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Nota di contenuto	Part I. Iterative optimization methods -- 1. Introduction to seismic inversion -- 2. Introduction to gradient optimization -- 3. Steepest-descent method -- 4. Conjugate-gradient and quasi-Newton methods. Part II. Traveltime tomography -- 5. Raypath travelttime tomography -- 6. Traveltime tomography : assessing model accuracy. Part III. Numerical modeling -- 7. Traveltime calculation by solution of the eikonal equation -- 8. Numerical solutions to the wave equation -- 9. The viscoacoustic wave equation. Part IV. Reflection migration -- 10. Forward and adjoint modeling using Green's functions -- 11. Reverse time migration -- 12. Wavepaths -- 13. Generalized diffraction-stack migration and filtering of coherent noise -- 14. Resolution limits for wave equation imaging. Part V. Least-squares migration -- 15. Iterative least-squares migration -- 16. Viscoacoustic least-squares migration -- 17. Least-squares migration filtering -- 18. Migration deconvolution. Part VI. Waveform inversion -- 19. Acoustic waveform inversion and its numerical implementation -- 20. Wave-equation inversion of skeletonized data -- 21. Acoustic waveform inversion : case histories -- 22. Elastic and viscoelastic full-waveform inversion -- 23. Vertical

transverse isotropy FWI.

Part VII. Image-domain inversion -- 24. Classical migration velocity analysis -- 25. Generalized differential semblance optimization -- 26. Generalized image-domain inversion.

Sommario/riassunto

This book describes the theory and practice of inverting seismic data for the subsurface rock properties of the earth. The primary application is for inverting reflection and/or transmission data from engineering or exploration surveys, but the methods described also can be used for earthquake studies. This book is written for scientists and advanced students in engineering, earth sciences, and physics. The reader should have some familiarity with certain aspects of numerical computation, such as finite-difference solutions to partial differential equations, numerical linear algebra, and the basic physics of wave propagation (e. g., Snell's law and ray tracing). For those not familiar with the terminology and methods of seismic exploration, a brief introduction is provided in the Appendix of Chapter 1. Computational labs are provided for most of the chapters, and some field data labs are given as well. Matlab and Fortran labs at the end of some chapters are used to deepen the reader's understanding of the concepts and their implementation. Such exercises are introduced early and geophysical applications are presented in every chapter. For the non-geophysicist, geophysical concepts are introduced with intuitive arguments, and their description by rigorous theory is deferred to later chapters.--
