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Geometric Modelling-Fumihiko Kimura 2013-06-29 Geometric modelling has been an important and interesting subject for many years from the purely mathematical and computer science viewpoint, and also from the standpoint of engineering and various other applications, such as CAD/CAM, entertainment, animation, and multimedia. This book focuses on the interaction between the theoretical foundation of geometric modelling and practical applications in CAD and related areas. Geometric Modelling: Theoretical and Computational Basis towards Advanced CAD Applications starts with two position papers, discussing basic computational theory and practical system solutions. The well-organized seven review papers give a systematic overview of the current situation and deep insight for future research and development directions towards the reality of shape representation and processing. They discuss various aspects of important issues, such as geometric computation for space search and shape generation, parametric modelling, feature modelling, user interface for geometric modelling, geometric modelling for the Next Generation CAD, and geometric/shape standard. Other papers discuss features and new research directions in geometric modelling, solid modeling, free-form surface modeling, intersection calculation, mesh modeling and reverse engineering. They cover a wide range of geometric modelling issues to show the problem scope and the technological importance. Researchers interested in the current status of geometric modelling research and developments will find this volume to be an essential reference.

Computational Geometry-Franco P. Preparata 2012-12-06 From the reviews: "This book offers a coherent treatment, at the graduate textbook level, of the field that has come to be known in the last decade or so as computational geometry. ... ... The book is well organized and lucidly written; a timely contribution by two founders of the field. It clearly demonstrates that computational geometry in the plane is now a fairly well-understood branch of computer science and mathematics. It also points the way to the solution of the more challenging problems in dimensions higher than two." #Mathematical Reviews#1 "... This remarkable book is a comprehensive and systematic study on research results obtained especially in the last ten years. The very clear presentation concentrates on basic ideas, fundamental combinatorial structures, and crucial algorithmic techniques. The plenty of results is clever organized following these guidelines and within the framework of some detailed case studies. A large number of figures and examples also aid the understanding of the material. Therefore, it can be highly recommended as an early graduate text but it should prove also to be essential to researchers and professionals in applied fields of computer-aided design, computer graphics, and robotics." #Biometrical Journal#2

Computer Graphics and Geometric Modelling-Max K. Agoston 2005-12-06 Possibly the most comprehensive overview of computer graphics as seen in the context of geometric modelling, this two volume work covers implementation and theory in a thorough and systematic fashion. Computer Graphics and Geometric Modelling: Mathematics, contains the mathematical background needed for the geometric modeling topics in computer graphics covered in the first volume. This volume begins with material from linear algebra and a discussion of the transformations in affine & projective geometry, followed by topics from advanced calculus & chapters on general topology, combinatorial topology, algebraic topology, differential topology, differential geometry, and finally algebraic geometry. Two important goals throughout were to explain the material thoroughly, and to make it self-contained. This volume by itself would make a good mathematics reference book, in particular for practitioners in the field of geometric modelling. Due to its broad coverage and emphasis on explanation it could be used as a text for introductory mathematics courses on some of the covered topics, such as topology (general, combinatorial, algebraic, and differential) and geometry (differential & algebraic).

Algorithms and Theory of Computation Handbook-Mikhail J. Atallah 1998-11-23 Algorithms and Theory of Computation Handbook is a comprehensive collection of algorithms and data structures that also covers many theoretical issues. It offers a balanced perspective that reflects the needs of practitioners, including emphasis on applications within discussions on theoretical issues. Chapters include information on finite precision issues as well as discussion of specific algorithms where algorithmic techniques are of special importance, including graph drawing, robotics, forming a VLSI chip, vision and image processing, data compression, and cryptography. The book also presents some advanced topics in combinatorial optimization and parallel/distributed computing. • applications areas where algorithms and data structuring techniques are of special importance • graph drawing • robot algorithms • VLSI layout • vision and image processing algorithms • scheduling • electronic cash • data compression • dynamic graph algorithms • on-line algorithms • multidimensional data structures • cryptography • advanced topics in combinatorial optimization and parallel/distributed computing

