Download Computational Geosciences With Mathematica

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Computational Geosciences with Mathematica - William Haneberg - 2012-12-06
Computational Geosciences with Mathematica is the only book written by a geologist specifically to show geologists and geoscientists how to use Mathematica to formulate and solve problems. It spans a broad range of geologic and mathematical topics, which are drawn from the author's extensive experience in research, consulting, and teaching. The reference and text leads readers step-by-step through geologic applications such as custom graphics programming, data input and output, linear and differential equations, linear and nonlinear regression, Monte Carlo simulation, time series and image analysis, and the visualization and analysis of geologic surfaces. It is packed with actual
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**Mathematical Geosciences** - Joseph L. Awange - 2018-01-29

This book showcases powerful new hybrid methods that combine numerical and symbolic algorithms. Hybrid algorithm research is currently one of the most promising directions in the context of geosciences mathematics and computer mathematics in general. One important topic addressed here with a broad range of applications is the solution of multivariate polynomial systems by means of resultants and Groebner bases. But that’s barely the beginning, as the authors proceed to discuss genetic algorithms, integer programming, symbolic regression, parallel computing, and many other topics. The book is strictly goal-oriented, focusing on the solution of fundamental problems in the geosciences, such as positioning and point cloud problems. As such, at no point does it discuss purely theoretical mathematics. “The
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**MATLAB® Recipes for Earth Sciences**  
- Martin H. Trauth - 2020
MATLAB® is used in a wide range of geoscientific applications, e.g. for image processing in remote sensing, for creating and processing digital elevation models, and for analyzing time series. This book introduces readers to MATLAB-based data analysis methods used in the geosciences, including basic statistics for univariate, bivariate and multivariate datasets, time-series analysis, signal processing, the analysis of spatial and directional data, and image analysis. The revised and updated Fifth Edition includes seven new sections, and the majority of the chapters have been
MATLAB-based data analysis expanded. New sections include error analysis, the problem of classical linear regression of log-transformed data, aligning stratigraphic sequences, the Normalized Difference Vegetation Index, Aitchison's log-ratio transformation, graphical representation of spherical data, and statistics of spherical data. The book also includes numerous examples demonstrating how MATLAB can be used on datasets from the earth sciences. The supplementary electronic material (available online through SpringerLink) contains recipes that include all the MATLAB commands featured in the book and the sample data.

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MATLAB® is used in a wide range of applications in geosciences, such as image processing in remote sensing, generation and processing of digital elevation models and the analysis of time series. This book introduces methods of data analysis in geosciences using MATLAB such as basic statistics for univariate, bivariate and multivariate datasets, jackknife and bootstrap resampling schemes, processing of digital elevation models, gridding and contouring, geostatistics and kriging, processing and georeferencing of satellite images, digitizing from the screen, linear and nonlinear time-series analysis and the application of linear time-invariant and adaptive filters. The revised and updated Second Edition includes new subchapters on windowed Blackman-Tukey, Lomb-Scargle and Wavelet powerspectral analysis, distributions and digital elevation models, and a full new chapter on the statistical analysis of directional data. The text includes a brief description of each method and numerous examples demonstrating how MATLAB can be used on data sets from earth sciences. All MATLAB recipes can be easily modified in order to analyse the reader's own data sets.

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Frontiers in Offshore Geotechnics III - Vaughan Meyer - 2015-05-15
Frontiers in Offshore Geotechnics III comprises the contributions presented at the Third International Symposium on Frontiers in Offshore Geotechnics (ISFOG, Oslo, Norway, 10-12 June 2015), organised by the Norwegian Geotechnical Institute (NGI). The papers address current and emerging geotechnical engineering challenges facing those working in offshore engineering.

Rock Mechanics: Meeting Society's Challenges and Demands, Two Volume Set - Erik Eberhardt - 2007-05-17
Ore extraction through surface and underground mining continues to involve deeper excavations in more
‘Introduction to Geodesy I and II’ to undergraduate students at Stuttgart University, we noticed a gap which motivated the writing of the present book: Almost every topic that we taught required some skills in algebra, and in particular, computer algebra! Energy needs are accelerating the development of new hydroelectric dams and exploit

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Algebraic Geodesy and Geoinformatics - Joseph L. Awange - 2010-05-27

While preparing and teaching
present book: Almost every network densification and robotics apply resection and intersection techniques which require algebraic solutions. Solution of nonlinear systems of equations is an indispensable task in almost all geosciences such as geodesy, geoinformatics, geophysics (just to mention but a few) as well as robotics. These equations which require exact solutions underpin the operations of ranging, resection, intersection and other techniques that are normally used. Examples of problems that require exact solutions include; • three-dimensional resection problem for determining positions and orientation of sensors, e.g., camera, theodolites, robots, scanners etc.

