Geometric Approximation Algorithms Mathematical Surveys And Monographs

If you ally craving such a referred **Geometric Approximation Algorithms Mathematical Surveys And Monographs** book that will manage to pay for you worth, acquire the definitely best seller from us currently from several preferred authors. If you want to droll books, lots of novels, tale, jokes, and more fictions collections are as a consequence launched, from best seller to one of the most current released.

You may not be perplexed to enjoy every ebook collections Geometric Approximation Algorithms Mathematical Surveys And Monographs that we will unconditionally offer. It is not something like the costs. Its not quite what you habit currently. This Geometric Approximation Algorithms Mathematical Surveys And Monographs, as one of the most committed sellers here will definitely be along with the best options to review.

Proceedings, 38th Annual Symposium on Foundations of Computer Science IEEE Computer Society 1997
The Numerical Solution of Systems of Polynomials Arising in Engineering and Science Andrew J Sommese 2005-03-21 ' Written by the founders of the new and expanding field of numerical algebraic geometry, this is the first book that uses an algebraic-geometric approach to the numerical solution of polynomial systems and also the first one to treat numerical methods for finding positive dimensional solution sets. The text covers the full theory from methods developed for isolated solutions in the 1980's to the most recent research on positive dimensional sets.
Contents:Background:Polynomial SystemsHomotopy ContinuationProjective SpacesGenericity and Probability OnePolynomials of One VariableOther MethodsIsolated Solutions:Coefficient-Parameter HomotopyPolynomial StructuresCase StudiesEndpoint EstimationChecking Results and Other Implementation TipsPositive Dimensional Solutions:Basic Algebraic GeometryBasic Numerical Algebraic GeometryA Cascade Algorithm for Witness SupersetsThe Numerical Irreducible DecompositionThe Intersection of Algebraic SetsAppendices:Algebraic GeometrySoftware for Polynomial ContinuationHomLab User's Guide Readership: Graduate students and researchers in applied mathematics and mechanical engineering. Keywords:Polynomial Systems;Numerical Methods;Homotopy Methods;Mechanical Engineering;Numerical Algebraic Geometry;Kinematics;RoboticsKey Features:Useful introduction to the field for graduate students and researchers in related areasIncludes exercises suitable for classroom use and self-studyIncludes Matlab software to illustrate the methodIncludes many graphical illustrationsIncludes a detailed summary of useful results from algebraic geometryReviews:“The text is written in a very smooth and intelligent form, yielding a readable book whose contents are accessible to a wide class of readers, even to undergraduate students, provided that they accept that some delicate points of some of the proofs could be omitted. Its readability and fast access to the core of the book makes it recommendable as a pleasant read.”Mathematical Reviews “This is an excellent book on numerical solutions of polynomials systems for engineers, scientists and numerical analysts. As pioneers of the field of numerical algebraic geometry, the authors have provided a comprehensive summary of ideas, methods, problems of numerical algebraic geometry and applications to solving polynomial systems. Through the book readers will experience the authors' original ideas, contributions and their techniques in handling practical problems … Many interesting examples from engineering and science have been used throughout the book. Also the exercises are well designed in line with the content, along with the algorithms, sample programs in Matlab and author's own software 'HOMLAB' for polynomial continuation. This is a remarkable book that I recommend to engineers, scientists, researchers, professionals and students, and particularly numerical analysts who will benefit from the rapid development of numerical algebraic geometry.”Zentralblatt MATH '
Polynomial Root-finding and Polynomiography Bahman Kalantari 2009-01 This book offers fascinating and modern perspectives into the theory and practice of the historical subject of polynomial root-finding, rejuvenating the field via polynomiography, a creative and novel computer visualization that renders spectacular images of a polynomial equation. Polynomiography will not only pave the way for new applications of polynomials in science and mathematics, but also in art and education. The book presents a thorough development of the basic family, arguably the most fundamental family of iteration functions, deriving many surprising and novel theoretical and practical applications such as: algorithms for approximation of roots of polynomials and analytic functions, polynomiography, bounds on zeros of polynomials, formulas for the approximation of Pi, and characterizations or visualizations associated with a homogeneous linear recurrence relation. These discoveries and a set of beautiful images that provide new visions, even of the well-known polynomials and recurrences, are the makeup of a very desirable book. This book is a must for mathematicians, scientists, advanced undergraduates and graduates, but is also for anyone with an appreciation for the connections between a fantastically creative art form and its ancient mathematical foundations.
Approximation and Online Algorithms Giuseppe Persiano 2005-02-23 This book constitutes the thoroughly refereed post proceedings of the Second International Workshop on Approximation and Online Algorithms, WAOA 2004, held in Bergen, Norway in September 2004. The 21 revised full papers presented together with 2 invited papers were carefully selected during two rounds of reviewing and improvement from 47 submissions. WAOA is devoted to the design and analysis of algorithms for online and computationally hard problems. Among the topics addressed are applications to game theory, approximation classes, coloring and partitioning, competitive analysis, computational finance, cuts and connectivity, geometric computations, inapproximability results, mechanism design, network design, routing, packing and covering, paradigms, randomization techniques, and scheduling problems.
Ordered Algebraic Structures and Related Topics Fabrizio Broglia 2017 This volume contains the proceedings of the international conference ""Ordered Algebraic Structures and Related Topics'', held from October 12-16, 2015, at CIRM, Luminy, Marseilles, France. Papers contained in this volume cover topics in real analytic geometry, real algebra, and real algebraic geometry including complexity issues, model theory of various algebraic and differential structures, Witt equivalence of fields, and

