Elementary Classical Analysis

We describe in this book, new methods and applications of hybrid intelligent systems using soft computing techniques. Soft Computing (SC) consists of several intelligent computing paradigms, including fuzzy logic, neural networks, and evolutionary algorithms, which can be used to produce powerful hybrid intelligent systems. The book is organized in five main parts, which contain a group of papers around a similar subject. The first part consists of papers with the main theme of intelligent control, which are basically papers that use hybrid systems to solve particular problems of control. The second part contains papers with the main theme of pattern recognition, which are basically papers using soft computing techniques for achieving pattern recognition in different applications. The third part contains papers with the themes of intelligent agents and social systems, which are papers that apply the ideas of agents and social behavior to solve real-world problems. The fourth part contains papers that deal with the hardware implementation of intelligent systems for solving particular problems. The fifth part contains papers that deal with modeling, simulation and optimization for real-world applications.

Well Logging and Formation Evaluation

Designed for courses in advanced calculus and introductory real analysis, Elementary Classical Analysis strikes a careful balance between pure and applied mathematics with an emphasis on specific techniques important to classical analysis without vector calculus or complex analysis. Intended for students of engineering and physical science as well as pure mathematics.

Principles of Mathematical Petrophysics

Introduction to Well Logs & Subsurface Maps, 2nd Edition This book explains in detail how to use oil and gas show information to find hydrocarbons. It covers the basics of exploration methodologies, drilling and mud systems, cuttings and mud gas show evaluation, fundamental log analysis, the pitfalls of log-calculated water saturations, and a complete overview of the use of pressures to understand traps and migration, hydrodynamics, and seal and reservoir quantification using capillary pressure. Also included are techniques for quickly generating pseudo-capillary pressure curves from simple porosity/permeability data, with examples of how to build spreadsheets in Excel, and a complete treatment of fluid inclusion analysis and fluid inclusion stratigraphy to map migration pathways. In addition, petroleum systems modeling and fundamental source rock geochemistry are discussed in depth, particularly in the context of unconventional source rock evaluation and screening tools for entering new plays. The book is heavily illustrated with numerous examples and case histories from the author’s 37 years of exploration experience. The topics covered in this book will give any young geoscientist a quick start on a successful career and serve as a refresher for the more experienced explorer.

Science Of The Earth, Climate And Energy

AN UP-TO-DATE, COMPREHENSIVE TREATMENT OF A CLASSIC TEXT ON MISSING DATA IN STATISTICS The topic of missing data has gained considerable attention in recent decades. This new edition by two acknowledged experts on the subject offers an up-to-date account of practical methodology for handling missing data problems. Blending theory and application, authors Roderick Little and Donald Rubin review historical approaches to the subject and describe simple methods for multivariate analysis with missing values. They then provide a coherent theory for analysis of problems based on likelihoods derived from statistical models for the data and the missing data mechanism, and then they apply the theory to a wide range of important missing data problems. Statistical Analysis with Missing Data, Third Edition starts by introducing readers to the subject and approaches toward solving it. It looks at the patterns and mechanisms that create the missing data, as well as a taxonomy of missing data. It then goes on to examine missing data in experiments,
before discussing complete-case and available-case analysis, including weighting methods. The new edition expands its coverage to include recent work on topics such as nonresponse in sample surveys, causal inference, diagnostic methods, and sensitivity analysis, among a host of other topics. A new chapter on "classic" methods written by renowned authorities on the subject gives readers a comprehensive overview of the latest developments in the field.

The new edition also includes new topics such as growth and correlation consistency techniques, expansion indices, Multiple Bischke Plot analysis, and advanced manual and computer-based log correlation. It covers the latest computer-based contouring concepts and applications.

Geologic Analysis of Naturally Fractured Reservoirs

The new edition of this classic text includes new topics such as growth and correlation consistency techniques, expansion indices, and Multiple Bischke Plot analysis. It covers the latest computer-based contouring concepts and applications.

Geologic Well Logs: A Practical Guide to Interpreting Geophysical Data

This new edition of the classic text includes new topics such as growth and correlation consistency techniques, expansion indices, Multiple Bischke Plot analysis, and advanced manual and computer-based log correlation. It covers the latest computer-based contouring concepts and applications.

Borehole ACOUSTIC Logging - Theory and Methods

The second edition of this book covers many types of basic well logs and subsurface maps. The book will help you understand what many of these well logs are measuring and how they can be used to produce various subsurface maps. Three additional chapters included on spectral gamma ray logs, fault seal, geothermal energy, and source rock maps.

