

Inversion and Stochastic Modelling

COURSE OUTLINE

Over the past decade seismic inversion has become a standard tool for seismic analysis. The direct use of seismic data, including the results of inversion, have been growing in importance for reservoir characterisation and modelling. Recent developments in inversion technology include elastic impedance, P- and S-impedance inversion, simultaneous inversion schemes and stochastic inversion.

The course "Inversion and Stochastic Modelling" prepared by Earthworks Environment & Resources Ltd. is a comprehensive course designed to train geophysicists in the latest inversion techniques. Beginning with a concise refresher in inversion theory, the course progressively develops a framework for inversion through deterministic and stochastic methodologies. Particular attention is given to new methods for tying wells (including issues of support and upscaling), establishing phase estimates and zero phase deconvolution. At all stages, practical applications are constantly emphasised, particularly relative impedance methods. The pitfalls of deterministic inversion approaches are illustrated with case studies and their solution identified in stochastic theory and practice.

The course is light on mathematics and no prior knowledge of statistics is required. This is a new course first run in 2001. Initial feedback indicates that it is very highly rated by attendees.

CONTENTS

1. Introduction
2. Signal Processing
3. Fundamental Theory (Oldenburg)
4. Wavelet Estimation
5. Inversion Algorithms
6. Application of Relative Acoustic Impedance Inversion – Kadanwari Field
7. Statistics
8. Stochastic Theory
9. Stationarity
10. Entropy and Baye's Theorem
11. Estimation – Kriging
12. Stochastic Simulation
13. Cokriging
14. Deterministic, Stochastic and Best Estimate
15. Support
16. Petroleum Case Study
17. Log Editing and Calibration
18. Well Tie example
19. Low Frequency Model
20. Backus Upscaling
21. Support and Backus Upscaling
22. Stochastic Inversion

Instructor – Ashley Francis, BSc, M.I. Soil Sci.

Ashley is a geophysicist whose career has encompassed 17 years world-wide oil industry experience of exploration, development and production geophysics. He also makes occasional forays advising clients in nuclear and engineering sectors on subsurface definition and uncertainty. Since 1993 he has specialised in geostatistics in addition to geophysics. Ashley has worked in or on behalf of service companies, consultancies and oil companies in North and South America, Europe, Africa, Middle East, Far East and Australasia. He lectured in Borehole Geophysics to Honours Graduates at the University of the Witwatersrand, South Africa 1989-90 and was a Visiting Research Fellow at the Post Graduate Institute in Sedimentology, University of Reading, UK (1995-7). He has been teaching geostatistics to MSc Petroleum Geoscience students at Imperial College, London, since 1998/99. He is a committee member and regular attendee at the SEG Development & Production Forum and was Chairman of the 2000 meeting. He has presented widely at conferences on the subjects of geophysics and geostatistics. Ashley is a member of SEG, EAGE, IAMG, BSSS, IPSS and IAS.

Feedback from previous courses

Our feedback scoring is categorised from a minimum of 1 (Very Poor) to 6 (Exceptional) with intermediate grades of poor, adequate, good and excellent. The percentage of votes in each of the categories from the most recent 6 courses are given in the table below

	Very Poor	Poor	Adequate	Good	Excellent	Exceptional
Technical Knowledge of Tutor	0%	0%	0%	0%	50%	50%
Training/Presentation Skills of Tutor	0%	0%	0%	0%	80%	20%
Quality of course manual	0%	0%	0%	10%	60%	30%
Quality of presentation material	0%	0%	0%	0%	90%	10%

When asked if this course met their training needs or they would recommend it to their colleagues, all attendees responded Yes to both questions. All delegates are Geophysicists. Experience of attendees ranges from 5 to 26 years, with a mean experience of 18 years. When asked if this course improved their understanding the responses were Poorly: 0%; Moderately: 30%; Significantly: 70%.

Logistics

Duration and class sizes

The course is designed to run for 3 days although this depends on class size. The optimum class size is around 12 students but larger class sizes of up to 20 students are acceptable. For class sizes significantly larger or smaller than the recommendations given here, please contact Earthworks Environment & Resources Ltd. to discuss your requirements.

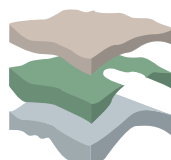
Requirements

The following facilities must be provided by the client:

Suitable classroom with tables.
PC projector
Flipchart or whiteboard

For further information please contact:

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