the moment problem.
Fundamentals of Computation Theory Rusins Freivalds 2003-05-15 This book constitutes the refereed proceedings of the 13th International Symposium Fundamentals of Computation Theory, FCT 2001, as well as of the International Workshop on Efficient Algorithms, WEA 2001, held in Riga, Latvia, in August 2001. The 28 revised full FCT papers and 15 short papers presented together with six invited contributions and 8 revised full WEA papers as well as three invited WEA contributions have been carefully reviewed and selected. Among the topics addressed are a broad variety of topics from theoretical computer science, algorithmics and programming theory. The WEA papers deal with graph and network algorithms, flow and routing problems, scheduling and approximation algorithms, etc.
Variational, Geometric, and Level Set Methods in Computer Vision Nikos Paragios 2005-10-13 Mathematical methods has been a dominant research path in computational vision leading to a number of areas like ?ltering, segmentation, motion analysis and stereo reconstruction. Within such a branch visual perception tasks can either be addressed through the introduction of application-driven geometric ?ows or through the minimization of problem-driven cost functions where their lowest potential corresponds to image understanding. The 3rd IEEE Workshop on Variational, Geometric and Level Set Methods focused on these novel mathematical techniques and their applications to c- puter vision problems. To this end, from a substantial number of submissions, 30 high-quality papers were selected after a fully blind review process covering a large spectrum of computer-aided visual understanding of the environment. The papers are organized into four thematic areas: (i) Image Filtering and Reconstruction, (ii) Segmentation and Grouping, (iii) Registration and Motion Analysis and (iiii) 3D and Reconstruction. In the ?rst area solutions to image enhancement, inpainting and compression are presented, while more advanced applications like model-free and model-based segmentation are presented in the segmentation area. Registration of curves and images as well as multi-frame segmentation and tracking are part of the motion understanding track, while - troducing computationalprocessesinmanifolds,shapefromshading,calibration and stereo reconstruction are part of the 3D track. We hope that the material presented in the proceedings exceeds your exp- tations and will in?uence your research directions in the future. We would like to acknowledge the support of the Imaging and Visualization Department of Siemens Corporate Research for sponsoring the Best Student Paper Award.
Algorithms and Data Structures Frank Dehne 2011-07-18 This book constitutes the refereed proceedings of the 12th Algorithms and Data Structures Symposium, WADS 2011, held in New York, NY, USA, in August 2011. The Algorithms and Data Structures Symposium - WADS (formerly "Workshop on Algorithms and Data Structures") is intended as a forum for researchers in the area of design and analysis of algorithms and data structures. The 59 revised full papers presented in this volume were carefully reviewed and selected from 141 submissions. The papers present original research on the theory and application of algorithms and data structures in all areas, including combinatorics, computational geometry, databases, graphics, parallel and distributed computing.
