exhibit the enchanting beauty of classical geometry. For every problem the authors provide a detailed solution and strive to pass on the intuition and motivation behind it. Numerous problems have multiple solutions.

Directly experiencing Olympiad geometry both as contestants and instructors, the authors are convinced that a neat diagram is essential to efficiently solve a geometry problem. Their diagrams do not contain anything superfluous, yet emphasize the key elements and benefit from a good choice of orientation. Many of the proofs should be legible only from looking at the diagrams.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Advanced topics in geometry; Introductory problems; Advanced problems; Solutions to introductory problems; Solutions to advanced problems; Further reading; Index.

XYZ Series, Volume 4

July 2013, 188 pages, Hardcover, ISBN: 978-0-9799269-7-6, 2010 *Mathematics Subject Classification:* 00A05, 00A07, 97U40, 97D50, **AMS members US\$39.96**, List US\$49.95, Order code XYZ/4



Balkan Mathematical Olympiads

Mircea Becheanu, *University of Bucharest, Romania*, and **Bogdan Enescu**, *BP Hasdeu National College, Buzau, Romania*

The authors, who have attended the BMO several times as leaders and/or deputy leaders, present a complete description of the evolution of the BMO from its

creation until the present. All problems are presented with complete solutions. Many problems have alternative solutions or extensions. A preparatory addendum, containing additional concepts and useful classical results, has been incorporated at the end of the book.

A publication of XYZ Press. Distributed in North America by the American Mathematical Society.

Contents: Problems and solutions; Supplementary problems; Glossary; Index of notations; References.

XYZ Series, Volume 8

February 2014, 273 pages, Hardcover, ISBN: 978-0-9885622-5-7, 2010 *Mathematics Subject Classification:* 00A05, 00A07, 97U40, 97D50, **AMS members US\$47.96**, List US\$59.95, Order code XYZ/8