1. Record Nr. UNINA9910830486403321

Titolo	Signal and image multiresolution analysis [[electronic resource] /] / edited by Abdeljalil Ouahabi ; series editor, Francis Castanie
Pubbl/distr/stampa	London, : ISTE Hoboken, N.J., : John Wiley and Sons Inc, 2012
ISBN	1-118-56876-1 1-118-56859-1 1-118-56866-4
Descrizione fisica	1 online resource (308 p.)
Collana	Digital signal and image processing series
Altri autori (Persone)	OuahabiAbdeldjalil CastanieFrancis
Disciplina	621.3822
Soggetti	Signal processing Image processing
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 Page; Table of Contents; Introduction; Chapter 1. Introduction to Multiresolution Analysis; 1.1. Introduction; 1.2. Wavelet transforms: an introductory review; 1.2.1. Brief history; 1.2.2. Continuous wavelet transforms; 1.2.2.1. Wavelet transform modulus maxima; 1.2.2.2. Reconstruction; 1.2.3. Discrete wavelet transforms; 1.3. Multiresolution; 1.3.1. Multiresolution analysis and wavelet bases; 1.3.1.1. Approximation spaces; 1.3.1.2. Detail spaces; 1.3.2. Multiresolution analysis: points to remember; 1.3.3. Decomposition and reconstruction 1.3.3.1. Calculation of coefficients1.3.3.2. Implementation of MRA: Mallat algorithm; 1.3.3.3. Extension to images; 1.3.4. Wavelet packets; 1.3.5. Multiresolution analysis summarized; 1.4. Which wavelets to choose?; 1.4.1. Number of vanishing moments, regularity, support (compactness), symmetry, etc.; 1.4.2. Well-known wavelets, scaling functions and associated filters; 1.4.2.1. Haar wavelet; 1.4.2.2. Daubechies wavelets; 1.4.2.3. Symlets; 1.4.2.4. Coiflets; 1.4.2.5. Meyer wavelets; 1.4.2.6. Polynomial spline wavelets; 1.5. Multiresolution analysis and biorthogonal wavelet bases

1.5.1. Why biorthogonal bases?1.5.2. Multiresolution context; 1.5.3. Example of biorthogonal wavelets, scaling functions and associated filters; 1.5.4. The concept of wavelet lifting; 1.5.4.1. The notion of lifting; 1.5.4.2. Significance of structure lifting; 1.6. Wavelet choice at a glance; 1.6.1. Regularity; 1.6.2. Vanishing moments; 1.6.3. Other criteria; 1.6.4. Conclusion; 1.7. Worked examples; 1.7.1. Examples of multiresolution analysis; 1.7.2. Compression; 1.7.3. Denoising (reduction of noise); 1.8. Some applications; 1.8.1. Discovery and contributions of wavelets
1.8.2. Biomedical engineering1.8.2.1. ECG, EEG and BCI; 1.8.2.2. Medical imaging; 1.8.3. Telecommunications; 1.8.3.1. Adaptive compression for sensor networks; 1.8.3.2. Masking image encoding and transmission errors; 1.8.3.3. Suppression of correlated noise; 1.8.4. "Compressive sensing", ICA, PCA and MRA; 1.8.4.1. Principal component analysis; 1.8.4.2. Independent component analysis; 1.8.4.3. Compressive sensing; 1.8.5. Conclusion; 1.9. Bibliography; Chapter 2. Discrete Wavelet Transform-Based Multifractal Analysis; 2.1. Introduction; 2.1.1. Fractals and wavelets: a happy marriage? 2.1.2. Background2.1.3. Mono/multifractal processes; 2.1.4. Chapter outline; 2.2. Fractality, variability and complexity; 2.2.1. System complexity; 2.2.2. Complex phenomena properties; 2.2.2.1. Tendency of autonomous agents to self-organize; 2.2.2.2. Variability and adaptability; 2.2.2.3. Bifurcation concept and chaotic model; 2.2.2.4. Hierarchy and scale invariance; 2.2.2.5. Self-organized critical phenomena; 2.2.2.6. Highly optimized tolerance; 2.2.3. Fractality; 2.3. Multifractal analysis; 2.3.1. Point-wise regularity; 2.3.2. Holder exponent
2.3.3. Signal classification according to the regularity properties

Sommario/riassunto

Multiresolution analysis using the wavelet transform has received considerable attention in recent years by researchers in various fields. It is a powerful tool for efficiently representing signals and images at multiple levels of detail with many inherent advantages, including compression, level-of-detail display, progressive transmission, level-of-detail editing, filtering, modeling, fractals and multifractals, etc.This book aims to provide a simple formalization and new clarity on multiresolution analysis, rendering accessible obscure techniques, and merging, unifying or completing