Approximation, Randomization, and Combinatorial Optimization. Algorithms and Techniques Leslie Ann Goldberg 2011-08-05 This book constitutes the joint refereed proceedings of the 14th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems, APPROX 2011, and the 15th International Workshop on Randomization and Computation, RANDOM 2011, held in Princeton, New Jersey, USA, in August 2011. The volume presents 29 revised full papers of the APPROX 2011 workshop, selected from 66 submissions, and 29 revised full papers of the RANDOM 2011 workshop, selected from 64 submissions. They were carefully reviewed and selected for inclusion in the book. In addition two abstracts of invited talks are included. APPROX focuses on algorithmic and complexity issues surrounding the development of efficient approximate solutions to computationally difficult problems. RANDOM is concerned with applications of randomness to computational and combinatorial problems.
Surveys on Discrete and Computational Geometry Jacob E. Goodman 2008 This volume contains nineteen survey papers describing the state of current research in discrete and computational geometry as well as a set of open problems presented at the 2006 AMS-IMS-SIAM Summer Research Conference Discrete and Computational Geometry--Twenty Years Later, held in Snowbird, Utah, in June 2006. Topics surveyed include metric graph theory, lattice polytopes, the combinatorial complexity of unions of geometric objects, line and pseudoline arrangements, algorithmic semialgebraic geometry, persistent homology, unfolding polyhedra, pseudo-triangulations, nonlinear computational geometry, k-sets, and the computational complexity of convex bodies.
Tensor Numerical Methods in Scientific Computing Boris N. Khoromskij 2018-06-11 The most difficult computational problems nowadays are those of higher dimensions. This research monograph offers an introduction to tensor numerical methods designed for the solution of the multidimensional problems in scientific computing. These methods are based on the rank-structured approximation of multivariate functions and operators by using the appropriate tensor formats. The old and new rank-structured tensor formats are investigated. We discuss in detail the novel quantized tensor approximation method (QTT) which provides function-operator calculus in higher dimensions in logarithmic complexity rendering super-fast convolution, FFT and wavelet transforms. This book suggests the constructive recipes and computational schemes for a number of real life problems described by the multidimensional partial differential equations. We present the theory and algorithms for the sinc-based separable approximation of the analytic radial basis functions including Green’s and Helmholtz kernels. The efficient tensor-based techniques for computational problems in electronic structure calculations and for the grid-based evaluation of long-range interaction potentials in multi-particle systems are considered. We also discuss the QTT numerical approach in many-particle dynamics, tensor techniques for stochastic/parametric PDEs as well as for the solution and homogenization of the elliptic equations with highly-oscillating coefficients. Contents Theory on separable approximation of multivariate functions Multilinear algebra and nonlinear tensor approximation Superfast computations via quantized tensor approximation Tensor approach to multidimensional integrodifferential equations
Proceedings of the Twelfth Annual ACM-SIAM Symposium on Discrete Algorithms SIAM Activity Group on Discrete Mathematics 2001-01-01 Contains 130 papers, which were selected based on originality, technical contribution, and relevance. Although the papers were not formally refereed, every attempt was made to verify the main claims. It is expected that most will appear in more complete form in scientific journals. The proceedings also includes the paper presented by invited plenary speaker Ronald Graham, as well as a portion of the papers presented by invited plenary speakers Udi Manber and Christos Papadimitriou.
Theoretical Computer Science Antonio Restivo 2003-06-30 This book constitutes the refereed proceedings of the 7th Italian Conference on Theoretical Computer Science, ICTCS 2001, held in Torino, Italy in October 2001. The 25 revised full papers presented together with two