Soft Computing for Hybrid Intelligent Systems The pioneering work of Gus Archie moved log interpretation into log analysis with the introduction of the equation that bears his name. Subsequent developments have mixed empiricism, physics, mathematical algorithms, and geological or engineering models as methods applied to petrophysical measurements in boreholes all over the world. Principles of Mathematical Petrophysics reviews the application of mathematics to petrophysics in a format that crystallizes the subject as a subdiscipline appropriate for the workstations of today. The subject matter is of wide interest to both academic and industrial professionals who work with subsurface data applied to energy, hydrology, and other environmental issues. This book is the first of its kind, in that it addresses mathematical petrophysics as a distinct discipline. Other books in petrophysics are either extensive descriptions of tool design or interpretation techniques, typically in an ad hoc treatment. It covers mathematical methods that are applied to borehole and corepetrophysical measurements to estimate rock properties of fluid saturation, pore types, permeability, mineralogy, facies, and reservoir characterization. These methods are demonstrated by a variety of case studies and summaries of applications. Principles of Mathematical Petrophysics is an invaluable resource for all people working with data related to petrophysics.

Introduction to Well Logs and Subsurface Maps This book presents guidelines for the design, operation and monitoring of CO₂ injection in fractured carbonates, with low permeability in the rock matrix, for geological storage in permanent trapping. CO₂ migration is dominated by fractures in formations where the hydrodynamic and geochemical effects induced by the injection play a key role influencing the reservoir behavior. CO₂ injection in these rocks shows specific characteristics that are different to injection in porous media, as the results from several research studies worldwide reveal. All aspects of a project of this type are discussed in this text, from the drilling to the injection, as well as support works like well logging, laboratory and field tests, modeling, and risk assessment. Examples are provided, lesson learned is detailed, and conclusions are drawn. This work is derived from the experience of international research teams and particularly from that gained during the design, construction and operation of Horntomín Technology Development Plant. Horntomín research pilot is currently the only active onshore injection site in the European Union, operated by Fundación Ciudad de la Energía- CIUDEN F. S. P. and recognized by the European Parliament as a key test facility. The authors provide guidelines and tools to enable readers to find solutions to their problems. The book covers activities relevant to a wide range of practitioners involved in reservoir exploration, modeling, site operation and monitoring. Fluid injection in fractured media shows specific features that are different than injection in porous media, influencing the reservoir behavior and defining conditions for safe and efficient operation. Therefore, this book is also useful to professionals working on oil & gas, hydrogeology and geothermal projects, and in general for those whose work is related to activities using fluid injection in the ground.

Teaching with Poverty in Mind What is a rubric? A rubric is a coherent set of criteria for student work that describes levels of performance quality. Sounds simple enough, right? Unfortunately, rubrics are commonly misunderstood and misused. The good news is that when rubrics are created and used correctly, they are strong tools that support and enhance classroom instruction and student learning. In this comprehensive guide to rubric development, Brookhart identifies two essential components of effective rubrics: (1) criteria that relate to the learning (not the "tasks") that students are being asked to demonstrate and (2) clear descriptions of performance across a continuum of quality. She outlines the difference between various kinds of rubrics (for example, general versus task-specific, and analytic versus holistic), explains when using each type of rubric is appropriate, and highlights examples from all grade levels and assorted content areas. In addition, Brookhart addresses * Common misconceptions about rubrics; * Important differences between rubrics and other assessment tools such as checklists and rating scales, and when such alternatives can be useful; and * How to use rubrics for formative assessment and grading, including standards-based grading and report card grades. Intended for educators who are already familiar with rubrics as well as those who are not, this book is a complete resource for writing effective rubrics and for choosing wisely from among the many rubrics that are available on the Internet and from other sources. And it makes the case that rubrics, when used appropriately, can improve outcomes by helping teachers teach and helping students learn.

