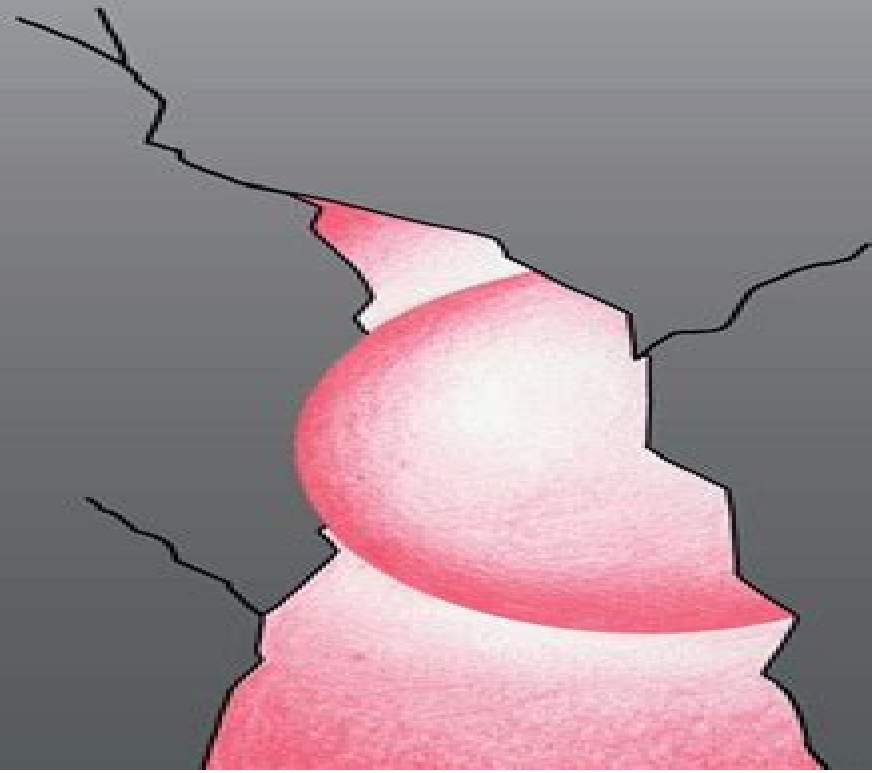


# **Seismic Modelling and Pattern Recognition in Oil Exploration**

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# Seismic Modelling And Pattern Recognition In Oil Exploration

**Keith R. Holdaway, Duncan H. B. Irving**



## **Seismic Modelling And Pattern Recognition In Oil Exploration:**

Seismic Modelling and Pattern Recognition in Oil Exploration Amita Sinvhal, Harsha Sinvhal, 1992 This book is aimed primarily at earth scientists research workers and engineers who are investigating new techniques and ideas for processing and interpreting large amounts of numerical data It meets the long felt need for a comprehensive text dealing with various aspects of pattern recognition in a single volume The treatment starts with a description of seismic modelling i e the formulation of mathematical models for subsurface geology based on Monte Carlo and Markov chains It then guides the reader through various steps in pattern recognition viz identification and automatic extraction of attributes in the time and frequency domains from the seismic response of models The use of these attributes in pattern recognition is validated by interpreting seismic reflection data as a practical application area Appropriate computer programs have also been included in the text An important aspect of this book is that it links subsurface geology with pattern recognition The present work will be of interest to those working in the areas of seismic prospecting seismic zonation and strong motion modelling as well as to those who deal with data interpretation in other disciplines Seismic Modelling and Pattern Recognition in Oil Exploration

A. Sinvhal, 2012-12-06 The reasons for writing this book are very simple We use and teach computer aided techniques of mathematical simulation and of pattern recognition Life would be much simpler if we had a suitable text book with methods and computer programmes which we could keep referring to Therefore we have presented here material that is essential for mathematical modelling of some complex geological situations with which earth scientists are often confronted The reader is introduced not only to the essentials of computer modelling data analysis and pattern recognition but is also made familiar with the basic understanding with which they can plunge into when solving related and more complex problems This book first makes a case for seismic stratigraphy and then for pattern recognition Chapter 1 provides an extensive review of applications of pattern recognition methods in oil exploration Simulation procedures are presented with examples that are fairly simple to understand and easy to use on the computer Several geological situations can be formulated and simulated using the Monte Carlo method The binary lithologic sequences discussed in Chapter 2 consist of alternating layers of any two of sand shale and coal Soft Computing and Intelligent Data Analysis in Oil Exploration M. Nikravesh, L.A. Zadeh, Fred Aminzadeh, 2003-04-22 This comprehensive book highlights soft computing and geostatistics applications in hydrocarbon exploration and production combining practical and theoretical aspects It spans a wide spectrum of applications in the oil industry crossing many discipline boundaries such as geophysics geology petrophysics and reservoir engineering It is complemented by several tutorial chapters on fuzzy logic neural networks and genetic algorithms and geostatistics to introduce these concepts to the uninitiated The application areas include prediction of reservoir properties porosity sand thickness lithology fluid seismic processing seismic and bio stratigraphy time lapse seismic and core analysis There is a good balance between introducing soft computing and geostatistics methodologies that are not routinely used in the petroleum

