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Autore	Gzyl Henryk <1946->
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Nota di contenuto	Preface; Contents; List of Figures; List of Tables; 1. Introduction; 2. A collection of linear inverse problems; 2.1 A battle horse for numerical computations; 2.2 Linear equations with errors in the data; 2.3 Linear equations with convex constraints; 2.4 Inversion of Laplace transforms from finite number of data points; 2.5 Fourier reconstruction from partial data; 2.6 More on the non-continuity of the inverse; 2.7 Transportation problems and reconstruction from marginals; 2.8 CAT; 2.9 Abstract spline interpolation; 2.10 Bibliographical comments and references; References 3. The basics about linear inverse problems3.1 Problemstatements; 3.2 Quasi solutions and variational methods; 3.3 Regularization and approximate solutions; 3.4 Appendix; 3.5 Bibliographical comments and references; References; 4. Regularization in Hilbert spaces: Deterministic and stochastic approaches; 4.1 Basics; 4.2 Tikhonov's regularization scheme; 4.3 Spectral cutoffs; 4.4 Gaussian regularization of inverse problems; 4.5 Bayesianmethods; 4.6 The method ofmaximumlikelihood; 4.7 Bibliographical comments and references; References; 5. Maxentropic approach to linear inverse problems 5.1 Heuristic preliminaries5.2 Some properties of the entropy

functionals; 5.3 The direct approach to the entropic maximization problem; 5.4 Amore detailed analysis; 5.5 Convergence ofmaxentropic estimates; 5.6 Maxentropic reconstruction in the presence of noise; 5.7 Maxentropic reconstruction of signal and noise; 5.8 Maximum entropy according to Dacunha-Castelle and Gamboa. Comparison with Jaynes' classical approach; 5.8.1 Basic results; 5.8.2 Jaynes' and Dacunha and Gamboa's approaches; 5.9 MEM under translation; 5.10 Maxent reconstructions under increase of data
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6.5.3 Linear systems with non-Euclidean norm constraints6.5.4 Linear systems with solutions in unbounded convex sets; 6.5.5 Linear equations without constraints; 6.6 Linear systems with measurement noise; 6.7 Bibliographical comments and references; References; 7. Some simple numerical examples and moment problems; 7.1 The density of the Earth; 7.1.1 Solution by the standard L2[0, 1] techniques; 7.1.2 Piecewise approximations in L2([0, 1]); 7.1.3 Linear programming approach; 7.1.4 Maxentropic reconstructions: Influence of a priori data; 7.1.5 Maxentropic reconstructions: Effect of the noise
7.2 A test case

Sommario/riassunto

This book describes a useful tool for solving linear inverse problems subject to convex constraints. The method of maximum entropy in the mean automatically takes care of the constraints. It consists of a technique for transforming a large dimensional inverse problem into a small dimensional non-linear variational problem. A variety of mathematical aspects of the maximum entropy method are explored as well.