The Geological Interpretation of Well Logs Teachers across the country are seeking ways to make their multicultural classrooms come alive with student talk about content. Content-Area Conversations: How to Plan Discussion-Based Lessons for Diverse Language Learners is a practical, hands-on guide to creating and managing environments that spur sophisticated levels of student communication, both oral and written. Paying special attention to the needs of English language learners, the authors *Detail research-based steps for designing lessons that spark student talk; *Share real-life classroom scenarios and dialogues that bring theory to life; *Describe easy-to-use assessments for all grade levels; *Provide rubrics, worksheets, sentence frames, and other imaginative tools that encourage academic communication; and *Offer guiding questions to help teachers plan instruction. Teachers at any grade level, in any content area, will find a wide variety of strategies in this book to help students simultaneously learn English and learn in English. Drawing both on decades of research data and on the authors' real-life experiences as teachers of English language learners, this book is replete with ideas for fostering real academic discourse in your classroom.

Statistical Analysis with Missing Data The petroleum geologist and engineer must have a working knowledge of petrophysics in order to find oil reservoirs, devise the best plan for getting it out of the ground, then start drilling. This book offers the engineer and geologist a manual to accomplish these goals, providing much-needed calculations and formulas on fluid flow, rock properties, and many other topics that are encountered every day. New updated material covers topics that have emerged in the petrochemical industry since 1997. Contains information and calculations that the engineer or geologist must use in

daily activities to find oil and devise a plan to get it out of the ground Filled with problems and solutions, perfect for use in undergraduate, graduate, or professional courses Covers real-life problems and cases for the practicing engineer

Springer Handbook of Petroleum Technology Carbonate reservoirs contain an increasingly important percentage of the world's hydrocarbon reserves. This volume presents key recent advances in carbonate exploration and reservoir analysis.

Openhole Log Analysis and Formation Evaluation

Applied Geophysics

The Imperial College Lectures in Petroleum Engineering A large part of the global population lives in arid lands which have low rainfall and often lack the water required for sustainable population and economic growth. This book presents a comprehensive description of the hydrogeology and hydrologic processes at work in arid lands. It describes the techniques that can be used to assess and manage the water resources of these areas with an emphasis on groundwater resources, including recent advances in hydrologic evaluation and the differences between how aquifer systems behave in arid lands versus more humid areas. Water management techniques are described and summarized to show how a more comprehensive approach to water management is required in these areas, including the need to be aware of cultural sensitivities and conditions unique to many arid regions. The integration of existing resources with the addition of new water sources, such as desalination of brackish water and seawater, along with reusing treated wastewater, will be required to meet future water supply needs. Also, changing climatic conditions will force water management systems to be more robust so that future water supply demands can be met as droughts become more intense and rainfall events become more intense. A range of water management techniques are described and discussed in order to illustrate the methods for integrating these measures within the context of arid lands conditions.

Field Methods for Geologists and Hydrogeologists This hand guide in the Gulf Drilling Guides series offers practical techniques that are valuable to petrophysicists and engineers in their day-to-day jobs. Based on the author's many years of experience working in oil companies around the world, this guide is a comprehensive collection of techniques and rules of thumb that work. The primary functions of the drilling or petroleum engineer are to ensure that the right operational decisions are made during the course of drilling and testing a well, from data gathering, completion and testing, and thereafter to provide the necessary parameters to enable an accurate static and dynamic model of the reservoir to be constructed. This guide supplies these, and many other answers, to their everyday problems. There are chapters on NMR logging, core analysis, sampling, and interpretation of the data to give the engineer a full picture of the formation. There is no other single guide like this, covering all aspects of well logging and formation evaluation, completely updated with the latest techniques and applications. - A valuable reference dedicated solely to well logging and formation evaluation. - Comprehensive coverage of the latest technologies and practices, including, troubleshooting for stuck pipe, operational decisions, and logging contracts. - Packed with money-saving and time saving strategies for the engineer working in the field.

Unconventional Reservoir Geomechanics This book covers the fundamentals of the earth sciences and examines their role in controlling the global occurrence and distribution of hydrocarbon resources. It explains the principles, practices and the terminology associated with the upstream sector of the oil industry. Key topics include a look at the elements and processes involved in the generation and accumulation of hydrocarbons and demonstration of how geological and geophysical techniques can be applied to explore for oil and gas. There is detailed investigation into the nature and chemical composition of petroleum, and of surface and subsurface maps, including their construction and uses in upstream operations. Other topics include well-logging techniques and their use in determining rock and fluid properties, definitions and classification of resources and reserves, conventional oil and gas reserves, their quantification and global distribution as well as unconventional hydrocarbons, their worldwide occurrence and the resources potentially associated with them. Finally, practical analysis is concentrated on the play concept, play maps, and the construction of petroleum events charts and quantification of risk in exploration ventures. As the first volume in the Imperial College Lectures in Petroleum Engineering, and based on a lecture series on the same topic, An Introduction to Petroleum Geoscience provides the introductory information needed for students of the earth sciences, petroleum engineering, engineering and geoscience. This volume also includes an introduction to the series by Martin Blunt and Alain Gringarten, of Imperial College London.