industry and various applications areas The book can be used by many practitioners such as processing geophysicists seismic interpreters geologists reservoir engineers petrophysicist geostatisticians asset managers and technology application professionals It will also be of interest to academics to assess the importance of and contribute to R D efforts in relevant areas

*Handbook of Pattern Recognition and Computer Vision* C. H. Chen, L. F. Pau, P. S. Wang, 1993-08 The book provides an up to date and authoritative treatment of pattern recognition and computer vision with chapters written by leaders in the field On the basic methods in pattern recognition and computer vision topics range from statistical pattern recognition to array grammars to projective geometry to skeletonization and shape and texture measures **BOOK JACKET**

**Geohazards** Madhavi Latha Gali, P. Raghuvier Rao, 2020-08-13 This volume comprises select papers presented during the Indian Geotechnical Conference 2018 This volume discusses concepts of soil dynamics and studies related to earthquake geotechnical engineering slope stability and landslides The papers presented in this volume analyze failures connected to geotechnical and geological origins to improve professional practice codes of analysis and design This volume will prove useful to researchers and practitioners alike

**Automated Pattern Analysis in Petroleum Exploration** Ibrahim Palaz, Sailes K. Sengupta, 2012-12-06 Here is a state of the art survey of artificial intelligence in modern exploration programs Focussing on standard exploration procedures the contributions examine the advantages and pitfalls of using these new techniques and in the process provide new more accurate and consistent methods for solving old problems They show how expert systems can provide the integration of information that is essential in the petroleum industry when solving the complicated questions facing the modern petroleum geoscientist

*Syntactic Pattern Recognition* Mariusz Flasiński, 2019-03-25 This unique compendium presents the major methods of recognition and learning used in syntactic pattern recognition from the 1960s till 2018 Each method is introduced firstly in a formal way Then it is explained with the help of examples and its algorithms are described in a pseudocode The survey of the applications contains more than 1 000 sources published since the 1960s The open problems in the field the challenges and the determinants of the future development of syntactic pattern recognition are discussed This must have volume provides a good read and serves as an excellent source of reference materials for researchers academics and postgraduate students in the fields of pattern recognition machine perception computer vision and artificial intelligence

**Geologie en Mijnbouw**, 1992

**Enhance Oil and Gas Exploration with Data-Driven Geophysical and Petrophysical Models** Keith R. Holdaway, Duncan H. B. Irving, 2017-10-04 Leverage Big Data analytics methodologies to add value to geophysical and petrophysical exploration data Enhance Oil Gas Exploration with Data Driven Geophysical and Petrophysical Models demonstrates a new approach to geophysics and petrophysics data analysis using the latest methods drawn from Big Data Written by two geophysicists with a combined 30 years in the industry this book shows you how to leverage continually maturing computational intelligence to gain deeper insight from specific exploration data Case studies illustrate the value propositions of this alternative analytical

workflow and in depth discussion addresses the many Big Data issues in geophysics and petrophysics From data collection and context through real world everyday applications this book provides an essential resource for anyone involved in oil and gas exploration Recent and continual advances in machine learning are driving a rapid increase in empirical modeling capabilities This book shows you how these new tools and methodologies can enhance geophysical and petrophysical data analysis increasing the value of your exploration data Apply data driven modeling concepts in a geophysical and petrophysical context Learn how to get more information out of models and simulations Add value to everyday tasks with the appropriate Big Data application Adjust methodology to suit diverse geophysical and petrophysical contexts Data driven modeling focuses on analyzing the total data within a system with the goal of uncovering connections between input and output without definitive knowledge of the system s physical behavior This multi faceted approach pushes the boundaries of conventional modeling and brings diverse fields of study together to apply new information and technology in new and more valuable ways Enhance Oil Gas Exploration with Data Driven Geophysical and Petrophysical Models takes you beyond traditional deterministic interpretation to the future of exploration data analysis **Oil** Xiaobing Li,Michael