From Geometric Modeling to Shape Modeling-Umberto Cugini 2013-03-14 IFIP Working Group 5.2 has organized a series of workshops aimed at presenting and discussing current issues and future perspectives of Geometric Modeling in the CAD environment. From Geometric Modeling to Shape Modeling comprises the proceedings of the seventh GEO workshop, which was sponsored by the International Federation for Information Processing (IFIP) and held in Parma, Italy in October 2000. The workshop looked at new paradigms for CAD including the evolution of geometric-centric CAD systems, modeling of non-rigid materials, shape modeling, geometric modeling and virtual prototyping, and new methods of interaction with geometric models. The seventeen included papers provide an interesting overview of the evolution of geometric centric modeling into shape modeling. Also included is an invited speaker paper, which discusses the foundation of the next generation of CAD systems, where shape and function enhance geometric descriptions. The main topics discussed in the book are: Theoretical foundation for solids and surfaces; Computational basis for geometric modeling; Methods of interaction with geometric models; Industrial and other applications of geometric modeling; New paradigms of geometric modeling for CAD; Shape modeling. From Geometric Modeling to Shape Modeling is essential reading for researchers, graduate and postgraduate students, systems developers of advanced computer-aided design and manufacturing systems, and engineers involved in industrial applications.

Nonlinear Computational Geometry-Ioannis Z. Emiris 2009-10-28 An original motivation for algebraic geometry was to understand curves and surfaces in three dimensions. Recent theoretical and technological advances in areas such as robotics, computer vision, computer-aided geometric design and molecular biology, together with the increased availability of computational resources, have brought these original questions once more into the forefront of research. One particular challenge is to combine applicable methods from algebraic geometry with proven techniques from piecewise-linear computational geometry (such as Voronoi diagrams and hyperplane arrangements) to develop tools for treating curved objects. These research efforts may be summarized under the term nonlinear computational geometry. This volume grew out of an IMA workshop on Nonlinear Computational Geometry in May/June 2007 (organized by I.Z. Emiris, R. Goldman, F. Sottile, T. Theobald) which gathered leading experts in this emerging field. The research and expository articles in the volume are intended to provide an overview of nonlinear computational geometry. Since the topic involves computational geometry, algebraic geometry, and geometric modeling, the volume has contributions from all of these areas. By addressing a broad range of issues from purely theoretical and algorithmic problems, to implementation and practical applications this volume conveys the spirit of the IMA workshop.

Algebraic Geometry Modeling in Information Theory-Edgar Martínez-Moro 2013 Algebraic & geometry methods have constituted a basic background and tool for people working on classic block coding theory and cryptography. Nowadays, new paradigms on coding theory and cryptography have arisen such as: Network coding, S-Boxes, APN Functions, Steganography and decoding by linear programming. Again understanding the underlying procedure and symmetry of these topics needs a whole bunch of non trivial knowledge of algebra and geometry that will be used to both, evaluate those methods and search for new

codes and cryptographic applications. This book shows those methods in a self-contained form.

Computational Intelligence in Archaeology-Barcelo, Juan A. 2008-07-31 Provides analytical theories offered by innovative artificial intelligence computing methods in the archaeological domain.

Computer Aided Geometric Design-Robert E. Barnhill 2014-05-10 Computer Aided Geometric Design covers the proceedings of the First International Conference on Computer Aided Geometric Design, held at the University of Utah on March 18-21, 1974. This book is composed of 15 chapters and starts with reviews of the properties of surface patch equation and the use of computers in geometrical design. The next chapters deal with the principles of smooth interpolation over triangles and without twist constraints, as well as the graphical representation of surfaces over triangles and rectangles. These topics are followed by discussions of the B-spline curves and surfaces; mathematical and practical possibilities of UNISURF; nonlinear splines; and some piecewise polynomial alternatives to splines under tension. Other chapters explore the smooth parametric surfaces, the space curve as a folded edge, and the interactive computer graphics application of the parametric bi-cubic surface to engineering design problems. The final chapters look into the three-dimensional human-machine communication and a class of local interpolating splines. This book will prove useful to design engineers.

