Bayesian Wavelet Estimation From Seismic And Well Data

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05-2 Inverse modeling: stochastic inversion~~Webinar #1 - Seismic Inversion and Reservoir~~

Characterization with InterWell, April 2020 Rock Physics Integration: from Petrophysics to Simulation *Solving Interpretation Problems using Machine Learning on Multi Attribute, Sample Based Seismic Data Geophysics: Seismic - A review of basic notions, period, wavelength and* *the seismic wavelet How Bayes Theorem works A visual guide to Bayesian thinking* Demonstrating P and S Seismic Waves Sampling, Aliasing \u0026 Nyquist Theorem **Introduction to Bayesian data analysis - part 1: What is Bayes?**

Easy Introduction to Wavelets***Post***

stack inversion demo **well logging simple and easy** ***Overview of Emerson's Modified Stochastic Inversion*** **Basic Geophysics: Artificial Intelligence in Seismology**

QAB4083: Lecture 11 - Stacking **Basic Geophysics: Processing I: Pre-processing** **05-1 Inverse modeling:**

deterministic inversion Basic Geophysics: Processing II: Deconvolution Lesson 29: Seismic Inversion LA RAC Webinar Series 2: 5_Advanced Seismic Inversion Methods: Present and Future

Lesson 21 - Seismic SequencesLesson 19 Seismic Interpretation Sort Seismic

Data to CDP Order *Bayesian Wavelet Estimation From Seismic*
A Bayesian method for wavelet estimation from seis- mic and well data is developed. The method works both on stacked data and on prestack data in form of an- gle gathers. The seismic forward model is based on the

convolutional model, where the reflectivity is calculated from the well logs.

Bayesian wavelet estimation from seismic and well data
A Bayesian method for wavelet estimation from seis-mic and well data

is developed. The method works both on stacked data and on prestack data in form of an-gle gathers.

Bayesian wavelet estimation from seismic and well data

In this letter, we show how a seismic inversion method based on a Bayesian framework can be applied on a poststack seismic data to estimate the wavelet, the seismic noise level, and the subsurface ...

(PDF) Bayesian Framework to Wavelet Estimation and ...
ABSTRACT This paper gives a review

of Bayesian parameter estimation. The Bayesian approach is fundamental and applicable to all kinds of inverse problems. ... BAYESIAN ESTIMATION IN SEISMIC INVERSION. PART II: UNCERTAINTY ANALYSIS, ... wavelet estimation and noise‐level estimation using a spatially coupled hierarchical Bayesian model ...

BAYESIAN ESTIMATION IN SEISMIC INVERSION. PART I ...

The inversion problem also involves estimation of a seismic wavelet and the seismic - noise level. The noise model is represented by a zero mean

Gaussian distribution specified by a covariance matrix. A method for joint AVO inversion, wavelet estimation and estimation of the noise level is developed in a Bayesian framework.

Joint AVO inversion, wavelet estimation and noise - level ...

The wavelet extraction model is formulated as a Bayesian inverse problem, and the software will simultaneously estimate wavelet coefficients, other parameters associated with uncertainty in the time-to-depth mapping, positioning errors in the seismic imaging, and useful amplitude-variation- with-offset (AVO) related parameters in multi-stack extractions.

Wavelet extractor: A Bayesian well-tie and wavelet ...

The method uses a Bayesian approach to estimate the property of interest on a location in a reservoir and quantify the uncertainty associated with the estima-tion. This includes a stochastic variable selection model to reduce the number of wavelet coe–cient needed for accurate prediction of the reservoir properties. We present the model in Section 2.

Bayesian Wavelet Regression for Spatial Estimation

To illustrate that the proposed empirical Bayes block wavelet shrinkage and block wavelet thresholding estimators are appealing visually as well as quantitatively, we present in Fig. 2 a noisy HeaviSine function sampled at n=1024 equally spaced points on [0,1] with RSNR=7. Fig. 3 displays the reconstructions obtained from one simulation using the six wavelet estimators.

Empirical Bayes approach to block

wavelet function estimation
Suppose that the seismic wavelet is w(t): (1) w t = ∫ − ∞ ∞ w ^ ω e i ω t d ω. ŵ(ω) is the frequency spectrum. This equation means that the seismic wavelet can be regarded as the superposition of a series of simple harmonic waves ŵ (ω) e iωt , in

which ω is the frequency of the harmonic wave.

Seismic attenuation compensation by Bayesian inversion ...
We'll look at two ways you can estimate a wavelet when you only have seismic data: fitting a band-pass

filter to the frequency content of the data and; doing an autocorrelation. Then we'll look at wavelet estimation options when you have seismic and well-log data. For the sake of illustration, we'll use a portion of the Marmousi2 synthetic ...