Molina,2014-10-14 Despite ongoing efforts to find alternatives oil is still one of the most critical and valuable commodities on earth This two volume set provides extensive background information on key topics relating to oil profiles countries that are major producers and consumers of oil and examines relevant political issues Aside from air and water oil is perhaps the most valuable natural resource Oil supplies the tremendous energy needs of the modern world What exactly is oil where does it come from how does it get consumed and who is using it This encyclopedia provides clear answers to these questions and more offering students entries on the fundamentals of the oil industry and profiles of the countries that play a major role in oil production and consumption Volume 1 presents topical entries on critical concepts key terms major oil spills and disasters and important organizations and individuals relating to the oil industry Entries define terms such as barrel and reserve cover incidents such as the BP oil spill and explain the significance of organizations such as OPEC The second volume spotlights specific countries that are major producers consumers exporters and importers of oil from the United States to Russia to Saudi Arabia to Venezuela Each profile shows readers the importance of oil in that country through a brief background history data on its oil usage or production information about major trading partners and an explanation of political issues

*Forging New Frontiers: Fuzzy Pioneers I* Masoud Nikravesh,Lofti A. Zadeh,2007-09-27 The 2005 BISC International Special Event BISCSE 05 Forging the frontiers was held in the University of California Berkeley Where fuzzy logic began from November 3 6 2005 The successful applications of fuzzy logic and it s rapid growth suggest that the impact of fuzzy logic will be felt increasingly in coming years Fuzzy logic is likely to play an especially important role in science and engineering but eventually its influence may extend much farther In many ways fuzzy logic represents a significant paradigm shift in the aims of computing a shift which reflects the fact that the human mind unlike present day computers possesses a

remarkable ability to store and process information which is pervasively imprecise uncertain and lacking in categoricity The chapters of the book are evolved from presentations made by selected participants at the meeting and organized in two books The papers include reports from the different front of soft computing in various industries and address the problems of different fields of research in fuzzy logic fuzzy set and soft computing The book provides a collection of forty four 44 articles in two volumes

Geophysical Exploration Technology Ming Li, 2014-02-06 Authored by one of the world s hydrocarbon exploration experts Geophysical Exploration Technology Applications in Lithological and Stratigraphic Reservoirs presents the latest technological advancements and cutting edge techniques in reservoir theory research and exploration Stratigraphic and lithological reservoirs play a critical role in increasing the production from oil reserves and new hydrocarbon sources Recent resource evaluations indicate that onshore stratigraphic and subtle reservoirs account for as much as 40% of the total remaining hydrocarbon sources globally As a result these reservoirs will be the most practical potential and prevalent fields for long lasting onshore exploration Intended as an aid in developing an understanding of the techniques of reservoir exploration this book presents the latest and most practical methods and technology in oil and gas exploration It can be used as a training book for lithological stratigraphic exploration and a reference for scientific and technological personnel in the oil and gas industry Authored by one of the world s foremost experts in stratigraphic and lithological reservoir exploration who has more than 30 years of experience in research and instruction Features more than 200 figures illustrations and working examples to aid the reader in retaining key concepts Presents the latest technological developments in reservoir exploration techniques Integrates theory and application arming readers with a rigorous yet practical approach to hydrocarbon exploration in stratigraphic and lithological reservoirs

**Hybrid Methods in Pattern Recognition** Horst Bunke, Abraham Kandel, 2002 The field of pattern recognition has seen enormous progress since its beginnings almost 50 years ago A large number of different approaches have been proposed Hybrid methods aim at combining the advantages of different paradigms within a single system Hybrid Methods in Pattern Recognition is a collection of articles describing recent progress in this emerging field It covers topics such as the combination of neural nets with fuzzy systems or hidden Markov models neural networks for the processing of symbolic data structures hybrid methods in data mining the combination of symbolic and subsymbolic learning and so on Also included is recent work on multiple classifier systems Furthermore the book deals with applications in on line and off line handwriting recognition remotely sensed image interpretation fingerprint identification and automatic text categorization

Subsurface Hydrology David W. Hyndman, Frederick D. Day-Lewis, Kamini Singha, 2013-04-30 Published by the American Geophysical Union as part of the Geophysical Monograph Series Volume 171 Groundwater is a critical resource and the PrinciPal source of drinking water for over 1 5 billion people In 2001 the National Research Council cited as a grand challenge our need to understand the processes that control water movement in the subsurface This volume faces that challenge in terms of data integration

between complex multi scale hydrologic processes and their links to other physical chemical and biological processes at multiple scales Subsurface Hydrology Data Integration for Properties and Processes presents the current state of the science in four aspects Approaches to hydrologic data integration Data integration for characterization of hydrologic properties Data integration for understanding hydrologic processes Meta analysis of current interpretations Scientists and researchers in the field the laboratory and the classroom will find this work an important resource in advancing our understanding of subsurface water movement