invited papers were carefully reviewed and selected from 45 submissions. The papers are organized in topical sections on lambda calculus and types, algorithms and data structures, new computing paradigms, formal languages, objects and mobility, computational complexitiy, security, and logics and logic programming.
Combinatorial and Computational Geometry cob E. Goodman 2005-08-08 This 2005 book deals with interest topics in Discrete and Algorithmic aspects of Geometry.
Geometric and Topological Inference Jean-Daniel Boissonnat 2018-09-27 A rigorous introduction to geometric and topological inference, for anyone interested in a geometric approach to data science.
Cubic Fields with Geometry Samuel A. Hambleton 2018-11-07 The objective of this book is to provide tools for solving problems which involve cubic number fields. Many such problems can be considered geometrically; both in terms of the geometry of numbers and geometry of the associated cubic Diophantine equations that are similar in many ways to the Pell equation. With over 50 geometric diagrams, this book includes illustrations of many of these topics. The book may be thought of as a companion reference for those students of algebraic number theory who wish to find more examples, a collection of recent research results on cubic fields, an easy-to-understand source for learning about Voronoi’s unit algorithm and several classical results which are still relevant to the field, and a book which helps bridge a gap in understanding connections between algebraic geometry and number theory. The exposition includes numerous discussions on calculating with cubic fields including simple continued fractions of cubic irrational numbers, arithmetic using integer matrices, ideal class group computations, lattices over cubic fields, construction of cubic fields with a given discriminant, the search for elements of norm 1 of a cubic field with rational parametrization, and Voronoi's algorithm for finding a system of fundamental units. Throughout, the discussions are framed in terms of a binary cubic form that may be used to describe a given cubic field. This unifies the chapters of this book despite the diversity of their number theoretic topics.
Dilations, Linear Matrix Inequalities, the Matrix Cube Problem and Beta Distributions J. William Helton 2019-02-21 An operator C on a Hilbert space H dilates to an operator T on a Hilbert space K if there is an isometry V:H→K such that C=V∗TV. A main result of this paper is, for a positive integer d, the simultaneous dilation, up to a sharp factor ϑ(d), expressed as a ratio of Γ functions for d even, of all d×d symmetric matrices of operator norm at most one to a collection of commuting self-adjoint contraction operators on a Hilbert space.
Algorithms and Data Structures Faith Ellen 2017-07-04 This book constitutes the refereed proceedings of the 15th Algorithms and Data Structures Symposium, WADS 2017, held in St. John's, NL, Canada, in July/August 2017. The 49 full papers presented together with 3 abstracts of invited talks were carefully reviewed and selected from 109 submissions. They present original research on the theory and application of algorithms and data structures in many areas, including combinatorics, computational geometry, databases, graphics, and parallel and distributed computing. The WADS Symposium, which alternates with the Scandinavian Symposium and Workshops on Algorithm Theory, SWAT, is intended as a forum for researchers in the area of design and analysis of algorithms and data structures. Papers presenting original research on the theory and application of algorithms and data structures
Proceedings Of The International Congress Of Mathematicians 2018 (Icm 2018) (In 4 Volumes) Sirakov Boyan 2019-02-27 The Proceedings of the ICM publishes the talks, by invited speakers, at the conference organized by the International Mathematical Union every 4 years. It covers several areas of Mathematics and it includes the Fields Medal and Nevanlinna, Gauss and Leelavati Prizes and the Chern Medal laudatios.
Capacity Theory with Local Rationality Robert Rumely 2013-12-26 This book is devoted to the proof of a deep theorem in arithmetic geometry, the Fekete-Szegö theorem with local rationality conditions. The prototype for the theorem is Raphael Robinson's theorem on totally real algebraic integers in an interval, which says that if is a real interval of length greater than 4, then it contains infinitely many Galois orbits of algebraic integers, while if its length is less than 4, it contains only finitely many. The theorem shows this phenomenon holds on algebraic curves of arbitrary genus over global fields of any characteristic, and is valid for a broad class of sets. The book is a sequel to the author's work Capacity Theory on Algebraic Curves and contains applications to algebraic integers and units, the Mandelbrot set, elliptic curves, Fermat curves, and modular curves. A long chapter is devoted to examples, including methods for computing capacities. Another chapter contains extensions of the theorem, including variants on Berkovich curves. The proof uses both algebraic and analytic methods, and draws on arithmetic and algebraic geometry, potential theory, and approximation theory. It introduces new ideas and tools which may be useful in other settings, including the local action of the Jacobian on a curve, the "universal function" of given degree on a curve, the theory of inner capacities and Green's functions, and the construction of near-extremal approximating functions by means of the canonical distance.
Ridge Functions and Applications in Neural Networks Vugar E. Ismailov 2021-12-17 Recent years have witnessed a growth of interest in the special functions called ridge functions. These functions appear in various fields and under various guises. They appear in partial differential equations (where they are called plane waves), in computerized tomography, and in statistics. Ridge functions are also the underpinnings of many central models in neural network theory. In this book various approximation theoretic properties of ridge functions are described. This book also describes properties of generalized ridge functions, and their relation to linear superpositions and Kolmogorov's famous superposition theorem. In the final part of the book, a single and two hidden layer neural networks are discussed. The results obtained in this part are based on properties of ordinary and generalized ridge functions. Novel aspects of the universal approximation property of feedforward neural networks are revealed. This book will be of interest to advanced graduate students and researchers working in functional analysis, approximation theory, and the theory of real functions, and will be of particular interest to those wishing to learn more about neural network theory and applications and other areas where ridge functions are used.
Differential Equations with Applications to Biology Shigui Ruan
Geometric Modeling and Algebraic Geometry Bert Jüttler 2007-12-24 Geometric Modeling and Algebraic Geometry, though closely related, are traditionally represented by two almost disjoint scientific communities. Both fields deal with objects defined by algebraic equations, but the objects are studied in different ways. In 12 chapters written by leading experts, this book presents recent results which rely on the interaction of both fields. Some of these results have been obtained from a major European project in geometric modeling.
Fractals in Probability and Analysis Christopher J. Bishop 2016-12-22 This is a mathematically rigorous introduction to fractals which emphasizes examples and fundamental ideas. Building up from basic techniques of geometric measure theory and probability, central topics