Wavelet estimation for well ties - SEG Wiki

Wavelet estimation is an essential step in qualitatively and quantitatively analysing and interpreting seismic data. Applications span from seismic data quality assessment to well ties and seismic inversion. Wavelet estimation methods can be roughly separated into two approaches, data driven inversion methods and analytical definitions.

parametric model for seismic wavelets—with estimation and ...
A method for parametric estimation of

seismic wavelets from well logs and seismic data is devel-oped. Parameters includeamplitude,skewness,lengthand fluctuationorder,andthelinkbetween parameters and wavelet properties provides a user-friendly interpretation of the wavelet function.

Parametric Wavelet Estimation

The problem with using boundaries such as top and/or base of salt, top of volcanics and basement (which can take on a variety of geologic and economic meanings) for estimating wavelet phase is that these boundaries often may be gradational and not sharply defined, so their seismic responses are effectively composite responses to multiple, closely-spaced impedance contrasts rather than to a single, well-known impedance contrast. At the same time, the impedance properties of the materials ...

Visual estimation of wavelet phase - SEG Wiki

In this thesis, the uncertainty aspect of seismic amplitude versus offset (AVO) in version is assessed using a Bayesian approach to inversion. The main objective is to estimate elastic material parameters with associated uncertainty from large seismic data sets, but the in versionproblem also includes estimation of seismic wavelets and the noise level.

NTNU Open: Bayesian Seismic AVO Inversion

The methods for seismic wavelet estimation can be classified into two basic types:deterministic and statistical. By combining the deterministic spectral coherence method and the statistical skewness attribute method, the amplitude and phase of the timevarying wavelet are estimated separately.

TIME-VARYING SEISMIC WAVELET ESTIMATION FROM NONSTATIONARY ...

prestack seismic data using Bayesian linearized AVO inversion to estimate elastic and assess their properties uncertianty. We also show how to combine a credible seismic inversion result with rock physics analysis to identify gas carbonate reservoir. Introduction . Seismic responses in carbonates are poorly studied, and a

Combined Bayesian AVO inversion

with rock physics to ...
Density Estimation and Wavelet Thresholding via Bayesian Methods: A Wavelet Probability Band and Related Metrics Approach to Assess Agitation and Sedation in ICU Patients In Kang, Irene Hudson, Andrew Rudge and J. Geoffrey Chase Additional information

is available at the end of the chapter

Density Estimation and Wavelet Thresholding via Bayesian ...
Seismic source wavelet estimation from the seismic data using borehole velocity and density information is one of the important steps in seismic

data processing and is also very useful for inversion process to estimate the impedance changes for accurate mapping of natural oil and gas deposits.

This book discusses the latest advances in singular spectrum-based algorithms for seismic data processing, providing an update on recent developments in this field. Over the past few decades, researchers have extensively studied the application of the singular spectrum-based time and frequency domain eigen image methods, singular spectrum analysis (SSA) and multichannel SSA for various geophysical data. This book addresses seismic reflection signals, which represent the amalgamated signals of several unwanted signals/noises, such as ground roll, diffractions etc. Decomposition of such non-stationary and erratic field data is one of the multifaceted tasks in seismic data processing. This volume also includes comprehensive methodological and parametric descriptions, testing on appropriately generated synthetic data, as well as comparisons between time and frequency domain algorithms and their applications to the field data on 1D, 2D, 3D and 4D data sets. Lastly, it features an exclusive chapter with MATLAB coding for SSA.

Preface -- Reconstruction of sound pressure field by IFEM / R. Anderssohn [und weitere] -- Seabed parameter estimation by inversion of long range sound propagation fields / W. Chen, L. Ma and N.R. Chapman -- High resolution radon transform and wavefield separation / J. Chen [und weitere] -- Three-dimensional acoustic simulation on acoustic scattering by nonlinear internal wave in coastal ocean / L.Y.S. Chiu, C.-F. Chen and J.F. Lynch -- Estimation of shear wave velocity in seafloor sediment by seismo-acoustic interface waves: a case study for geotechnical application / H. Dong, J.M. Hovem and S.A. Frivik. The optimum source depth distribution for reverberation inversion in a shallow-water waveguide / T.F. Gao and E.C. Shang -- Semi-automatic adjoint PE modeling for geoacoustic inversion / J.-P. Hermand [und weitere] -- Modeling

3D wave propagation in the ocean coupled with elastic bottom and irregular interface / L.-W. Hsieh, D. Lee and C.-F. Chen -- Reflections from steel plates with doubly periodic anechoic coatings / S. Ivansson -- Seismic characterization and monitoring of thin-layer reservoir / L.

Jin, X. Chen and J. Li -- The energy-conserving property of the standard PE / D. Lee and E.-C. Shang -- Estimation of anisotropic properties from a surface seismic survey and log data / R. Li and M. Urosevic -- Using Gaussian beam model in oceans with penetrating slope bottoms / Y.-T. Lin [und weitere] -- Application Niche genetic algorithms to AVOA inversion in orthorhombic media / M.-H. Lu and H.-Z. Yang -- Reconstruction of seismic impedance from marine seismic data / B.R. Mabuza [und weitere] -- Characterization of an underwater acoustic signal using the statistics of the wavelet subband coefficients / M.I. Taroudakis, G. Tzagkarakis and P. Tsakalides -- Some theoretical aspects for elastic wave modeling in a recently developed spectral element method / X.M. Wang, G. Seriani and W.J. Lin -- Inversion of bottom back-scattering matrix / J.R. Wu, T.F. Gao and E.C.