### **Mathematical Methods and Modelling in Hydrocarbon Exploration and Production**

Armin Iske, Trygve Randen, 2006-01-27 Hydrocarbon exploration and production incorporate great technology challenges for the oil and gas industry In order to meet the world's future demand for oil and gas further technological advance is needed which in turn requires research across multiple disciplines including mathematics geophysics geology petroleum engineering signal processing and computer science This book addresses important aspects and fundamental concepts in hydrocarbon exploration and production Moreover new developments and recent advances in the relevant research areas are discussed whereby special emphasis is placed on mathematical methods and modelling The book reflects the multi disciplinary character of the hydrocarbon production workflow ranging from seismic data imaging seismic analysis and interpretation and geological model building to numerical reservoir simulation Various challenges concerning the production workflow are discussed in detail The thirteen chapters of this joint work authored by international experts from academic and industrial institutions include survey papers of expository character as well as original research articles Large parts of the material presented in this book were developed between November 2000 and April 2004 through the European research and training network NetAGES Network for Automated Geometry Extraction from Seismic The new methods described here are currently being implemented as software tools at Schlumberger Stavanger Research one of the world's largest service providers to the oil industry

### **Geophysical Applications of Artificial Neural Networks and Fuzzy Logic**

W. Sandham, M. Leggett, 2013-06-29 The past fifteen years has witnessed an explosive growth in the fundamental research and applications of artificial neural networks ANNs and fuzzy logic FL The main impetus behind this growth has been the ability of such methods to offer solutions not amenable to conventional techniques particularly in application domains involving pattern recognition prediction and control Although the origins of ANNs and FL may be traced back to the 1940s and 1960s respectively the most rapid progress has only been achieved in the last fifteen years This has been due to significant theoretical advances in our understanding of ANNs and FL complemented by major technological developments in high speed computing In geophysics ANNs and FL have enjoyed significant success and are now employed routinely in the following areas amongst others 1 Exploration Seismology a Seismic data processing trace editing first break picking deconvolution and multiple suppression wavelet estimation velocity analysis noise identification reduction statics analysis dataset matching prediction attenuation b AVO analysis c Chimneys d Compression I dimensionality reduction e Shear wave analysis f Interpretation

event tracking lithology prediction and well log analysis prospect appraisal hydrocarbon prediction inversion reservoir characterisation quality assessment tomography 2 Earthquake Seismology and Subterranean Nuclear Explosions 3 Mineral Exploration 4 Electromagnetic I Potential Field Exploration a Electromagnetic methods b Potential field methods c Ground penetrating radar d Remote sensing e inversion      Neural Networks and Systolic Array Design David Zhang, Sankar K. Pal, 2002 Neural networks NNs and systolic arrays SAs have many similar features This volume describes in a unified way the basic concepts theories and characteristic features of integrating or formulating different facets of NNs and SAs as well as presents recent developments and significant applications The articles written by experts from all over the world demonstrate the various ways this integration can be made to efficiently design methodologies algorithms and architectures and also implementations for NN applications The book will be useful to graduate students and researchers in many related areas not only as a reference book but also as a textbook for some parts of the curriculum It will also benefit researchers and practitioners in industry and R D laboratories who are working in the fields of system design VLSI parallel processing neural networks and vision      **Seismic Attributes as the Framework for Data Integration Throughout the Oilfield Life Cycle** Kurt J. Marfurt, 2018-01-31 Useful attributes capture and quantify key components of the seismic amplitude and texture for subsequent integration with well log microseismic and production data through either interactive visualization or machine learning Although both approaches can accelerate and facilitate the interpretation process they can by no means replace the interpreter Interpreter grayware includes the incorporation and validation of depositional diagenetic and tectonic deformation models the integration of rock physics systematics and the recognition of unanticipated opportunities and hazards This book is written to accompany and complement the 2018 SEG Distinguished Instructor Short Course that provides a rapid overview of how 3D seismic attributes provide a framework for data integration over the life of the oil and gas field Key concepts are illustrated by example showing modern workflows based on interactive interpretation and display as well as those aided by machine learning      **Applied Mechanics Reviews** ,1987      *Fossil Energy Update* ,1981



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