Conformal Geometry-Miao Jin 2018-04-10 This book offers an essential overview of computational conformal geometry applied to fundamental problems in specific engineering fields. It introduces readers to conformal geometry theory and discusses implementation issues from an engineering perspective. The respective chapters explore fundamental problems in specific fields of application, and detail how computational conformal geometric methods can be used to solve them in a theoretically elegant and computationally efficient way. The fields covered include computer graphics, computer vision, geometric modeling, medical imaging, and wireless sensor networks. Each chapter concludes with a summary of the material covered and suggestions for further reading, and numerous illustrations and computational algorithms complement the text. The book draws on courses given by the authors at the University of Louisiana at Lafayette, the State University of New York at Stony Brook, and Tsinghua University, and will be of interest to senior undergraduates, graduates and researchers in computer science, applied mathematics, and engineering.

Computational Hemodynamics – Theory, Modelling and Applications-Jiyuan Tu 2015-02-24 This book discusses geometric and mathematical models that can be used to study fluid and structural mechanics in the cardiovascular system. Where traditional research methodologies in the human cardiovascular system are challenging due to its invasive nature, several recent advances in medical imaging and computational fluid and solid mechanics modelling now provide new and exciting research opportunities. This emerging field of study is multi-disciplinary, involving numerical methods, computational science, fluid and structural mechanics, and biomedical engineering. Certainly any new student or researcher in this field may feel overwhelmed by the wide range of disciplines that need to be understood. This unique book is one of the first to bring together knowledge from multiple disciplines, providing a starting point to each of the individual disciplines involved, attempting to ease the steep learning curve. This book presents elementary knowledge on the physiology of the cardiovascular system; basic knowledge and techniques on reconstructing geometric models from medical imaging; mathematics that describe fluid and structural mechanics, and corresponding numerical/computational methods to solve its equations and problems. Many practical examples and case studies are presented to reinforce best practice guidelines for setting high quality computational models and simulations. These examples contain a large number of images for visualization, to explain cardiovascular physiological functions and disease. The reader is then exposed to some of the latest research activities through a summary of breakthrough research models, findings, and techniques. The book's approach is aimed at students and researchers entering this field from engineering, applied mathematics, biotechnology or medicine, wishing to engage in this emerging and exciting field of computational hemodynamics modelling.

Discourse, Interaction and Communication-INTERNATIONAL COLLOQUIUM ON COGNITIVE SCIENCE 1995 1998-02-28 The papers in this volume represent leading-edge work by well-known scholars on the topics mentioned in the title: discourse, interaction, and communication. They report work done from widely divergent points on the theoretical spectrum of cognitive science, and from different disciplinary starting points (philosophy, logic, linguistics, artificial intelligence). Not only do these works faithfully represent the main topics and the wide range of differing positions presented at the Fourth International Colloquium on Cognitive Science (ICCS-95), but despite their differences (or perhaps because of these differences) they also display many clear directions for future research in these three central areas of cognitive science. This book is essential reading for all researchers in cognitive science.

Computer Graphics and Geometric Modelling-Max K. Agoston 2005-12-06 Possibly the most comprehensive overview of computer graphics as seen in the context of geometric modelling, this two volume work covers implementation and theory in a thorough and systematic fashion. Computer Graphics and Geometric Modelling: Implementation and Algorithms, covers the computer graphics part of the field of geometric modelling and includes all the standard computer graphics topics. The first part deals with basic concepts and algorithms and the main steps involved in displaying photorealistic images on a computer. The second part covers curves and surfaces and a number of more advanced geometric modelling topics including intersection algorithms, distance algorithms, polygonizing curves and surfaces, trimmed surfaces, implicit curves and surfaces, offset curves and surfaces, curvature, geodesics, blending etc. The third part touches on some aspects of computational geometry and a few special topics such as interval analysis and finite element methods. The volume includes two companion programs.