Well Logging for Earth Scientists Logging has come a long way from the simple electrical devices of the early years. Today's tools are considerably more accurate and are used for an increasingly diverse number of tasks. A mong these are tools that characterise geological properties of rocks in the borehole. Combined with new technology to drill deviated wells, the geoscientist now has tools which allow him to characterise and develop reservoirs more accurately than ever. This book, written for researchers, graduate students and practising geoscientists, documents these techniques and illustrates their use in a number of typical case studies.

Petrology of Sedimentary Rocks Encyclopedia of Geology, Second Edition presents 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, 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.

The Geological Interpretation of Well Logs Well Logging for Physical Properties A Handbook for Geophysicists, Geologists and Engineers Second Edition Joseph R. Hearst Consultant Philip H. Nelson United States Geological Survey Frederick L. Paillet United States Geological Survey Standard well logging technology was developed primarily to use measurements in liquid-filled boreholes to quantify the petroleum content in liquid-saturated sedimentary formations. By taking a fundamental approach to tool physics, this book enables readers to move beyond the standard situations and assumptions to use the technology under other conditions, such as air-filled boreholes and partially-saturated formations, and for other applications, such as the estimation of lithology type, shale fraction, mineral content, coal quality, total organic carbon, bedding dip and strike, and the movement of fluids in a borehole. This new edition explores the physical principles behind logging methods, including modern methods such as nuclear magnetic resonance, full-wave acoustic methods, and logging-while-drilling. No other book explains all of these new techniques. However, because log analysts must deal with logs run long ago, descriptions of the older technology are also retained. This comprehensive resource will help the log user review the results from the logging service companies, which run the logs and present the results. It will enable the user to understand the technology, to ask the right questions, and then to use the answers. Throughout the book, numerical values for the physical properties of fluids and minerals help the readers convert log values to actual formation properties. The explanations of technology, practical examples, and numerical data not only make this book an invaluable reference but also permit readers to improve and correct measurements made in the field.

Geological Well Logs Whether on personal health, politics, or climate change, we are constantly bombarded with more numerous 'breaking news' articles than we have time for. In such an environment, how can we tell which to read, or which is even true. Science of the Earth, Climate and Energy helps readers understand major issues that affect us individually and the world as a whole. In language that a non-scientist can follow easily, the book first explains the general principles of science, its nature and how it works, with a certain degree of emphasis on the meaning of the words "uncertainty" and "fact," before it goes into the related topics of the earth, its climate and energy sources at a level that does not require a background in science. Finally, the book addresses what individuals and societies can do to mitigate problems associated with both climate change and limited resources. Contents: Introduction How Science is Done Energy, Light and Machines Earth Climate and Temperature General Principles Climate Change Population of the Earth Fossil Fuels Coal Clean Coal Coal Carbon Sequestration Petroleum Natural Gas Fracking Renewable Energy Sources What Can We Do Remediation of and Solutions to Our Problems Readership: Members of the general public, support staff to policy makers, and decision makers who wish to have a clear grasp on issues regarding the environment and energy, and who may not have any background in the sciences. Keywords: Climate,Energy,Earth,Population,Change,Resources,Environment,Growth,War,Seal,Energy,Carbon Dioxide,Greenhouse,Nuclear Power,Fossil Fuels;Sustainable Review: "The book is targeted as a General Education textbook for college level teaching. As most good General Education textbooks, the book can also be used as a general education tool for the general public, before and after college education, that wish to familiarize themselves with energy-related science. [] The book is well written with minimal emphasis on quantitative analysis I highly recommend this fascinating book." Professor Micha Tomkiewicz Brooklyn College and School for Graduate Studies City University of New York Key Features: Starting with little or no background, the reader can understand the modern science of the earth and energy Unlike many books, the nature of science is described carefully and relatively completely. The controversies about climate change are described in detail, so that the reader can assess the situation for his or herself Energy sources are used differently by different nations. Why that is the case is described in the book, so the reader can understand this situation Theory, Measurement, and Interpretation of Well Logs Logging has come a long way from the simple electrical devices of the early years. Today's tools are considerably more accurate and are used for an increasingly diverse number of tasks. Among these are tools that characterise geological properties of rocks in the borehole. Combined with new technology to drill deviated wells, the geoscientist now has tools which allow him to characterise and develop reservoirs more accurately than ever. This book, written for researchers, graduate students and practising geoscientists, documents these techniques and illustrates their use in a number of typical case studies.

