Analysis Geometry And Modeling In Finance Advanced Methods In Option Pricing Chapman And Hallcrc Financial Mathematics Series

This book covers topics of Informational Geometry, a field which deals with the differential geometric study of the manifold probability density functions. This is a field that is increasingly attracting the interest of researchers from many different areas of science, including mathematics, statistics, geometry, computer science, signal processing, physics and neuroscience. It is the authors' hope that the present book will be a valuable reference for researchers and graduate students in one of the aforementioned fields. This textbook is a unified presentation of differential geometry and probability theory, and constitutes a text for a course directed at graduate or advanced undergraduate students interested in applications of differential geometry in probability and statistics. The book contains over 100 proposed exercises meant to help students deepen their understanding, and it is accompanied by software that is able to provide numerical computations of several information geometric objects. The reader will understand a flourishing field of mathematics in which very few books have been written so far.

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.

Distills key concepts from linear algebra, geometry, matrices, calculus, optimization, probability and statistics that are used in machine learning.

Geometric Modeling and Scientific Visualization are both established disciplines, each with their own series of workshops, conferences and journals. But clearly both disciplines overlap; this observation led to the idea of composing a book on Geometric Modeling for Scientific Visualization.

Analysis, Geometry, and Modeling in Finance: Advanced Methods in Option Pricing is the first book that applies advanced analytical and geometrical methods used in physics and mathematics to the financial field. It even obtains new results when only approximate and partial solutions were previously available. Through the problem of option pricing, the author introduces powerful tools and methods, including differential geometry, spectral decomposition, and supersymmetry, and applies these methods to practical problems in finance. He mainly focuses on the calibration and dynamics of implied volatility, which is commonly called smile. The book covers the Black–Scholes, local volatility, and stochastic volatility models, along with the Kolmogorov, Schrödinger, and Bellman–Hamilton–Jacobi equations. Providing both theoretical and numerical results throughout, this book offers new ways of solving financial

problems using techniques found in physics and mathematics.

As a new interdisciplinary research area, "image-based geometric modeling and mesh generation" integrates image processing, geometric modeling and mesh generation with finite element method (FEM) to solve problems in computational biomedicine, materials sciences and engineering. It is well known that FEM is currently well-developed and efficient, but mesh generation for complex geometries (e.g., the human body) still takes about 80% of the total analysis time and is the major obstacle to reduce the total computation time. It is mainly because none of the traditional approaches is sufficient to effectively construct finite element meshes for arbitrarily complicated domains, and generally a great deal of manual interaction is involved in mesh generation. This contributed volume, the first for such an interdisciplinary topic, collects the latest research by experts in this area. These papers cover a broad range of topics, including medical imaging, image alignment and segmentation, image-to-mesh conversion, quality improvement, mesh warping, heterogeneous materials, biomodelcular modeling and simulation, as well as medical and engineering applications. This contributed volume, the first for such an interdisciplinary topic, collects the latest research by experts in this area. These papers cover a broad range of topics, including medical imaging, image alignment and segmentation, image-to-mesh conversion, quality improvement, mesh warping, heterogeneous materials, biomodelcular modeling and simulation, as well as medical and engineering applications. This contributed volume, the first for such an interdisciplinary topic, collects the latest research by experts in this area. These papers cover a broad range of topics, including medical imaging, image alignment and segmentation, image-to-mesh conversion, quality improvement, mesh warping, heterogeneous materials, biomodelcular modeling and simulation, as well as medical and engineering applications. This contributed volume, the first for such an interdisciplinary topic, collects the latest research by experts in this area. These papers cover a broad range of topics, including medical imaging, image alignment and segmentation, image-to-mesh conversion, quality improvement, mesh warping, heterogeneous materials, biomodelcular modeling and simulation, as well as medical and engineering applications.

This book spans the distance between algebraic descriptions of geometric objects and the rendering of digital geometric shapes based on algebraic models. These contrasting points of view inspire a thorough analysis of the key challenges and how they are met. The articles focus on important classes of problems: implicitization, classification, and intersection. Combining illustrative graphics, computations and review articles this book helps the reader gain a firm practical grasp of these subjects.

