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The use of actual observations to infer the properties of a model is an inverse problem, which are often difficult as they may not have a unique solution. This book proposes a general approach that is valid for linear as well as for nonlinear problems. The philosophy is essentially probabilistic and allows the reader to understand the basic difficulties appearing in the resolution of inverse problems. The book attempts to explain how a method of acquisition of information can be applied to actual real-world problems, including heuristic arguments. Prompted by recent developments in inverse theory, this text is a completely rewritten version of a 1987 book by the same author, and includes many algorithmic details of Monte Carlo methods, least-squares discrete problems, and least-squares problems involving functions. In addition, some notions are clarified, the role of optimization techniques is underplayed, and Monte Carlo methods are taken more seriously. Directed to all scientists facing the problem of quantitative interpretation of experimental data in fields such as physics, chemistry, biology, image processing, and information sciences. Considerable effort has been made so that this book can serve either as a reference manual for researchers or as a textbook in a course for undergraduate or graduate students. Prompted by recent developments in inverse theory, this edition is a completely rewritten version of a 1987 book by the same author. Read more

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Data Published January 2005Format: PaperbackISBN: 9780898715729Length: 352 pagesDimensions: 252 x 175 x 20 mmWeight: 0.61kgAvailability: Available in limited markets only 1. The general discrete inverse problem 2. Monte Carlo methods 3. The least-squares criterion 4. Least-absolute values criterion and minimax criterion 5. Functional inverse problems 6. Appendices 7. Problems References Index Albert Tarantola, Université de Paris VI (Pierre et Marie Curie) Photograph taken in 2006, at rue de Vaugirard, with one of the two original mètres still in place. Albert Tarantola was a Spanish-born physicist (Barcelona, June 15, 1949 – December 6, 2009), of the University of Paris and the Institut de Physique du Globe (IPGP), and author of the book Probabilistic Formulation of Inverse Problems (Tarantola, 1987, 2005). Tarantola was the leader of the Geophysical Tomography Group, that during the years 1985–2000 developed methods for the interpretation of seismic waveform data. Beyond just this field, he is widely credited with popularizing the idea that inverse problems can be interpreted in a statistical sense, yielding the Bayesian perspective of inverse problems. Apart from his scientific research, Tarantola taught both at IPGP and at other universities. In 2018, he was given the Maurice Ewing Medal of the Society of Exploration Geophysicists, its highest award. Notable publications Books Tarantola, Albert (2005). Inverse Problem Theory and Methods for Model Parameter Estimation. SIAM. ISBN 978-0-89871-572-9. Tarantola, Albert (2006). Elements for Physics: Quantities, Qualities, and Intrinsic Theories. Springer. ISBN 978-3-642-06452-4. Scientific articles Tarantola, Albert; Valette, Bernard (1982). "Inverse Problems = Queues for Information" (PDF). Journal of Geophysics. 50: 159–170. Tarantola, Albert; Valette, Bernard (May 1982). "Generalized Nonlinear Inverse Problems Solved Using the Least Squares Criterion" (PDF). 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