Understanding Oil and Gas Shows and Seals in the Search for Hydrocarbons From the reviews: "Is a "must" for serious field novices, and for seasoned middle-career and senior practitioners in hydrogeology, mainly those people who answer a calling to offer honest and accurate hydrogeological approximations and findings. Any engineering geologist or groundwater geologist who claims capability as a "Hydrogeologist" should own this book and submit it to highlighting and page tabbing. Of course, the same goes for those who practice in karst terranes, as author Lamoreaux is one of the pioneers in this field, worldwide"
Arid Lands Water Evaluation and Management This handbook provides a comprehensive but concise reference resource for the vast field of arid lands water. It includes chapters on hydrogeology, water resources, and sustainable water management.

Well Logging for Physical Properties The fractal analysis is becoming a very useful tool to process obtained data from chaotic systems in geosciences. Two chapters are devoted to applications of the fractal analysis in climatology, two of them to data of cosmic and solar geomagnetic data from observatories. Four chapters of the book contain some applications of the (multi-) fractal analysis in exploration geophysics. I believe that the current book is an important source for researchers and students from universities.

Fractal Analysis and Chaos in Geosciences Blackwell Publishing is delighted to announce that this book has been Highly Commended in the 2004 BMA Medical Book Competition. Here is the judges' summary of this book: "This is a technical book on a technical subject but presented in a delightful way. There are many books on statistics for doctors but there are few that are excellent and this is certainly one of them. Statistics is not an easy subject to teach or write about. The authors have succeeded in producing a book that is as good as it can get. For the keen student who does not want a book from mathematicians, this is an excellent first book on medical statistics." Essential Medical Statistics is a classic amongst medical statisticians. An introductory textbook, it presents statistiscs with a clarity and logic that demystifies the subject, while providing a comprehensive coverage of advanced as well as basic methods. The second edition of Essential Medical Statistics has been comprehensively revised and updated to include modern statistical methods and modern approaches to

statistical analysis, while retaining the approachable and non-mathematical style of the first edition. The book now includes full coverage of the most commonly used regression models, multiple linear regression/logistic regression, Poisson regression and Cox regression, as well as a chapter on general issues in regression modeling. In addition, new chapters introduce more advanced topics such as meta-analysis, likelihood, bootstrapping and robust standard errors, and analysis of clustered data. Aimed at students of medical statistics, medical researchers, public health practitioners and practicing clinicians using statistics in their daily work, the book is designed as both a teaching and a reference text. The format of the book is clear with highlighted formulae and worked examples, so that all concepts are presented in a simple, practical and easy-to-understand way. The second edition enhances the emphasis on choice of appropriate methods with new chapters on strategies for analysis and measurement association and impact. Essential Medical Statistics is supported by a web site at www.blackwellpublishing.com/essentialmedstats. This useful online resource provides statistical datasets to download, as well as sample chapters and future updates.

Encyclopedia of Geology In Teaching with Poverty in Mind: What Being Poor Does to Kid's Brains and What Schools Can Do About It, veteran educator and brain expert Eric Jensen takes an unflinching look at how poverty hurts children, families, and communities across the United States and demonstrates how schools can improve the academic achievement and life readiness of economically disadvantaged students. Jensen argues that although chronic exposure to poverty can result in detrimental changes to the brain, the brain's very ability to adapt from experience means that poor children can also experience emotional, social, and academic success. A brain that is susceptible to adverse environmental effects is equally susceptible to the positive effects of rich, balanced learning environments and caring relationships that build students' resilience, self-esteem, and character. Drawing from research, experience, and real school success stories, Teaching with Poverty in Mind reveals: * What poverty is and how it affects students in school; * What drives change at both the macro level (within schools and districts) and at the micro level (inside a student's brain); * Effective strategies from those who have succeeded and ways to replicate those best practices at your own school; and * How to engage the resources necessary to make change happen. Too often, we talk about change while maintaining a culture of excuses. We can do better. Although no magic bullet can offset the grave challenges faced daily by disadvantaged children, this timely resource shines a spotlight on what matters most, providing an inspiring and practical guide for enriching the minds and lives of all your students.