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While preparing and teaching ‘Introduction to Geodesy I and II’ to undergraduate students at Stuttgart University, we noticed a gap which motivated the writing of the topic that we taught required some skills in algebra, and in particular, computer algebra! From positioning to transformation problems inherent in geodesy and geoinformatics, knowledge of algebra and application of computer algebra software were required. In preparing this book therefore, we have attempted to put together basic concepts of abstract algebra which underpin the techniques for solving algebraic problems. Algebraic computational algorithms useful for solving problems which require exact solutions to nonlinear systems of equations are presented and tested on various problems. Though the present book focuses mainly on the two fields, the concepts and techniques presented herein are nonetheless applicable to other fields where algebraic computational problems might be encountered. In Engineering for example, network densification and robotics apply resection and intersection techniques which require algebraic solutions.
extends the second edition by introducing three new chapters: Robust parameter estimation, Multiobjective optimization and Symbolic regression. Furthermore, the linear homotopy chapter is expanded to include nonlinear homotopy. These disciplines are discussed first in the theoretical part of the book before illustrating their geospatial applications in the applications chapters where numerous numerical examples are presented. The renewed electronic supplement contains these new theoretical and practical topics, with the corresponding Mathematica statements and functions supporting their computations introduced and applied. This third edition is renamed in light of these technological advancements.

**Geospatial Algebraic Computations** - Joseph Awange - 2016-01-29
Improved geospatial instrumentation and technology such as in laser scanning has now resulted in millions of data being collected, e.g., point clouds. It is in realization that such huge amount of data requires efficient and robust mathematical solutions that this third edition of the book

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**Thematic Cartography, Thematic Cartography and Transformations** - Colette Cauvin - 2013-03-27
of a region or location. theoretical basis for thematic mapping, as well as the means of applying the various techniques and methodologies in order to create a desired analytical presentation. This first volume introduces the basics of thematic cartography. The authors present the transformations necessary to the production – using a scientific approach – of any thematic map. Four stages are detailed: from geographic entities to cartographic objects; the [XY] transformation; the [XYZ] cartographic transformations; and the semiotic transformation. Technical aspects giving map-reading keys are also included.

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A thematic map is a map that illustrates more than simply geographical relationships or locations, but rather also portrays themes, patterns, or data relating to physical, social, medical, economic, political, or any other aspect

Examples include maps that show variations of population density, climate data, wealth, voting intentions, or life expectancy with geographical location. These tools have become central to the work of scientists, practitioners, and students in nearly every field, from epidemiology to political science, and are familiar to members of the public as a common means of expressing complicated and multivariate information in easily understood graphical formats. This set of three volumes on Thematic Cartography considers maps as information constructs resulting from a number of successive information transformations and the products of decision stages, integrated into a logical reasoning and the order of those choices. It thereby provides a thorough understanding of the theoretical basis for thematic mapping, as well as the means of applying the various techniques and methodologies in order to create a desired analytical presentation. This first volume introduces the
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**Submarine Mass Movements and their Consequences** - Geoffroy Lamarche - 2015-10-02