Advanced Methods for Geometric Modeling and Numerical Simulation-Carlotta Giannelli 2019-09-18 This book gathers selected contributions presented at the INdAM Workshop "DREAMS", held in Rome, Italy on January 22−26, 2018. Addressing cutting-edge research topics and advances in computer aided geometric design and isogeometric analysis, it covers distinguishing curve/surface constructions and spline models, with a special focus on emerging adaptive spline constructions, fundamental spline theory and related algorithms, as well as various aspects of isogeometric methods, e.g. efficient quadrature rules and spectral analysis for isogeometric B-spline discretizations. Applications in finite element and boundary element methods are also discussed. Given its scope, the book will be of interest to both researchers and graduate students working in these areas.

Statistical Optimization for Geometric Computation-Kenichi Kanatani 2005-07-26 This text for graduate students discusses the mathematical foundations of statistical inference for building three-dimensional models from image and sensor data that contain noise--a task involving autonomous robots guided by video cameras and sensors. The text employs a theoretical accuracy for the optimization procedure, which maximizes the reliability of estimations based on noise data. The numerous mathematical prerequisites for developing the theories are explained systematically in separate chapters. These methods range from linear algebra, optimization, and geometry to a detailed statistical theory of geometric patterns, fitting estimates, and model selection. In addition, examples drawn from both synthetic and real data demonstrate the insufficiencies of conventional procedures and the improvements in accuracy that result from the use of optimal methods.

Measurement of Cardiac Deformations from MRI: Physical and Mathematical Models-A.A. Amini 2001-12-31 Measurement of Cardiac Deformations from MRI: Physical and Mathematical Models describes the latest imaging and imag analysis techniques that have been developed at leading centers for the visualization, analysis, and understanding of normal and abnormal cardiac motion with magnetic resonance imaging (MRI). The use of MRI in measuring cardiac motion is particularly important because MRI is non-invasive, and it is the only modality capable of imaging detailed intramural motion within the myocardium. Biomedical engineers, medical physicists, computer scientists, and physicians interested in learning about the latest advances in cardiovascular MRI should find this book to be a valuable educational resource. In particular, it is more tutorial in nature than most of the technical papers where the research was originally published. Practitioners and researchers working in the field of cardiovascular MRI will find the book to be filled with practical technical details and references to other work, enabling the implementation of existing methods and serving as a basis for further research in the area.

Fundamentals of Digital Manufacturing Science-Zude Zhou 2011-10-22 The manufacturing industry will reap significant benefits from encouraging the development of digital manufacturing science and technology. Digital Manufacturing Science uses theorems, illustrations and tables to introduce the definition, theory architecture, main content, and key technologies of digital manufacturing science. Readers will be able to develop an in-depth understanding of the emergence and the development, the theoretical background, and the techniques and methods of digital manufacturing science. Furthermore, they will also be able to use the basic theories and key technologies described in Digital Manufacturing Science to solve practical engineering problems in modern manufacturing processes. Digital Manufacturing Science is aimed at advanced undergraduate and postgraduate students, academic researchers and researchers in the manufacturing industry. It allows readers to integrate the theories and technologies described with their own research works, and to propose new ideas and new methods to improve the theory and application of digital manufacturing science.

Computational Hemodynamics – Theory, Modelling and Applications-Jiyuan Tu 2015-02-24 This book discusses geometric and mathematical models that can be used to study fluid and structural mechanics in the cardiovascular system. Where traditional research methodologies in the human cardiovascular system are challenging due to its invasive nature, several recent advances in medical imaging and computational fluid and solid mechanics modelling now provide new and exciting research opportunities. This emerging field of study is multi-disciplinary, involving numerical methods, computational science, fluid and structural mechanics, and biomedical engineering. Certainly any new student or researcher in this field may feel overwhelmed by the wide range of disciplines that need to be understood. This unique book is one of the first to bring together knowledge from multiple disciplines, providing a starting point to each of the individual disciplines involved, attempting to ease the steep learning curve. This book presents elementary knowledge on the physiology of the cardiovascular system;