Essential Medical Statistics Assuming no mathematical or chemistry knowledge, this book introduces complete beginners to the field of petroleum engineering. Written in a straightforward style, the author takes a practical approach to the subject avoiding complex mathematics to achieve a text that is robust without being intimidating. Covering traditional petroleum engineering topics, readers of this book will learn about the formation and characteristics of petroleum reservoirs, the processes involved in the exploitation of reservoirs, post-extraction processing, industrial safety, and the long-term outlook for the oil and gas production. The descriptions and discussions are informed by considering the production histories of several fields including the Ekofisk field in the North Sea, the Wyburn Field in Canada, the Manifa Field in Saudi Arabia and the Wilmington Field off the Californian Coast. The factors leading up to the well blowouts on board the Deepwater Horizon in the Gulf of Mexico and in the Mantara Field in the Timor Sea are also examined. With a glossary to explain key words and concepts, this book is a perfect introduction for newcomers to a petroleum engineering course, as well as non-specialists in industry. Professor David Shallcross is one of the foremost practitioners in chemical engineering education worldwide. Readers of this book will find his previous book, Chemical Engineering Explained, a useful companion.

An Introduction to Geophysical Exploration A comprehensive overview of the key geologic, geomechanical and engineering principles that govern the development of unconventional oil and gas reservoirs. Covering hydrocarbon-bearing formations, horizontal drilling, reservoir seismology and environmental impacts, this is an invaluable resource for geologists, geophysicists and reservoir engineers.

Petroleum Engineering Explained An indispensable tool, Theory, Measurement and Interpretation of Well Logs introduces the three primary phases of well-logging technology to engineering and geoscience students. This text offers an in-depth study of the electric, radioactive, and acoustic properties of sedimentary rocks. Mathematical and empirical models relate a formation property of interest to the property measured with the logging tool. Openhole logging techniques are covered, along with concepts of traditional and modern tools. ADDITIONAL RESOURCES: You may want to consider this related SPE training course: Well Log Interpretation Essentials

CO2 Injection in the Network of Carbonate Fractures This book covers the principles, historical development, and applications of many acoustic logging methods, including acoustic logging-while-drilling and cased-hole logging methods. Benefiting from the rapid development of information technology, the subsurface energy resource industry is moving toward data integration to increase the efficiency of decision making through the use of advanced big data and artificial intelligence technologies, such as machine/deep learning. However, wellbore failure may happen if evaluations of risk and infrastructure are made using data mining methods without a complete understanding of the physics of borehole measurements. Processed results from borehole acoustic logging will constitute part of the input data used for data integration. Therefore, to successfully employ modern techniques for data assimilation and analysis, one must fully understand the complexity of wave mode propagation, how such propagation is influenced by the well, and the materials placed within the well.
(i.e., the cement, casing, and drill strings), and ultimately how waves penetrate into and are influenced by geological formations. State-of-the-art simulation methods, such as the discrete wavenumber integration method (DWM) and the finite difference method (FDM), are introduced to tackle the numerical challenges associated with models containing large material contrasts, such as the contrasts between borehole fluids and steel casings. Waveforms and pressure snapshots are shown to help the reader understand the wavefields under various conditions. Advanced data processing methods, including velocity analyses within the time and frequency domains, are utilized to extract the velocities of different modes. Furthermore, the authors discuss how various formation parameters influence the waveforms recorded in the borehole and describe the principles of both existing and potential tool designs and data acquisition schemes. This book greatly benefits from the research and knowledge generated over four decades at the Earth Resources Laboratory (ERL) of the Massachusetts Institute of Technology (MIT) under its acoustic logging program. Given its scope, the book is of interest to geophysicists (including borehole geophysicists and seismologists), petrophysicists, and petroleum engineers who are interested in formation evaluation and cementation conditions. In addition, this book is of interest to researchers in the acoustic sciences and to 4th-year undergraduate and postgraduate students in the areas of geophysics and acoustical physics.

Content Area Conversations
This publication is a general introduction to common openhole logging measurements, both wire line and MWD/LWD, and the interpretation of those measurements to determine the traditional analytical goals of porosity, fluid saturation, and lithology/mineralogy. It is arranged by the interpretation goals of the data, rather than by the underlying physics of the measurements. The appendix files contain digital versions of the data from the case studies, a summary guide to the measurements and their interpretation, and a simple spreadsheet containing some of the more common interpretation algorithms.

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