This book is a comprehensive collection of state-of-the-art studies of seafloor slope instability and their societal implications. The volume captures the most recent and exciting scientific progress made in this research field. As the world’s climate and energy needs change, the conditions under which slope instability occurs and needs to be considered, are also changing. The science and engineering of submarine – or more widely subaqueous – benefiting from advances in seafloor and sub-seafloor surveying technologies. Ultra-high-resolution seafloor mapping and 3D seismic reflection cubes are becoming commonly available datasets that are dramatically increasing our knowledge of the mechanisms and controls of subaqueous slope failure. Monitoring of slope deformation, repeat surveying and deep drilling, on the other hand, are emerging as important new techniques for understanding the temporal scales of slope instability. In essence, rapid advances in technology are being readily incorporated into scientific research and as a result, our understanding of submarine mass movements is increasing at a very fast rate. The volume also marks the beginning of the third IGCP project for the submarine mass movement research community, IGCP-640 S4SLIDE (Significance of Modern and Ancient Submarine Slope LandSLIDEs). The Submarine Mass Movements and Their Consequences symposium is
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**Fractal Geography** - André Dauphiné - 2013-01-09
Our daily universe is rough and infinitely diverse. The fractal approach clarifies and orders these disparities. It helps us to envisage new explanations of geographical phenomena, which are, however, considered as
and infinitely diverse. The fractal approach clarifies and orders these disparities. It helps us to envisage new explanations of geographical phenomena, which are, however, considered as definitely understood. Written for use by geographers and researchers from similar disciplines, such as ecologists, economists, historians and sociologists, this book presents the algorithms best adapted to the phenomena encountered, and proposes case studies illustrating their applications in concrete situations. An appendix is also provided that develops programs written in Mathematica. Contents 1. A Fractal World. 2. Auto-similar and Self-affine Fractals. 3. From the Fractal Dimension to Multifractal Spectrums. 4. Calculation and Interpretation of Fractal Dimensions. 5. The Fractal Dimensions of Rank-size Distributions. 6. Calculation and Interpretation of Multifractal Spectrums. 7. Geographical Explanation of Fractal Forms and Dynamics. 8. Using Complexity Theory to Explain a Fractal World. 9. Land-use Planning and Managing a Fractal Environment.

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Our daily universe is rough
Why are we all taught maths for years of our lives? Does it really empower everyone? Or fail most and disenfranchise many? Is it crucial for the AI age or an obsolete rite of passage? The Math(s) Fix: An Education Blueprint for the AI Age is a groundbreaking book that exposes why maths education is in crisis worldwide and how the only fix is a fundamentally new mainstream subject. It argues that today's maths education is not working to elevate society with modern computation, data science and AI. Instead, students are subjugated to compete with what computers do best, and lose. This is the only book to explain why being "bad at maths" may be as much the subject's fault as the learner's: how a stuck educational ecosystem has students, parents, teachers, schools, employers and policymakers running in the wrong direction to catch up with real-world requirements. But it goes further too"¬,¬"for the first time setting out a completely
schools, employers and computational school subject to fix the problem and seed more general reformation of education for the AI age.

The Math(s) Fix - Conrad Wolfram - 2020
Why are we all taught maths for years of our lives? Does it really empower everyone? Or fail most and disenfranchise many? Is it crucial for the AI age or an obsolete rite of passage? The Math(s) Fix: An Education Blueprint for the AI Age is a groundbreaking book that exposes why maths education is in crisis worldwide and how the only fix is a fundamentally new mainstream subject. It argues that today's maths education is not working to elevate society with modern computation, data science and AI. Instead, students are subjugated to compete with what computers do best, and lose. This is the only book to explain why being "bad at maths" may be as much the subject's fault as the learner's: how a stuck educational ecosystem has students, parents, teachers, policymakers running in the wrong direction to catch up with real-world requirements. But it goes further too

Time Series Analysis and Inverse Theory for Geophysicists - David Gubbins - 2004-03-18
This unique textbook provides the foundation for understanding and applying techniques commonly used in geophysics to process and interpret modern digital data. The geophysicist's toolkit contains a range of techniques which may be divided into two main groups: processing, which concerns time series analysis and is used to separate the signal of interest from background noise; and inversion, which involves generating some map or physical model from the data. These two groups of techniques are normally
time series analysis and is here presented together as parts I and II of the book. Part III describes some real applications and includes case studies in seismology, geomagnetism, and gravity. This textbook gives students and practitioners the theoretical background and practical experience, through case studies, computer examples and exercises, to understand and apply new processing methods to modern geophysical datasets. Solutions to the exercises are available on a website at http://publishing.cambridge.org/resources/0521819652

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**Handbook of Mathematical Geodesy** - Willi Freeden - 2018-06-11
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**Hands-On Start to Wolfram**
introducing the breadth of Mathematica, with a focus on ease of use. Readers get detailed instruction with examples for interactive learning and end-of-chapter exercises. Each chapter also contains authors tips from their combined 50+ years of Mathematica use.

**Hands-On Start to Wolfram Mathematica** - Cliff Hastings
- 2015-09-01
For more than 25 years, Mathematica has been the principal computation environment for millions of innovators, educators, students, and others around the world. This book is an introduction to Mathematica. The goal is to provide a hands-on experience introducing the breadth of Mathematica, with a focus on ease of use. Readers get detailed instruction with examples for interactive learning and end-of-chapter exercises. Each chapter also contains authors tips from their combined 50+ years of Mathematica use.