such as Hausdorff dimension, self-similar sets and Brownian motion are introduced, as are more specialized topics, including Kakeya sets, capacity, percolation on trees and the traveling salesman theorem. The broad range of techniques presented enables key ideas to be highlighted, without the distraction of excessive technicalities. The authors incorporate some novel proofs which are simpler than those available elsewhere. Where possible, chapters are designed to be read independently so the book can be used to teach a variety of courses, with the clear structure offering students an accessible route into the topic.

An Invitation to Analytic Combinatorics Stephen Melczer 2020-12-22 This book uses new mathematical tools to examine broad computability and complexity questions in enumerative combinatorics, with applications to other areas of mathematics, theoretical computer science, and physics. A focus on effective algorithms leads to the development of computer algebra software of use to researchers in these domains. After a survey of current results and open problems on decidability in enumerative combinatorics, the text shows how the cutting edge of this research is the new domain of Analytic Combinatorics in Several Variables (ACSV). The remaining chapters of the text alternate between a pedagogical development of the theory, applications (including the resolution by this author of conjectures in lattice path enumeration which resisted several other approaches), and the development of algorithms. The final chapters in the text show, through examples and general theory, how results from stratified Morse theory can help refine some of these computability questions. Complementing the written presentation are over 50 worksheets for the SageMath and Maple computer algebra systems working through examples in the text.