basic knowledge and techniques on reconstructing geometric models from medical imaging; mathematics that describe fluid and structural mechanics, and corresponding numerical/computational methods to solve its equations and problems. Many practical examples and case studies are presented to reinforce best practice guidelines for setting high quality computational models and simulations. These examples contain a large number of images for visualization, to explain cardiovascular physiological functions and disease. The reader is then exposed to some of the latest research activities through a summary of breakthrough research models, findings, and techniques. The book's approach is aimed at students and researchers entering this field from engineering, applied mathematics, biotechnology or medicine, wishing to engage in this emerging and exciting field of computational hemodynamics modelling.

IUTAM Symposium on Theoretical, Computational and Modelling Aspects of Inelastic Media-B. Daya Reddy 2008-09-24 This work comprises papers based on some of the talks presented at the IUTAM Symposium of the same name, held in Cape Town, January 14-18, 2008. This volume treats cutting-edge issues in modelling, the behaviour of various classes of inelastic media, and associated algorithms for carrying out computational simulations. A key feature of the contributions are works directed at modelling behaviour at the meso and micro-scales, and at bridging the micro-macro scales.

Uncertainty in Geometric Computations-Joab Winkler 2012-12-06 This book contains the proceedings of the workshop Uncertainty in Geomet ric Computations that was held in Sheffield, England, July 5-6, 2001. A total of 59 delegates from 5 countries in Europe, North America and Asia attended the workshop. The workshop provided a forum for the discussion of com putational methods for quantifying, representing and assessing the effects of uncertainty in geometric computations. It was organised around lectures by invited speakers, and presentations in poster form from participants. Computer simulations and modelling are used frequently in science and engi neering, in applications ranging from the understanding of natural and artificial phenomena, to the design, test and manufacturing stages of production. This widespread use necessarily implies that detailed knowledge of the limitations of computer simulations is required. In particular, the usefulness of a computer simulation is directly dependent on the user's knowledge of the uncertainty in the simulation. Although an understanding of the phenomena being modelled is an important requirement of a good computer simulation, the model will be plagued by deficiencies if the errors and uncertainties in it are not consid ered when the results are analysed. The applications of computer modelling are large and diverse, but the workshop focussed on the management of un certainty in three areas : Geometric modelling, computer vision, and computer graphics.

Mathematical and Computational Modeling of Tonality-Elaine Chew 2013-12-14 From the Preface: Blending ideas from operations research, music psychology, music theory, and cognitive science, this book aims to tell a coherent story of how tonality pervades our experience, and hence our models, of music. The story is told through the developmental stages of the Spiral Array model for tonality, a geometric model designed to incorporate and represent principles of tonal cognition, thereby lending itself to practical applications of tonal recognition, segmentation, and visualization. Mathematically speaking, the coils that make up the Spiral Array model are in effect helices, a spiral referring to a curve emanating from a central point. The use of "spiral" here is inspired by spiral staircases, intertwined spiral staircases: nested double helices within an outer spiral. The book serves as a compilation of knowledge about the Spiral Array model and its applications, and is written for a broad audience, ranging from the layperson interested in music, mathematics, and computing to the music scientist-engineer interested in computational approaches to music representation and analysis, from the music-mathematical and computational sciences student interested in learning about tonality from a formal modeling standpoint to the computer musician interested in applying these technologies in interactive composition and performance. Some chapters assume no musical or technical knowledge, and some are more musically or computationally involved.

Computational Geometry-Su Bu-qing 2014-05-10 Computational Geometry: Curve and Surface Modeling provides information pertinent to the fundamental aspects of computational geometry. This book discusses the geometric properties of parametric polynomial curves by using the theory of affine invariants for algebraic curves. Organized into eight chapters, this book begins with an overview of the objects studies in computational geometry, namely surfaces and curves. This text then explores the developments in the theory and application of spline functions, which began with cubic spline functions. Other chapters consider the mechanical background of the cubic spline functions, which is the wooden spline with small deflection. This book discusses as well that in mathematical lofting the information of a geometric shape is given by a set of data points, while in geometric design other ways of representations are available. The final chapter deals with the concepts in the theory of algebraic curves. This book is a valuable resource for mathematicians.