**Géographie fractale** - André Dauphiné
- 2011-09-09

**Statistik in der Geographie**
- Susanne Zimmermann-Janschitz
- 2013-11-08
Mit der Statistik verhält es sich so wie mit der Stadt New York – entweder man liebt sie, oder man hasst sie. Was hat diese Feststellung jedoch mit vorliegendem Buch zu tun? Im Laufe der letzten Jahrzehnte hat sich die Geographie von ihrer länderkundlichen Betrachtungsweise umorientiert und ist um zahlreiche Schwerpunkte und Zugänge erweitert worden, etwa der Implementierung (geo-)technologischer Methoden, GIS und


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**Elasticity and Geomechanics** - R. O. Davis - 1996-04-26
A concise examination of the use of elasticity in solving geotechnical engineering problems.

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**New Kind of Science** - Stephen Wolfram - 2002-12-01

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**American Book Publishing Record** - - 2005

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**Generalized Fractional Order Differential Equations Arising in Physical Models** - Santanu
This book analyzes the various semi-analytical and analytical methods for finding approximate and exact solutions of fractional order partial differential equations. It explores approximate and exact solutions obtained by various analytical methods for fractional order partial differential equations arising in physical models.

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**Catalogue of Periodicals and Continuations** - - 1997

**Industrial Mathematics** - Mohan C. Joshi - 2006
This monograph contains results of recent research interests concerning solution strategies employed for solving real life problems pertaining to modelling and scientific computing, control and optimizations, and financial mathematics.

**ULTRICH'S INTERNATIONAL PERIODICALS DIRECTORY** - - 1997
Vol. for 1947 includes "A list of clandestine periodicals of World War II, by Adrienne Florence Muzzy."

**Ulrich's International Periodicals Directory** - Carolyn Farquhar Ulrich - 2000
This monograph contains results of recent research interests concerning solution strategies employed for solving real life problems pertaining to modelling and scientific computing, control and optimizations, and financial mathematics.
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Carolyn Farquhar Ulrich - 2000
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This book offers a new approach to introductory scientific computing. It aims to make students comfortable using computers to do science, to provide them with the computational tools and knowledge they need throughout their college careers and into their professional careers, and to show how all the pieces can work together. Rubin Landau introduces the requisite mathematics and computer science in the course of realistic problems, from energy use to the building of skyscrapers to projectile motion with drag. He is attentive to how each discipline uses its own language to describe the same concepts and how computations are concrete.

Landau covers the basics of computation, numerical analysis, and programming from a computational science perspective. The first part of the printed book uses the problem-solving environment Maple as its context, with the same material covered on the accompanying CD as both Maple and Mathematica programs; the second part uses the compiled language Java, with equivalent materials in Fortran90 on the CD; and the final part presents an introduction to LaTeX replete with sample files. Providing the essentials of computing, with practical examples, A First Course in Scientific Computing adheres to the principle that science and engineering students learn computation best while sitting in front of a computer, book in hand, in trial-and-error mode. Not only is it an invaluable learning text and an essential reference for students of mathematics, engineering, physics, and other sciences, but it is also a consummate model for future textbooks in computational
realistic problems, from courses. A broad spectrum of computing tools and examples that can be used throughout an academic career Practical computing aimed at solving realistic problems Both symbolic and numerical computations A multidisciplinary approach: science + math + computer science Maple and Java in the book itself; Mathematica, Fortran90, Maple and Java on the accompanying CD in an interactive workbook format


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Algebra is the first error mode. Not only is it an invaluable learning text and an essential reference for students of mathematics, engineering, physics, and other sciences, but it is also a consummate model for future textbooks in computational science and engineering courses. A broad spectrum of computing tools and examples that can be used throughout an academic career Practical computing aimed at solving realistic problems Both symbolic and numerical computations A multidisciplinary approach: science + math + computer science Maple and Java in the book itself; Mathematica, Fortran90, Maple and Java on the accompanying CD in an interactive workbook format

**Fulltext Sources Online** - - 2006

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Algorithms for Computer Algebra is the first comprehensive textbook to be published on the topic of computational symbolic mathematics. The book first develops the foundational material from modern algebra that is required for subsequent topics. It then presents a thorough development of modern computational algorithms for such problems as multivariate polynomial arithmetic and greatest common divisor calculations, factorization of multivariate polynomials, symbolic solution of linear and polynomial systems of equations, and analytic integration of elementary functions. Numerous examples are integrated into the text as an aid to understanding the mathematical development. The algorithms developed for each topic are presented in a Pascal-like computer language. An extensive set of exercises is presented at the end of each chapter. Algorithms for Computer Algebra is suitable for use as a textbook for a course on algebraic algorithms at the

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Date reviews of geologic applications to motivate the understanding of the theory of rings and fields.

