

1. Record Nr.	UNINA9911006671003321
Autore	Sen Mrinal K
Titolo	Global optimization methods in geophysical inversion / / Mrinal Sen and Paul L. Stoffa
Pubbl/distr/stampa	Amsterdam ; ; New York, : Elsevier, c1995
ISBN	1-281-05519-0 9786611055196 0-08-053256-X
Descrizione fisica	1 online resource (294 p.)
Collana	Advances in exploration geophysics ; ; 4
Altri autori (Persone)	StoffaPaul L. <1948->
Disciplina	550/.1/13
Soggetti	Geological modeling Geophysics - Mathematical models Inverse problems (Differential equations) Mathematical optimization
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 269-277) and index.
Nota di contenuto	Front Cover; Global Optimization Methods in Geophysical Inversion; Copyright Page; Contents; Preface; Chapter 1. Preliminary Statistics; 1.1. Random variables; 1.2. Random numbers; 1.3. Probability; 1.4. Probability distribution, distribution function and density function; 1.5. Joint and marginal probability distributions; 1.6. Mathematical expectation, moments, variances, and covariances; 1.7. Conditional probability; 1.8. Monte Carlo integration; 1.9. Importance sampling; 1.10. Stochastic processes; 1.11. Markov chains 1.12. Homogeneous, inhomogeneous, irreducible and aperiodic Markov chains1.13. The limiting probability; Chapter 2. Direct, Linear and Iterative-linear Inverse Methods; 2.1. Direct inversion methods; 2.2. Model based inversion methods; 2.3. Linear/linearized inverse methods; 2.4. Iterative linear methods for quasi-linear problems; 2.5. Bayesian formulation; 2.6. Solution using probabilistic formulation; 2.7. Summary; Chapter 3. Monte Carlo Methods; 3.1. Enumerative or grid search techniques; 3.2. Monte Carlo inversion; 3.3. Hybrid Monte Carlo-linear inversion 3.4. Directed Monte Carlo methodsChapter 4. Simulated Annealing

Methods; 4.1. Metropolis algorithm; 4.2. Heat bath algorithm; 4.3. Simulated annealing without rejected moves; 4.4. Fast simulated annealing; 4.5. Very fast simulated reannealing; 4.6. Mean; 4.7. Using SA in geophysical inversion; 4.8. Summary; Chapter 5. Genetic Algorithms; 5.1. A classical GA; 5.2. Schemata and the fundamental theorem of genetic algorithms; 5.3. Problems; 5.4. Combining elements of SA into a new GA; 5.5. A mathematical model of a GA; 5.6. Multimodal fitness functions, genetic drift; 5.7. Uncertainty estimates 5.8. Evolutionary programming 5.9. Summary; Chapter 6. Geophysical Applications of SA and G A; 6.1. 1-D Seismic waveform inversion; 6.2. Pre-stack migration velocity estimation; 6.3. Inversion of resistivity sounding data for 1-D earth models; 6.4. Inversion of resistivity profiling data for 2-D earth models; 6.5. Inversion of magnetotelluric sounding data for 1-D earth models; 6.6. Stochastic reservoir modeling; 6.7. Seismic deconvolution by mean field annealing and Hopfield network; Chapter 7. Uncertainty Estimation; 7.1. Methods of Numerical Integration 7.2. Simulated annealing: The Gibbs' sampler 7.3. Genetic algorithm: The parallel Gibbs' sampler; 7.4. Numerical examples; 7.5. Summary; References; Subject Index

Sommario/riassunto

One of the major goals of geophysical inversion is to find earth models that explain the geophysical observations. Thus the branch of mathematics known as optimization has found significant use in many geophysical applications. Both local and global optimization methods are used in the estimation of material properties from geophysical data. As the title of the book suggests, the aim of this book is to describe the application of several recently developed global optimization methods to geophysical problems. The well known linear and gradient based optimization methods have been summari