Shang -- New methods of scattering coefficients computation for the prediction of room acoustic parameters / X. Zeng, C.L. Christensen and J.H. Rindel

Praise for the First Edition ". . . a readable, comprehensive volume that . . . belongs onthe desk, close at hand, of any serious researcher orpractitioner." —Mathematical Geosciences The state of the art in geostatistics Geostatistical models and techniques such as kriging andstochastic multi-realizations exploit spatial correlations toevaluate natural resources, help optimize their development, andaddress environmental issues related to air and water quality, soilpollution, and forestry. Geostatistics: Modeling SpatialUncertainty, Second Edition presents a comprehensive, up-to-datereference on the topic, now featuring the latest developments inthe field. The authors explain both the theory and applications ofgeostatistics through a unified treatment that emphasizesmethodology. Key topics that are the foundation of geostatisticsare explored in-depth, including stationary and nonstationarymodels; linear and nonlinear methods; change of support;multivariate approaches; and conditional simulations. The SecondEdition highlights the growing number of applications ofgeostatistical methods and discusses three key areas of growth inthe field: New results and methods, including kriging very large datasets;kriging with outliers; nonse??parable space-time covariances;multipoint simulations; pluri-gaussian simulations; gradualdeformation; and extreme value geostatistics Newly formed connections between geostatistics and otherapproaches such as radial basis functions, Gaussian Markov randomfields, and data assimilation New perspectives on topics such as collocated cokriging, krigingwith an external drift, discrete Gaussian change-of-support models,and simulation algorithms Geostatistics, Second Edition is an excellent book for courseson the topic at the graduate level. It also serves as an invaluablereference for earth scientists, mining and petroleum engineers,geophysicists, and environmental statisticians who collect andanalyze data in their everyday work.

This volume presents an overview of Bayesian methods for inference in the wavelet domain. The papers in this volume are divided into six parts: The first two papers introduce basic concepts. Chapters in Part II explore different approaches to prior modeling, using independent priors. Papers in the Part III discuss decision theoretic aspects of such prior models. In Part IV, some aspects of prior modeling using priors that account for dependence are explored. Part V considers the use of 2-dimensional wavelet decomposition in spatial modeling. Chapters in Part VI discuss the use of empirical Bayes estimation in wavelet based models. Part VII concludes the volume with a discussion of case studies using wavelet based Bayesian approaches. The cooperation of all contributors in the timely preparation of their manuscripts is greatly recognized. We decided early on that it was impor tant to referee and critically evaluate the papers which were submitted for inclusion in this volume. For this substantial task, we relied on the service of numerous referees to whom we are most indebted. We are also grateful to John Kimmel and the Springer-Verlag referees for considering our proposal in a very timely manner. Our special thanks go to our spouses, Gautami and Draga, for their support.

Many scientific, medical or engineering problems raise the issue ofrecovering some physical quantities from indirect measurements; forinstance, detecting or quantifying flaws or cracks within amaterial from acoustic or electromagnetic measurements at itssurface is an essential problem of non-destructive evaluation. Theconcept of inverse problems precisely originates from the idea ofinverting the laws of physics to recover a quantity of interestfrom measurable data. Unfortunately, most inverse problems are ill-posed, which meansthat precise and stable solutions are not easy to devise.Regularization is the key concept to solve inverse problems. The goal of this book is to deal with inverse problems andregularized solutions using the Bayesian statistical tools, with aparticular view to signal and image estimation. The first three chapters bring the theoretical notions that make itpossible to cast inverse problems within a mathematical framework.The next three chapters address the fundamental inverse problem ofdeconvolution in a comprehensive manner. Chapters 7 and 8 deal withadvanced statistical questions linked to image estimation. In thelast five chapters, the main tools introduced in the previouschapters are put into a practical context in important applicativeareas, such as astronomy or medical imaging.

The focus of this book is on "ill-posed inverse problems". These problems cannot be solved only on the basis of observed data. The building of solutions involves the recognition of other pieces of a priori information. These solutions are then specific to the pieces of information taken into account. Clarifying and taking these pieces of information into account is necessary for grasping the domain of validity and the field of application for the solutions built. For too long, the interest in these problems has remained very limited in the signal-image community. However, the community has since recognized that these matters are more interesting and they have become the subject of much greater enthusiasm. From the application field ' s point of view, a significant part of the book is devoted to conventional subjects in the field of inversion: biological and medical imaging, astronomy, non-destructive evaluation, processing of video sequences, target tracking, sensor networks and digital communications.

The variety of chapters is also clear, when we examine the acquisition modalities at stake: conventional modalities, such as tomography and NMR, visible or infrared optical imaging, or more recent modalities such as atomic force imaging and polarized light imaging.