Theory and Applications of Models of Computation-T V Gopal 2014-04-01 This book constitutes the refereed proceedings of the 11th Annual Conference on Theory and Applications of Models of Computation, TAMC 2014, held in Chennai, India, in April 2014. The 27 revised full papers presented were carefully reviewed and selected from 112 submissions. The papers explore the algorithmic foundations, computational methods and computing devices to meet today's and tomorrow's challenges of complexity, scalability and sustainability, with wide-ranging impacts on everything from the design of biological systems to the understanding of economic markets and social networks.

Computational Neuroscience: Theoretical Insights into Brain Function-Paul Cisek 2007-11-14 Computational neuroscience is a relatively new but rapidly expanding area of research which is becoming increasingly influential in shaping the way scientists think about the brain. Computational approaches have been applied at all levels of analysis, from detailed models of single-channel function, transmembrane currents, single-cell electrical activity, and neural signaling to broad theories of sensory perception, memory, and cognition. This book provides a snapshot of this exciting new field by bringing together chapters on a diversity of topics from some of its most important contributors. This includes chapters on neural coding in single cells, in small networks, and across the entire cerebral cortex, visual processing from the retina to object recognition, neural processing of auditory, vestibular, and electromagnetic stimuli, pattern generation, voluntary movement and posture, motor learning, decision-making and cognition, and algorithms for pattern recognition. Each chapter provides a bridge between a body of data on neural function and a mathematical approach used to interpret and explain that data. These contributions demonstrate how computational approaches have become an essential tool which is integral in many aspects of brain science, from the interpretation of data to the design of new experiments, and to the growth of our understanding of neural function. • Includes contributions by some of the most influential people in the field of computational neuroscience • Demonstrates how computational approaches are being used today to interpret experimental data • Covers a wide range of topics from single neurons, to neural systems, to abstract models of learning

Computational Geometry and Graph Theory-Hiro Ito 2008-11-13 This book constitutes the thoroughly refereed post-conference proceedings of the Kyoto Conference on Computational Geometry and Graph Theory, KyotoCGGT 2007, held in Kyoto, Japan, in June 2007, in honor of Jin Akiyama and Vašek Chvátal, on the occasion of their 60th birthdays. The 19 revised full papers, presented together with 5 invited papers, were carefully selected during two rounds of reviewing and improvement from more than 60 talks at the conference. All aspects of Computational Geometry and Graph Theory are covered, including tilings, polygons, impossible objects, coloring of graphs, Hamilton cycles, and factors of graphs.

Theory and Applications of Models of Computation-Jianer Chen 2009-04-28 Theory and Applications of Models of Computation (TAMC) is an inter- tional conference series with an interdisciplinary character, bringing together researchers working in computer science, mathematics (especially logic) and the physical sciences. This crossdisciplinary character, together with its focus on - gorithms, complexity and computability theory, gives the conference a special ?avor and distinction. TAMC2009wasthesixthconferenceintheseries.Theprevious?vemeetings werehelddduringMay17–19,2004inBeijing,May17–20,2005inKunming,May 15–20, 2006 in Beijing, May 22–25, 2007 in Shanghai, and April 25–29, 2008 in Xi'an. TAMC 2009 was held in ChangSha, during May 18–22, 2009. Next year will see a new departure, namely, the ?rst TAMC conference to be held outside of Asia. TAMC 2010 will be held in Prague, capital of the Czech Republic. At TAMC 2009 we had three plenary speakers, Leslie Valiant (Harvard U- versity, USA), Moshe Vardi (Rice University, USA) and Matthew Hennessy (Trinity College, Ireland), giving one-hour talks each. Professor Valiant spoke on "Neural Computations That Support Long Mixed Sequence of Knowledge Acquisition Tasks," Professor Vardi on "Constraints, Graphs, Algebra, Logic, and Complexity," and Professor Hennessy on "Distributed Systems and Their Environments." Their respective abstracts accompanying the talks are included in these proceedings.

