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| Descrizione fisica      | 1 online resource (383 p.)  |
| Collana                 | Digital signal and image processing series. ; ; v.35  |
| Altri autori (Persone)  | IdierJerome   |
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| Soggetti                | Inverse problems (Differential equations)<br>Bayesian statistical decision theory   |
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| Note generali           | Description based upon print version of record.   |
| Nota di bibliografia    | Includes bibliographical references and index.  |
| Nota di contenuto       | Bayesian Approach to Inverse Problems; Table of Contents; Introduction; Part I. Fundamental Problems and Tools; Chapter 1. Inverse Problems, Ill-posed Problems; 1.1. Introduction; 1.2. Basic example; 1.3. Ill-posed problem; 1.3.1. Case of discrete data; 1.3.2. Continuous case; 1.4. Generalized inversion; 1.4.1. Pseudo-solutions; 1.4.2. Generalized solutions; 1.4.3. Example; 1.5. Discretization and conditioning; 1.6. Conclusion; 1.7. Bibliography; Chapter 2. Main Approaches to the Regularization of Ill-posed Problems; 2.1. Regularization; 2.1.1. Dimensionality control<br>2.1.1.1. Truncated singular value decomposition<br>2.1.1.2. Change of discretization; 2.1.1.3. Iterative methods; 2.1.2. Minimization of a composite criterion; 2.1.2.1. Euclidian distances; 2.1.2.2. Roughness measures; 2.1.2.3. Non-quadratic penalization; 2.1.2.4. Kullback pseudo-distance; 2.2. Criterion descent methods; 2.2.1. Criterion minimization for inversion; 2.2.2. The quadratic case; 2.2.2.1. Non-iterative techniques; 2.2.2.2. Iterative techniques; 2.2.3. The convex case; 2.2.4. General case; 2.3. Choice of regularization coefficient; |

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2.3.2. "L-curve" method  
2.3.3. Cross-validation; 2.4. Bibliography;  
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Part II. Deconvolution  
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## Sommario/riassunto

Many scientific, medical or engineering problems raise the issue of recovering some physical quantities from indirect measurements; for instance, detecting or quantifying flaws or cracks within a material from acoustic or electromagnetic measurements at its surface is an essential problem of non-destructive evaluation. The concept of inverse problems precisely originates from the idea of inverting the laws of physics to recover a quantity of interest from measurable data. Unfortunately, most inverse problems are ill-posed, which means that precise and stable solutions are not easy to devise

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