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operator equations and their solution by iterative methods; 4.2 A generalized minimal residual method
4.3 The regularization method in a linear inverse problem solutionChapter 5. Nonlinear inversion technique; 5.1 Gradient-type methods; 5.2 Regularized gradient-type methods in the solution of nonlinear inverse problems; 5.3 Regularized solution of a nonlinear discrete inverse problem; 5.4 Conjugate gradient re-weighted optimization; Part III: Geopotential Field Inversion; Chapter 6. Integral representations in forward modeling of gravity and magnetic fields; 6.1 Basic equations for gravity and magnetic fields
6.2 Integral representations of potential fields based on the theory of functions of a complex variableChapter 7. Integral representations in inversion of gravity and magnetic data; 7.1 Gradient methods of gravity inversion; 7.2 Gravity field migration; 7.3 Gradient methods of magnetic anomaly inversion; 7.4 Numerical methods in forward and inverse modeling; Part IV: Electromagnetic Inversion; Chapter 8. Foundations of electromagnetic theory; 8.1 Electromagnetic field equations; 8.2 Electromagnetic energy flow; 8.3 Uniqueness of the solution of electromagnetic field equations
8.4 Electromagnetic Green's tensorsChapter 9. Integral representations in electromagnetic forward modeling; 9.1 Integral equation method; 9.2 Family of linear and nonlinear integral approximations of the electromagnetic field; 9.3 Linear and non-linear approximations of higher orders; 9.4 Integral representations in numerical dressing; Chapter 10. Integral representations in electromagnetic inversion; 10.1 Linear inversion methods; 10.2 Nonlinear inversion; 10.3 Quasi-linear inversion; 10.4 Quasi-analytical inversion; 10.5 Magnetotelluric (MT) data inversion
Chapter 11. Electromagnetic migration imaging

Sommario/riassunto

This book presents state-of-the-art geophysical inverse theory developed in modern mathematical terminology. The book brings together fundamental results developed by the Russian mathematical school in regularization theory and combines them with the related research in geophysical inversion carried out in the West. It presents a detailed exposition of the methods of regularized solution of inverse problems based on the ideas of Tikhonov regularization, and shows the different forms of their applications in both linear and nonlinear methods of geophysical inversion. This text is the first t