Methods of Geometric Analysis in Extension and Trace Problems Alexander Brudnyi 2011-10-07 The book presents a comprehensive exposition of extension results for maps between different geometric objects and of extension-trace results for smooth functions on subsets with no a priori differential structure (Whitney problems). The account covers development of the area from the initial classical works of the first half of the 20th century to the flourishing period of the last decade. Seemingly very specific these problems have been from the very beginning a powerful source of ideas, concepts and methods that essentially influenced and in some cases even transformed considerable areas of analysis. Aside from the material linked by the aforementioned problems the book also is unified by geometric analysis approach used in the proofs of basic results. This requires a variety of geometric tools from convex and combinatorial geometry to geometry of metric space theory to Riemannian and coarse geometry and more. The necessary facts are presented mostly with detailed proofs to make the book accessible to a wide audience.

Mathematische Bildverarbeitung Kristian Bredies 2010-11-09 Dieses Buch behandelt die mathematischen Aspekte der modernen Bildverarbeitungsmethoden. Besonderer Schwerpunkt liegt dabei auf der Präsentation von Grundideen und Konzepten. Es werden eine Vielzahl moderner mathematischer Methoden behandelt, welche zur Lösung wichtiger, grundlegender Probleme der Bildverarbeitung eingesetzt werden. Die Grundprobleme umfassen zum Beispiel Entrauschen, Scharfzeichnen, Kantenerkennung, Inpainting. Neben elementaren Methoden wie Punktoperationen, linearen oder morphologischen Filtern stellt das Buch insbesondere neuere Methoden wie partielle Differentialgleichungen und Variationsmethoden vor.

Algorithms and Data Structures Anna Lubiw 2021-07-30 This book constitutes the refereed proceedings of the 17th International Symposium on Algorithms and Data Structures, WADS 2021, held in virtually in August 2021. The 47 full papers, presented together with two invited lectures, were carefully reviewed and selected from a total of 123 submissions. They present original research on the theory, design and application of algorithms and data structures.

Numerical Algorithms for Number Theory: Using Pari/GP Karim Belabas 2021-06-23 This book presents multiprecision algorithms used in number theory and elsewhere, such as extrapolation, numerical integration, numerical summation (including multiple zeta values and the Riemann-Siegel formula), evaluation and speed of convergence of continued fractions, Euler products and Euler sums, inverse Mellin transforms, and complex L L-functions. For each task, many algorithms are presented, such as Gaussian and doubly-exponential integration, Euler-MacLaurin, Abel-Plana, Lagrange, and Monien summation. Each algorithm is given in detail, together with a complete implementation in the free Pari/GP system. These implementations serve both to make even more precise the inner workings of the algorithms, and to gently introduce advanced features of the Pari/GP language. This book will be appreciated by anyone interested in number theory, specifically in practical implementations, computer experiments and numerical algorithms that can be scaled to produce thousands of digits of accuracy.

Classical And Dynamical Markov And Lagrange Spectra: Dynamical, Fractal And Arithmetic Aspects Davi Dos Santos Lima 2020-09-18 The book intends to give a modern presentation of the classical Markov and Lagrange spectrum, which are fundamental objects from the theory of Diophantine approximations and of their several generalizations related to Dynamical Systems and Differential Geometry. Besides presenting many classical results, the book includes several topics of recent research on the subject, connecting several fields of Mathematics – Number Theory, Dynamical Systems and Fractal Geometry.It includes topics as:

Combinatorics and Complexity of Partition Functions Alexander Barvinok 2017-03-13 Partition functions arise in combinatorics and related problems of statistical physics as they encode in a succinct way the combinatorial structure of complicated systems. The main focus of the book is on efficient ways to compute (approximate) various partition functions, such as permanents, hafnians and their higher-dimensional versions, graph and hypergraph matching polynomials, the independence polynomial of a graph and partition functions enumerating 0-1 and integer points in polyhedra, which allows one to make algorithmic advances in otherwise intractable problems. The book unifies various, often quite recent, results scattered in the literature, concentrating on the three main approaches: scaling, interpolation and correlation decay. The prerequisites include moderate amounts of real and complex analysis and linear algebra, making the book accessible to advanced math and physics undergraduates.

