1. Record Nr. UNINA9910828770503321

Titolo	Regularization and Bayesian methods for inverse problems in signal and image processing / / edited by Jean-Francois Giovannelli, Jerome Idier
Pubbl/distr/stampa	London, [England] ; ; Hoboken, New Jersey : , : ISTE Limited : , : Hoboken, New Jersey, , 2015 ©2015
ISBN	1-118-82698-1 1-118-82725-2 1-118-82707-4
Descrizione fisica	1 online resource (323 p.)
Collana	Digital Signal and Image Processing Series
Disciplina	515.35
Soggetti	Inverse problems (Differential equations) Bayesian statistical decision theory Signal processing - Mathematics Image processing - Mathematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover; Title Page; Copyright; Contents; Introduction; I.1. Bibliography; 1: 3D Reconstruction in X-ray Tomography: Approach Example for Clinical Data Processing; 1.1. Introduction; 1.2. Problem statement; 1.2.1. Data formation models; 1.2.2. Estimators; 1.2.3. Algorithms; 1.3. Method; 1.3.1. Data formation models; 1.3.2. Estimator; 1.3.3. Minimization method; 1.3.3.1. Algorithm selection; 1.3.3.2. Minimization procedure; 1.3.4. Implementation of the reconstruction procedure; 1.4. Results; 1.4.1. Comparison of minimization algorithms; 1.4.2. Using a region of interest in reconstruction 1.4.3. Consideration of the polyenergetic character of the X-ray source1.4.3.1. Simulated data in 2D; 1.4.3.2. Real data in 3D; 1.5. Conclusion; 1.6. Acknowledgments; 1.7. Bibliography; 2: Analysis of Force-Volume Images in Atomic Force Microscopy Using Sparse Approximation; 2.1. Introduction; 2.2. Atomic force microscopy; 2.2.1. Biological cell characterization; 2.2.2. AFM modalities; 2.2.2.1. Isoforce and isodistance images; 2.2.2.2. Force spectroscopy; 2.2.2.3. Force-

volume imaging; 2.2.3. Physical piecewise models; 2.2.3.1. Approach phase models; 2.2.3.2. Retraction phase models
2.3. Data processing in AFM spectroscopy2.3.1. Objectives and methodology in signal processing; 2.3.1.1. Detection of the regions of interest; 2.3.1.2. Parametric model fitting; 2.3.2. Segmentation of a force curve by sparse approximation; 2.3.2.1. Detecting jumps in a signal; 2.3.2.2. Joint detection of discontinuities at different orders; 2.3.2.3. Scalar and vector variable selection; 2.4. Sparse approximation algorithms; 2.4.1. Minimization of a mixed l2-l0 criterion; 2.4.2. Dedicated algorithms; 2.4.3. Joint detection of discontinuities; 2.4.3.1. Construction of the dictionary
2.4.3.2. Selection of scalar variables2.4.3.3. Selection of vector variables; 2.5. Real data processing; 2.5.1. Segmentation of a retraction curve: comparison of strategies; 2.5.2. Retraction curve processing; 2.5.3. Force-volume image processing in the approach phase; 2.6. Conclusion; 2.7. Bibliography; 3: Polarimetric Image Restoration by Non-local Means; 3.1. Introduction; 3.2. Light polarization and the Stokes-Mueller formalism; 3.3. Estimation of the Stokes vectors; 3.3.1. Estimation of the Stokes vector in a pixel; 3.3.1.1. Problem formulation 3.3.1.2. Properties of the constrained optimization problem3.3.1.3. Optimization algorithm; 3.3.2. Non-local means filtering; 3.3.3. Adaptive non-local means filtering; 3.3.3.1. The function ; 3.3.3.2. Patches size and shape; 3.3.4. Application to the estimation of Stokes vectors; 3.4. Results; 3.4.1. Results with synthetic data; 3.4.1.1. Synthetic data and context evaluation presentation; 3.4.1.2. Results; 3.4.1.3. Significance of the proposed method for the estimation of the weights; 3.4.2. Results with real data; 3.5. Conclusion; 3.6. Bibliography
4: Video Processing and Regularized Inversion Methods

Sommario/riassunto

The focus of this book is on "ill-posed inverseproblems". These problems cannot be solved only on the basisof observed data. The building of solutions involves therecognition of other pieces of a priori information. Thesesolutions are then specific to the pieces of information taken intoaccount. Clarifying and taking these pieces of information intoaccount is necessary for grasping the domain of validity and thefield of application for the solutions built. For too long, the interest in these problems has remained very limited in thesignal-image community. However, the community has since recog