In response to a growing interest in Total Least Squares (TLS) and Errors-In-Variables (EIV) modeling by researchers and practitioners, well-known experts from several disciplines were invited to prepare an overview paper and present it at the third international workshop on TLS and EIV modeling held in Leuven, Belgium, August 27-29, 2001. These invited papers, representing two-thirds of the book, together with a selection of other presented contributions yield a complete overview of the main scientific achievements since 1996 in TLS and Errors-In-Variables modeling. In this way, the book nicely completes two earlier books on TLS (SIAM 1991 and 1997). Not only computational issues, but also statistical, numerical, algebraic properties are described, as well as many new generalizations and applications. Being aware of the growing interest in these techniques, it is a strong belief that this book will aid and stimulate users to apply the new techniques and models correctly to their own practical problems.

Geometric Methods for Digital Picture Analysis
Analysis, Algorithms and Applications
Geometry, Coverage, and Capacity
Analysis, Geometry, and Modeling in Finance

Applied Dimensional Analysis and Modeling provides the full mathematical background and step-by-step procedures for employing dimensional analyses, along with a wide range of applications to problems in engineering and applied science, such as fluid dynamics, heat flow, electromagnetics, astronomy and economics. This new edition offers additional worked-out examples in mechanics, physics, geometry, hydrodynamics, and biometry. Covers 4 essential aspects and applications: principal characteristics of dimensional systems, applications of dimensional techniques in engineering, mathematics and geometry, applications in biosciences, biometry and economics, applications in astronomy and physics Offers more than 250 worked-out examples and problems with solutions Provides detailed descriptions of techniques of both dimensional analysis and dimensional modeling

This book gathers nineteen papers presented at the first NLAGA-BIRS Symposium, which was held at the Cheikh Anta Diop University in Dakar, Senegal, on June 24–28, 2019. The four-day symposium brought together African experts on nonlinear analysis and geometry and their applications, as well as their international partners, to present and discuss mathematical results in various areas. The main goal of the NLAGA project is to advance and consolidate the development of these mathematical fields in West and Central Africa with a focus on solving real-world problems such as coastal erosion, pollution, and urban network and population dynamics problems. The book addresses a range of topics related to partial differential equations, geometrical analysis of optimal shapes, geometric structures, optimization and optimal transportation, control theory, and mathematical modeling.

This book presents a theoretical treatment of nonlinear behaviour of solids and structures in such a way that it is suitable for numerical computation, typically using the Finite Element Method. Starting out from elementary concepts, the author systematically uses the principle of virtual work, initially illustrated by truss structures, to give a self-contained and rigorous account of the basic methods. The author illustrates the combination of translations and rotations by finite deformation beam theories in absolute and co-rotation format, and describes the deformation of a three-dimensional continuum in material form. A concise introduction to finite elasticity is followed by an extension to elasto-plastic materials via internal variables and the maximum dissipation principle. Finally, the author presents numerical techniques for solution of the nonlinear global equations and summarises recent results on momentum and energy conserving integration of time-dependent problems. Exercises, examples and

algorithms are included throughout.
Modern introduction to algebraic geometry for undergraduates; uses analytic ideas to access algebraic theory.
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).
This self-contained introduction shows how stochastic geometry techniques can be used for studying the behaviour of heterogeneous cellular networks (HCNs). The unified treatment of analytic results and approaches, collected for the first time in a single volume, includes the mathematical tools and techniques used to derive them. A single canonical problem formulation encompassing the analytic derivation of Signal to Interference plus Noise Ratio (SINR) distribution in the most widely-used deployment scenarios is presented, together with applications to systems based on the 3GPP-LTE standard, and with implications of these analyses on the design of HCNs. An outline of the different releases of the LTE standard and the features relevant to HCNs is also provided. A valuable reference for industry practitioners looking to improve the speed and efficiency of their network design and optimization workflow, and for graduate students and researchers seeking tractable analytical results for performance metrics in wireless HCNs.
Triangulations, and more precisely meshes, are at the heart of many problems relating to a wide variety of scientific disciplines, and in particular numerical simulations of all kinds of physical phenomena. In numerical simulations, the functional spaces of approximation used to search for solutions are defined from meshes, and in this sense these meshes play a fundamental role. This strong link between meshes and functional spaces leads us to consider advanced simulation methods in which the meshes are adapted to the behaviors of the underlying physical phenomena. This book presents the basic elements of this vision of meshing. These mesh adaptations are generally governed by a posteriori error estimators representing an increase of the error with respect to a size or metric.

