

Book Review

M. Sen and P. L. Stoffa, *Global Optimization Methods in Geophysical Inversion*, Elsevier (1995), xi + 281 pp., Price \$170.50.

Extremely hard computational global optimization problems are pervasive in fields ranging from molecular biology to operations research and geophysical inversion. One of the major problems in geophysical inversion is to find models that explain the geophysical observations. These problems involve the global optimization of a function. The function one wants to optimize is a misfit or fitness function that characterizes the differences or similarities between observed or synthetic data calculated by using an assumed earth model.

In this book the authors describe local and global optimization techniques with an emphasis on geophysical applications. The authors concentrate mainly on stochastic types of global optimization methods. The applications include several seismic examples for the problem of 1-D seismic waveform inversion, pre-stack migration velocity analysis, examples from resistivity profiling and sounding, magnetotellurics, and a problem in reservoir description. The following list of chapters gives a good idea of the material covered in this book:

- Chapter 1: Preliminary Statistics
- Chapter 2: Direct, Linear and Iterative-Linear Inverse Models
- Chapter 3: Monte Carlo Methods
- Chapter 4: Simulated Annealing Methods
- Chapter 5: Genetic Algorithms
- Chapter 6: Geophysical Applications of SA and GA
- Chapter 7: Uncertainty Estimations

The book is well organized and self contained. The objectives set by the authors are well met. Every chapter and section starts with an introduction that outlines the upcoming material to discuss. The book will be a valuable source for researchers and students in geophysical sciences as well as in nonlinear optimization. The detailed index and the bibliography enhance the usefulness of this book.

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