A Course in Convexity Alexander Barvinok 2002-11-19 Convexity is a simple idea that manifests itself in a surprising variety of places. This fertile field has an immensely rich structure and numerous applications. Barvinok demonstrates that simplicity, intuitive appeal, and the universality of applications make teaching (and learning) convexity a gratifying experience. The book will benefit both teacher and student: It is easy to understand, entertaining to the reader, and includes many exercises that vary in degree of difficulty. Overall, the author demonstrates the power of a few simple unifying principles in a variety of pure and applied problems. The prerequisites are minimal amounts of linear algebra, analysis, and elementary topology, plus basic computational skills. Portions of the book could be used by advanced undergraduates. As a whole, it is designed for graduate students interested in mathematical methods, computer science, electrical engineering, and operations research. The book will also

be of interest to research mathematicians, who will find some results that are recent, some that are new, and many known results that are discussed from a new perspective.

Algorithmics for Hard Problems Juraj Hromkovič 2013-03-14 Algorithmic design, especially for hard problems, is more essential for success in solving them than any standard improvement of current computer tech nologies. Because of this, the design of algorithms for solving hard problems is the core of current algorithmic research from the theoretical point of view as well as from the practical point of view. There are many general text books on algorithmics, and several specialized books devoted to particular approaches such as local search, randomization, approximation algorithms, or heuristics. But there is no textbook that focuses on the design of algorithms for hard computing tasks, and that systematically explains, combines, and compares the main possibilities for attacking hard algorithmic problems. As this topic is fundamental for computer science, this book tries to close this gap. Another motivation, and probably the main reason for writing this book, is connected to education. The considered area has developed very dynami cally in recent years and the research on this topic discovered several profound results, new concepts, and new methods. Some of the achieved contributions are so fundamental that one can speak about paradigms which should be in cluded in the education of every computer science student. Unfortunately, this is very far from reality. This is because these paradigms are not sufficiently known in the computer science community, and so they are insufficiently com municated to students and practitioners.

Fundamentals of Computation Theory Rusins Freivalds 2001-08-03 This book constitutes the refereed proceedings of the 13th International Symposium Fundamentals of Computation Theory, FCT 2001, as well as of the International Workshop on Efficient Algorithms, WEA 2001, held in Riga, Latvia, in August 2001. The 28 revised full FCT papers and 15 short papers presented together with six invited contributions and 8 revised full WEA papers as well as three invited WEA contributions have been carefully reviewed and selected. Among the topics addressed are a broad variety of topics from theoretical computer science, algorithmics and programming theory. The WEA papers deal with graph and network algorithms, flow and routing problems, scheduling and approximation algorithms, etc.

Geometry of Continued Fractions Oleg Karpenkov 2013-08-15 Traditionally a subject of number theory, continued fractions appear in dynamical systems, algebraic geometry, topology, and even celestial mechanics. The rise of computational geometry has resulted in renewed interest in multidimensional generalizations of continued fractions. Numerous classical theorems have been extended to the multidimensional case, casting light on phenomena in diverse areas of mathematics. This book introduces a new geometric vision of continued fractions. It covers several applications to questions related to such areas as Diophantine approximation, algebraic number theory, and toric geometry. The reader will find an overview of current progress in the geometric theory of multidimensional continued fractions accompanied by currently open problems. Whenever possible, we illustrate geometric constructions with figures and examples. Each chapter has exercises useful for undergraduate or graduate courses.