Independently of this metric of calculation, compliance with a geometry can also be calculated using a so-called geometric metric. The notion of mesh thus finds its meaning in the metric of its elements.

Human faces are familiar to our visual systems. We easily recognize a person's face in arbitrary lighting conditions and in a variety of poses; detect small appearance changes; and notice subtle expression details. Can computer vision systems process face images as well as human vision systems can? Face image processing has potential applications in surveillance, image and video search, social networking, and other domains. A comprehensive guide to this fascinating topic, this book provides a systematic description of modeling face geometry and appearance from images, including information on mathematical tools, physical concepts, image processing and computer vision techniques, and concrete prototype systems. The book will be an excellent reference for researchers and graduate students in computer vision, computer graphics, and multimedia as well as application developers who would like to gain a better understanding of the state of the art.

The first book on digital geometry by the leaders in the field.

Principal findings of this study were that geometrics alone account for only a small portion of the variance in accidents and that no relationship could be established between fatalities and the geometrics studied. The geometrics studied include several types of interchanges, paved shoulders, sight distance, delineators, surface types, and other variables. Mathematical models were developed which can provide estimates of the average number of accidents on a particular type of highway or interchange, using the appropriate variables.

Illustrates the application of mathematical and computational modeling in a variety of disciplines With an emphasis on the interdisciplinary nature of mathematical and computational modeling, Mathematical and Computational Modeling: With Applications in the Natural and Social Sciences, Engineering, and the Arts features chapters written by well-known, international experts in these fields and presents readers with a host of state-of-the-art achievements in the development of

mathematical modeling and computational experiment methodology. The book is a valuable guide to the methods, ideas, and tools of applied and computational mathematics as they apply to other disciplines such as the natural and social sciences, engineering, and technology. Mathematical and Computational Modeling: With Applications in the Natural and Social Sciences, Engineering, and the Arts also features: Rigorous mathematical procedures and applications as the driving force behind mathematical innovation and discovery Numerous examples from a wide range of disciplines to emphasize the multidisciplinary application and universality of applied mathematics and mathematical modeling Original results on both fundamental theoretical and applied developments in diverse areas of human knowledge Discussions that promote interdisciplinary interactions between mathematicians, scientists, and engineers Mathematical and Computational Modeling: With Applications in the Natural and Social Sciences, Engineering, and the Arts is an ideal resource for professionals in various areas of mathematical and statistical sciences, modeling and simulation, physics, computer science, engineering, biology and chemistry, industrial, and computational engineering. The book also serves as an excellent textbook for graduate courses in mathematical modeling, applied mathematics, numerical methods, operations research, and optimization. Roderick Melnik, PhD, is Professor in the Department of Mathematics at Wilfrid Laurier University, Canada, where he is also Tier I Canada Research Chair in Mathematical Modeling. He is internationally known for his research in computational and applied mathematics, numerical analysis, and mathematical modeling for scientific and engineering applications. Dr. Melnik is the recipient of many awards, including a number of prestigious fellowships in Italy, Denmark, England and Spain. He has published over 300 refereed research papers and has served on editorial boards of numerous international journals and book series. Currently, Dr. Melnik is Director of the MS2Discovery Interdisciplinary Research Institute in Waterloo, Canada.