**Deutsche Nationalbibliografie** - 2004-07

**Deutsche Nationalbibliografie** - 2004-07

**Encyclopedia of Geology** - 2020-12-16

Encyclopedia of Geology, Second Edition presents in six volumes state-of-the-art reviews on the various aspects of geologic research, all of which have moved on considerably since the writing of the first edition. New areas of discussion include extinctions, origins of life, plate tectonics and its influence on faunal provinces, new types of mineral and hydrocarbon deposits, new methods of dating rocks, and geological processes. Users will find this to be a fundamental resource for teachers and students of geology, as well as researchers and non-geology professionals seeking up-to-date reviews of geologic research. Provides a comprehensive and accessible one-stop shop for information on the subject of geology, explaining methodologies and technical jargon used in the field. Highlights connections between geology and other physical and biological sciences, tackling research problems that span multiple fields. Fills a critical gap of information in a field that has seen significant progress in past years. Presents an ideal reference for a wide range of scientists in earth and environmental areas of study.

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The Mathematical Sciences
in 2025 - National Research
Council - 2013-05-13
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Numerical Linear Algebra with Applications - William Ford - 2014-09-14
Numerical Linear Algebra with Applications is designed for those who want to gain a practical knowledge of modern computational techniques for the numerical solution of linear algebra problems, using MATLAB as the vehicle for computation. The book contains all the material necessary for a first year graduate or advanced undergraduate course on numerical linear algebra with numerous applications to engineering and science. With a unified presentation of
linear algebra problems can analysis, and numerical methods to compute solutions, this book is ideal for solving real-world problems. The text consists of six introductory chapters that thoroughly provide the required background for those who have not taken a course in applied or theoretical linear algebra. It explains in great detail the algorithms necessary for the accurate computation of the solution to the most frequently occurring problems in numerical linear algebra. In addition to examples from engineering and science applications, proofs of required results are provided without leaving out critical details. The Preface suggests ways in which the book can be used with or without an intensive study of proofs. This book will be a useful reference for graduate or advanced undergraduate students in engineering, science, and mathematics. It will also appeal to professionals in engineering and science, such as practicing engineers who want to see how numerical problems, using MATLAB as the vehicle for computation. The book contains all the material necessary for a first year graduate or advanced
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**Pythonic Geodynamics** - Gabriele Morra - 2017-08-01
This book addresses students and young researchers who want to learn to use numerical modeling to solve problems in geodynamics. Intended as an easy-to-use and self-learning guide, readers only need a basic background in calculus.
modeling to solve problems in material. The book difficulty increases very gradually, through four distinct parts. The first is an introduction to the Python techniques necessary to visualize and run vectorial calculations. The second is an overview with several examples on classical Mechanics with examples taken from standard introductory physics books. The third part is a detailed description of how to write Lagrangian, Eulerian and Particles in Cell codes for solving linear and non-linear continuum mechanics problems. Finally the last one address advanced techniques like tree-codes, Boundary Elements, and illustrates several applications to Geodynamics. The entire book is organized around numerous examples in Python, aiming at encouraging the reader to learn by experimenting and experiencing, not by theory.

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A lucid statement of the philosophy of modular programming can be found in a 1970 textbook on the design of system programs by Gouthier and Pont [1, l Cflo. 23], which we quote below: A well-defined segmentation of the project effort ensures system modularity. Each task fonos a separate, distinct program module. At implementation time each module and its inputs and outputs are well-defined, there is no confusion in the intended interface with other system modules. At checkout time the integrity of the module is tested independently; there are few scheduling problems in synchronizing the completion of several tasks before checkout can begin. Finally, the system is maintained in modular fashion; system errors and deficiencies can be traced to specific system modules, thus limiting the scope of detailed error searching. Usually nothing is said about the criteria to be used in dividing the system into modules. This paper will discuss that issue and, by means of examples, suggest some criteria which can be used in decomposing a system into modules. A Brief Status Report The major advancement in the area of modular programming has been the development of coding techniques and assemblers which (1) allow one module to be written with little knowledge of the code in another module, and (2) allow modules to be reassembled and replaced without reassembly of the whole system.

**Software Pioneers** - Manfred Broy - 2012-12-06
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