Complex Analysis and Dynamical Systems Mark Agranovsky 2018-01-31 This book focuses on developments in complex dynamical systems and geometric function theory over the past decade, showing strong links with other areas of mathematics and the natural sciences. Traditional methods and approaches surface in physics and in the life and engineering sciences with increasing frequency – the Schramm-Loewner evolution, Laplacian growth, and quadratic differentials are just a few typical examples. This book provides a representative overview of these processes and collects open problems in the various areas, while at the same time showing where and how each particular topic evolves. This volume is dedicated to the memory of Alexander Vasiliev.

Sampling in Combinatorial and Geometric Set Systems Nabil H. Mustafa 2022-01-14 Understanding the behavior of basic sampling techniques and intrinsic geometric attributes of data is an invaluable skill that is in high demand for both graduate students and researchers in mathematics, machine learning, and theoretical computer science. The last ten years have seen significant progress in this area, with many open problems having been resolved during this time. These include optimal lower bounds for epsilon-nets for many geometric set systems, the use of shallow-cell complexity to unify proofs, simpler and more efficient algorithms, and the use of epsilon-approximations for construction of coresets, to name a few. This book presents a thorough treatment of these probabilistic, combinatorial, and geometric methods, as well as their combinatorial and algorithmic applications. It also revisits classical results, but with new and more elegant proofs. While mathematical maturity will certainly help in appreciating the ideas presented here, only a basic familiarity with discrete mathematics, probability, and combinatorics is required to understand the material.

Shapes and Diffeomorphisms Laurent Younes 2010-05-17 Shapes are complex objects to apprehend, as mathematical entities, in terms that also are suitable for computerized analysis and interpretation. This volume provides the background that is required for this purpose, including different approaches that can be used to model shapes, and algorithms that are available to analyze them. It explores, in particular, the interesting connections between shapes and the objects that naturally act on them, diffeomorphisms. The book is, as far as possible, self-contained, with an appendix that describes a series of classical topics in mathematics (Hilbert spaces, differential equations, Riemannian manifolds) and sections that represent the state of the art in the analysis of shapes and their deformations. A direct application of what is presented in the book is a branch of the computerized analysis of medical images, called computational anatomy.

Solving Polynomial Equations Alicia Dickenstein 2006-01-27 The subject of this book is the solution of polynomial equations, that is, s- tems of (generally) non-linear algebraic equations. This study is at the heart of several areas of mathematics and its applications. It has provided the - tivation for advances in di?erent branches of mathematics such as algebra, geometry, topology, and numerical analysis. In recent years, an explosive - velopment of algorithms and software has made it possible to solve many problems which had been intractable up to then and greatly expanded the areas of applications to include robotics, machine vision, signal processing, structural molecular biology, computer-aided design and geometric modelling, as well as certain areas of statistics, optimization and game theory, and b- logical networks. At the same time, symbolic computation has proved to be an invaluable tool for experimentation and conjecture in pure mathematics. As a consequence, the interest in e?ective algebraic geometry and computer algebrahasextendedwellbeyonditsoriginalconstituencyofpureandapplied mathematicians and computer scientists, to encompass many other scientists and engineers. While the core of the subject remains algebraic geometry, it also calls upon many other aspects of mathematics and theoretical computer science, ranging from numerical

methods, di?erential equations and number theory to discrete geometry, combinatorics and complexity theory. Thegoalofthisbookistoprovideageneralintroduction tomodernma- ematical aspects in computing with multivariate polynomials and in solving algebraic systems.

Geometric Approximation Algorithms Sariel Har-Peled 2011 Exact algorithms for dealing with geometric objects are complicated, hard to implement in practice, and slow. Over the last 20 years a theory of geometric approximation algorithms has emerged. These algorithms tend to be simple, fast, and more robust than their exact counterparts. This book is the first to cover geometric approximation algorithms in detail. In addition, more traditional computational geometry techniques that are widely used in developing such algorithms, like sampling, linear programming, etc., are also surveyed. Other topics covered include approximate nearest-neighbor search, shape approximation, coresets, dimension reduction, and embeddings. The topics covered are relatively independent and are supplemented by exercises. Close to 200 color figures are included in the text to illustrate proofs and ideas.