1 Aims and Features of This Book The contents of t. his book were originally planned t. o be included in a book en titled Geometric lIlodeling and CAD/CAM to be written by M. Hosaka and F. Kimura, but since the draft. of my part of the book was finished much earlier than Kimura's, we decided to publish this part separately at first. In it, geometrically oriented basic methods and tools used for analysis and synthesis of curves and surfaces used in CAD/CAM, various expressions and manipulations of free-form surface patches and their connection, interference as well as their qualit. y eval uation are treated. They are important elements and procedures of geometric models. And construction and utilization of geometric models which include free-form surfaces are explained in the application examples, in which the meth ods and the techniques described in this book were used. In the succeeding book which Kimura is to write, advanced topics such as data structures of geometric models, non-manifold models, geometric inference as well as tolerance problems and product models, process planning and so on are to be included. Conse quently, the title of this book is changed to Modeling of Curves and Surfaces in CAD/CAM. Features of this book are

the following. Though there are excellent text books in the same field such as G. Farin's Curves and Surfaces for CAD /CAM[I] and C. M.

The area of analysis and control of mechanical systems using differential geometry is flourishing. This book collects many results over the last decade and provides a comprehensive introduction to the area.

Written by researchers who have helped found and shape the field, this book is a definitive introduction to geometric modeling. The authors present all of the necessary techniques for curve and surface representations in computer-aided modeling with a focus on how the techniques are used in design. They achieve a balance between mathematical rigor

This book collects the state-of-art and new trends in image analysis and biomechanics. It covers a wide field of scientific and cultural topics, ranging from remodeling of bone tissue under the mechanical stimulus up to optimizing the performance of sports equipment, through the patient-specific modeling in orthopedics, microtomography and its application in oral and implant research, computational modeling in the field of hip prostheses, image based model development and analysis of the human knee joint, kinematics of the hip joint, micro-scale analysis of compositional and mechanical properties of dentin, automated techniques for cervical cell image analysis, and biomedical imaging and computational modeling in cardiovascular disease. The book will be of interest to researchers, Ph.D students, and graduate students with multidisciplinary interests related to image analysis and understanding, medical imaging, biomechanics, simulation and modeling, experimental analysis

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.

Computer Graphics and Geometric Modelling
Digital Geometry
Face Geometry and Appearance Modeling
With Applications in Natural and Social Sciences, Engineering, and the Arts
Geometry Creation and Import With COMSOL Multiphysics
In Particular a Canned Switched Reluctance Machine
Algebraic and Analytic Geometry
Concepts and Applications
Geometric Modeling and Mesh Generation from Scanned Images
Geometric Control of Mechanical Systems
Biomedical Imaging and Computational Modeling in Biomechanics

Cutting-Edge Techniques to Better Analyze and Predict Complex Physical Phenomena Geometric Modeling and Mesh Generation from Scanned Images shows how to integrate image processing, geometric modeling, and mesh generation with the finite element method (FEM) to solve problems in computational biology, medicine, materials science, and engineering. Based on the author's recent research and course at Carnegie Mellon University, the text explains the fundamentals of medical imaging, image processing, computational geometry, mesh generation, visualization, and finite element analysis. It also explores novel and advanced applications in computational biology, medicine, materials science, and other engineering areas. One of the first to cover this emerging interdisciplinary field, the book addresses biomedical/material imaging, image processing, geometric modeling and visualization, FEM, and biomedical and engineering applications. It introduces image-mesh-simulation pipelines, reviews numerical methods used in various modules of the pipelines, and discusses several scanning techniques, including ones to probe polycrystalline materials. The book next presents the fundamentals of geometric modeling and computer graphics, geometric objects and transformations, and curves and surfaces as well as two isocontouring methods: marching cubes and dual contouring. It then describes various triangular/tetrahedral and quadrilateral/hexahedral mesh generation techniques. The book also discusses volumetric T-spline modeling for isogeometric analysis (IGA) and introduces some new developments of FEM in recent years with applications.