Reliable Implementation of Real Number Algorithms: Theory and Practice-Peter Hertling 2008-08-28 This book constitutes the revised papers of the International Seminar on Reliable Implementation of Real Number Algorithms, held at Dagstuhl Castle, Germany, in January 2006. The Seminar was inteded to stimulate an exchange of ideas between the different communities that deal with the problem of reliable implementation of real number algorithms. Topics included formal proofs, software libraries, systems and platforms, as well as computational geometry and solid modelling.

Geometric Modelling, Numerical Simulation, and Optimization:-Geir Hasle 2007-06-10 This edited volume addresses the importance of mathematics for industry and society by presenting highlights from contract research at the Department of Applied Mathematics at SINTEF, the largest independent research organization in Scandinavia. Examples range from computer-aided geometric design, via general purpose computing on graphics cards, to reservoir simulation for enhanced oil recovery. Contributions are written in a tutorial style.

On the Computational Geometry of Pocket Machining-Martin Held 1991-06-12 This monograph presents a thorough geometrical investigation of practical and theoretical problems arising from NC pocket machining. Practical topics include selection of tool sizes and determination of optimal tool paths. A rigorous theoretical framework based on Voronoi diagrams is given.

Computational Information Geometry-Frank Nielsen 2016-11-24 This book focuses on the application and development of information geometric methods in the

analysis, classification and retrieval of images and signals. It provides introductory chapters to help those new to information geometry and applies the theory to several applications. This area has developed rapidly over recent years, propelled by the major theoretical developments in information geometry, efficient data and image acquisition and the desire to process and interpret large databases of digital information. The book addresses both the transfer of methodology to practitioners involved in database analysis and in its efficient computational implementation.

Trends in Commutative Algebra-Luchezar L. Avramov 2004-12-13 In 2002, an introductory workshop was held at the Mathematical Sciences Research Institute in Berkeley to survey some of the many directions of the commutative algebra field. Six principal speakers each gave three lectures, accompanied by a help session, describing the interaction of commutative algebra with other areas of mathematics for a broad audience of graduate students and researchers. This book is based on those lectures, together with papers from contributing researchers. David Benson and Srikanth Iyengar present an introduction to the uses and concepts of commutative algebra in the cohomology of groups. Mark Haiman considers the commutative algebra of n points in the plane. Ezra Miller presents an introduction to the Hilbert scheme of points to complement Professor Haiman's paper. Further contributors include David Eisenbud and Jessica Sidman; Melvin Hochster; Graham Leuschke; Rob Lazarsfeld and Manuel Blickle; Bernard Teissier; and Ana Bravo.

Techniques for Computer Graphics-David F. Rogers 1987

Mathematical and Computational Modeling of Tonality-Elaine Chew 2013-12-13 From the Preface: Blending ideas from operations research, music psychology, music theory, and cognitive science, this book aims to tell a coherent story of how tonality pervades our experience, and hence our models, of music. The story is told through the developmental stages of the Spiral Array model for tonality, a geometric model designed to incorporate and represent principles of tonal cognition, thereby lending itself to practical applications of tonal recognition, segmentation, and visualization. Mathematically speaking, the coils that make up the Spiral Array model are in effect helices, a spiral referring to a curve emanating from a central point. The use of "spiral" here is inspired by spiral staircases, intertwined spiral staircases: nested double helices within an outer spiral. The book serves as a compilation of knowledge about the Spiral Array model and its applications, and is written for a broad audience, ranging from the layperson interested in music, mathematics, and computing to the music scientist-engineer interested in computational approaches to music representation and analysis, from the music-mathematical and computational sciences student interested in learning about tonality from a formal modeling standpoint to the computer musician interested in applying these technologies in interactive composition and performance. Some chapters assume no musical or technical knowledge, and some are more musically or computationally involved.