This book constitutes the refereed proceedings of the 4th International Conference on Geometric Modeling and Processing, GMP 2006, held in Pittsburgh, PA, USA in July 2006. The 36 revised full papers and 21 revised short papers presented were carefully reviewed and selected from a total of 84 submissions. All current issues in the area of geometric modeling and processing are addressed and the impact in such areas as computer graphics, computer vision, machining, robotics, and scientific visualization is shown. The papers are organized in topical sections on shape reconstruction, curves and surfaces, geometric processing, shape deformation, shape description, shape recognition, geometric modeling, subdivision surfaces, and engineering applications.

Computer Aided techniques, Applications, Systems and tools for Geometric Modeling are extremely useful in a number of academic and industrial settings. Specifically, Computer Aided Geometric Modeling (CAGM) plays a significant role in the construction of - signing and manufacturing of various objects. In addition to its cri- cal importance in the traditional fields of automobile and aircraft manufacturing, shipbuilding, and general product design, more - cently, the CAGM methods have also proven to be indispensable in a variety of modern industries, including computer vision, robotics, medical imaging, visualization, and even media. This book aims to provide a valuable source, which focuses on - terdisciplinary methods and affiliate research in the area. It aims to provide the user community with a variety of Geometric Modeling techniques, Applications, systems and tools necessary for various real life problems in the areas such as: Font Design Medical Visualization Scientific Data Visualization Archaeology Toon Rendering Virtual Reality Body Simulation It also aims to collect and disseminate information in various dis- plines including: Curve and Surface Fitting Geometric Algorithms Scientific Visualization Shape Abstraction and Modeling Intelligent CAD Systems Computational Geometry Solid Modeling v Shape Analysis and Description Industrial Applications The major goal of this book is to stimulate

views and provide a source where researchers and practitioners can find the latest dev- opments in the field of Geometric Modeling.

This book focuses on the electromagnetic and thermal modeling and analysis of electrical machines, especially canned electrical machines for hydraulic pump applications. It addresses both the principles and engineering practice, with more weight placed on mathematical modeling and theoretical analysis. This is achieved by providing in-depth studies on a number of major topics such as: can shield effect analysis, machine geometry optimization, control analysis, thermal and electromagnetic network models, magneto motive force modeling, and spatial magnetic field modeling. For the can shield effect analysis, several cases are studied in detail, including classical canned induction machines, as well as state-of-the-art canned permanent magnet machines and switched reluctance machines. The comprehensive and systematic treatment of the can effect for canned electrical machines is one of the major features of this book, which is particularly suited for readers who are interested in learning about electrical machines, especially for hydraulic pumping, deep-sea exploration, mining and the nuclear power industry. The book offers a valuable resource for researchers, engineers, and graduate students in the fields of electrical machines, magnetic and thermal engineering, etc.

This text on geometry is devoted to various central geometrical topics including: graphs of functions, transformations, (non-)Euclidean geometries, curves and surfaces as well as their applications in a variety of disciplines. This book presents elementary methods for analytical modeling and demonstrates the potential for symbolic computational tools to support the development of analytical solutions. The author systematically examines several powerful tools of MATLAB® including 2D and 3D animation of geometric images with shadows and colors and transformations using matrices. With over 150 stimulating exercises and problems, this text integrates traditional differential and non-Euclidean geometries with more current computer systems in a practical and user-friendly format. This text is an excellent classroom resource or self-study reference for undergraduate students in a variety of disciplines.

Analysis, Geometry, and Modeling in FinanceAdvanced Methods in Option PricingCRC Press

Modeling and Analysis of Eclipsing Binary Stars provides a comprehensive review of the physical and observational aspects of eclipsing binaries, and the modeling code, PHOEBE (PHysics Of Eclipsing BinariEs), that is used by a large number of researchers in this field. Aimed at students, researchers and astronomers, this book is the foundation of knowledge for eclipsing binaries and their subsequent modeling.

Modeling and Analysis of Compositional Data presents a practical and comprehensive introduction to the analysis of compositional data along with numerous examples to illustrate both theory and application of each method. Based upon short courses delivered by the authors, it provides a complete and current compendium of fundamental to advanced methodologies along with exercises at the end of each chapter to improve understanding, as well as data and a solutions manual which is available on an accompanying website. Complementing Pawlowsky-Glahn's earlier collective text that provides an overview of the state-of-the-art in this field, Modeling and Analysis of Compositional Data fills a gap in the literature for a much-needed manual for teaching, self learning or consulting.

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.

Reliability Modelling and Analysis in Discrete Time provides an overview of the probabilistic and statistical aspects connected with discrete reliability systems. This engaging book discusses their distributional properties and dependence structures before exploring various orderings associated between different reliability structures. Though clear explanations, multiple examples, and exhaustive coverage of the basic and advanced topics of research in this area, the work gives the reader a thorough understanding of the theory and concepts associated with discrete models and reliability structures. A comprehensive bibliography assists readers who are interested in further research and understanding. Requiring only an introductory understanding of statistics, this book offers valuable insight and coverage for students and researchers in Probability and Statistics, Electrical Engineering, and Reliability/Quality Engineering. The book also includes a comprehensive bibliography to assist readers seeking to delve deeper. Includes a valuable introduction to Reliability Theory before covering advanced topics of research and real world applications Features an emphasis on the mathematical theory of reliability modeling Provides many illustrative examples to foster reader understanding

This research includes a sensitivity analysis of channel geometry and model assumptions in 1 dimensional (1D) dam break analysis. The specific modeling assumptions that are analyzed include, breach development time, breach width, and breach side-slopes. The question always arises when doing 1D dam break modeling of how detailed does the geometry data need to be to answer the subject question within an acceptable tolerance. LIDAR data and bathymetric data used for channel characteristic add significant detail to the model geometry as opposed to using course gridded data such as the USGS 10 meter Digital Elevation Models (DEMs). However, as geometry detail increases so does model development time, model run time, and cost to retrieve data. This research analyzes the level of error introduced in model results from accuracy of

channel geometry as compared to the level of error introduced from assumption made in breach characteristic.

This book contains a collection of papers presented at the 2nd Tbilisi Salerno Workshop on Mathematical Modeling in March 2015. The focus is on applications of mathematics in physics, electromagnetics, biochemistry and botany, and covers such topics as multimodal logic, fractional calculus, special functions, Fourier-like solutions for PDE ' s, Rvachev-functions and linear dynamical systems. Special chapters focus on recent uniform analytic descriptions of natural and abstract shapes using the Gielis Formula. The book is intended for a wide audience with interest in application of mathematics to modeling in the natural sciences.

This book focuses on the geometry creation techniques for use in finite element analysis. Examples are provided as a sequence of fin designs with progressively increasing complexity. A fin was selected as it is a feature widely employed for thermal management. As the content progresses, the reader learns to create or import a geometry into a FEM tool using COMSOL Multiphysics ® . The fundamentals may also be applied to other commercial packages such as ANSYS ® or AbaqusTM. The content can be utilized in a variety of engineering disciplines including mechanical, aerospace, biomedical, chemical, civil, and electrical. The book provides an overview of the tools available to create and interact with the geometry. It also takes a broader look on the world of geometry, showing how geometry is a fundamental part of nature and how it is interconnected with the world around us. Features: Includes example models that enable the reader to implement conceptual material in practical scenarios with broad industrial applications Provides geometry modeling examples created with built in features of COMSOL Multiphysics ® v. 5.4 or imported from other dedicated CAD tools Presents meshing examples and provides practical advice on mesh generation Includes companion files with models and custom applications created with COMSOL Multiphysics ® Application Builder.

Sensitivities of Channel Geometry Compared to Modeling Assumptions in Dam Failure Analysis
Analytical Modeling of Heterogeneous Cellular Networks
Proceedings of the Second Tbilisi-Salerno Workshop on Modeling in Mathematics
Modeling and Analysis of Eclipsing Binary Stars: The Theory and Design Principles of PHOEBE

Curve and Surface Modeling
Geometric Modeling: Techniques, Applications, Systems and Tools
Modeling of Curves and Surfaces in CAD/CAM
Advanced Methods for Geometric Modeling and Numerical Simulation