Curves and Surfaces in Geometric Modeling-Jean Gallier 2000 "The focus here is on blossoming - the process of converting a polynomial to its polar form - as a natural, purely geometric explanation of the behavior of curves and surfaces. This insight is important for more than just its theoretical elegance - the author demonstrates the value of blossoming as a practical algorithmic tool for generating and manipulating curves and surfaces that meet many different criteria.

Foundations of Software Science and Computational Structures-Vladimiro Sassone 2005-03-24 This book constitutes the refereed proceedings of the 8th International Conference on Foundations of Software Science and Computation Structures, FOSSACS 2005, held in Edinburgh, UK in April 2005 as part of ETAPS. The 30 revised full papers presented together with 2 invited papers were carefully reviewed and selected from 108 submissions. The papers are organized in topical sections on rule formats and bisimulation, probabilistic models, algebraic models, games and automata, language analysis, partial order models, logics, coalgebraic modal logics, and computational models.

Effective Computational Geometry for Curves and Surfaces-Jean-Daniel Boissonnat 2006-10-24 This book covers combinatorial data structures and algorithms, algebraic issues in geometric computing, approximation of curves and surfaces, and computational topology. Each chapter fully details and provides a tutorial introduction to important concepts and results. The focus is on methods which are both well founded mathematically and efficient in practice. Coverage includes references to open source software and discussion of potential applications of the presented techniques.

From Geometric Modeling to Shape Modeling-Umberto Cugini 2013-02-02 IFIP Working Group 5.2 has organized a series of workshops aimed at presenting and discussing current issues and future perspectives of Geometric Modeling in the CAD environment. From Geometric Modeling to Shape Modeling comprises the proceedings of the seventh GEO workshop, which was sponsored by the International Federation for Information Processing (IFIP) and held in Parma, Italy in October 2000. The workshop looked at new paradigms for CAD including the evolution of geometric-centric CAD systems, modeling of non-rigid materials, shape modeling, geometric modeling and virtual prototyping, and new methods of interaction with geometric models. The seventeen included papers provide an interesting overview of the evolution of geometric centric modeling into shape modeling. Also included is an invited speaker paper, which discusses the foundation of the next generation of CAD systems, where shape and function enhance geometric descriptions. The main topics discussed in the book are: Theoretical foundation for solids and surfaces; Computational basis for geometric modeling; Methods of interaction with geometric models; Industrial and other applications of geometric modeling; New paradigms of geometric modeling for CAD; Shape modeling. From Geometric Modeling to Shape Modeling is essential reading for researchers, graduate and postgraduate students, systems developers of advanced computer-aided design and manufacturing systems, and engineers involved in industrial applications.

VI Hotine-Marussi Symposium on Theoretical and Computational Geodesy-Peiliang Xu 2008-02-27 This volume of proceedings is a collection of refereed papers resulting from the VI Hotine-Marussi Symposium on Theoretical and Computational Geodesy. The papers cover almost every topic of geodesy, including satellite gravity modeling, geodynamics, GPS data processing, statistical estimation and prediction theory, and geodetic inverse problem theory. In addition, particular attention is paid to topics of fundamental importance in the next one or two decades in Earth Science.

Applied Computational Geometry. Towards Geometric Engineering-Acm Workshop on Applied Computational Geometry 1996 Philadelphia, Pa 1996-09-25 Content Description #Anthology selected from contributions to the First ACM Workshop on Applied Computational Geometry.#Includes bibliographical references and index.

Issues in Logic, Operations, and Computational Mathematics and Geometry: 2012 Edition- 2013-01-10 Issues in Logic, Operations, and Computational Mathematics and Geometry: 2012 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Computational Mathematics. The editors have built Issues in Logic, Operations, and Computational Mathematics and Geometry: 2012 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Computational Mathematics in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Logic, Operations, and Computational Mathematics and Geometry: 2012 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at http://www.ScholarlyEditions.com/.

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