1. Record Nr. UNINA9910972000603321

Autore	Cattani Carlo <1954->
Titolo	Wavelet and wave analysis as applied to materials with micro or nanostructure / / Carlo Cattani, Jeremiah Rushchitsky
Pubbl/distr/stampa	Hackensack, NJ, : World Scientific Pub. Co., c2007
ISBN	1-281-91891-1 9786611918910 981-270-976-2
Edizione	[1st ed.]
Descrizione fisica	1 online resource (473 p.)
Collana	Series on advances in mathematics for applied sciences ; ; v. 74
Altri autori (Persone)	RushchitskiiIA. IA (IArema IAroslavovich)
Disciplina	620.1/18015152433
Soggetti	Wavelets (Mathematics) Nanostructures - 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 (p. 443-454) and index.
Nota di contenuto	Contents; Preface; 1. Introduction; 2. Wavelet Analysis; 2.1 Wavelet and Wavelet Analysis. Preliminary Notion; 2.1.1 The space L 2 (R); 2.1.2 The spaces L p (R) (p = 1); 2.1.3 The Hardy spaces H p (R) (p = 1); 2.1.4 The sketch scheme of wavelet analysis; 2.2 Rademacher, Walsh and Haar Functions; 2.2.1 System of Rademacher functions; 2.2.2 System of Walsh functions; 2.2.3 System of Haar functions; 2.3 Integral Fourier Transform. Heisenberg Uncertainty Principle; 2.4 Window Transform. Resolution; 2.4.1 Examples of window functions; 2.4.2 Properties of the window Fourier transform 2.4.3 Discretization and discrete window Fourier transform2.5 Bases. Orthogonal Bases. Biorthogonal Bases; 2.6 Frames. Conditional and Unconditional Bases; 2.6.1 Wojtaszczyk's definition of unconditional basis (1997); 2.6.2 Meyer's definition of unconditional basis (1997); 2.6.3 Donoho's definition of unconditional basis (1993); 2.6.4 Definition of conditional basis; 2.7 Multiresolution Analysis; 2.8 Decomposition of the Space L 2 (R); 2.9 Discrete Wavelet Transform. Analysis and Synthesis; 2.9.1 Analysis: transition from the fine scale to the coarse scale 2.9.2 Synthesis: transition from the coarse scale to the fine scale2.10 Wavelet Families; 2.10.1 Haar wavelet; 2.10.2 Stromberg wavelet; 2.10.3 Gabor wavelet; 2.10.4 Daubechies-Jaffard-Journe wavelet;

2.10.5 Gabor-Malvar wavelet; 2.10.6 Daubechies wavelet; 2.10.7 Grossmann-Morlet wavelet; 2.10.8 Mexican hat wavelet; 2.10.9 Coifman wavelet - coiflet; 2.10.10 Malvar-Meyer-Coifman wavelet; 2.10.11 Shannon wavelet or sinc-wavelet; 2.10.12 Cohen-Daubechies-Feauveau wavelet; 2.10.13 Geronimo-Hardin-Massopust wavelet; 2.10.14 Battle-Lemarie wavelet; 2.11 Integral Wavelet Transform
2.11.1 Definition of the wavelet transform2.11.2 Fourier transform of the wavelet; 2.11.3 The property of resolution; 2.11.4 Complex-value wavelets and their properties; 2.11.5 The main properties of wavelet transform; 2.11.6 Discretization of the wavelet transform; 2.11.7 Orthogonal wavelets; 2.11.8 Dyadic wavelets and dyadic wavelet transform; 2.11.9 Equation of the function (signal) energy balance; 3. Materials with Micro- or Nanostructure; 3.1 Macro-, Meso-, Micro-, and Nanomechanics; 3.2 Main Physical Properties of Materials; 3.3 Thermodynamical Theory of Material Continua
3.4 Composite Materials3.5 Classical Model of Macroscopic (Effective) Moduli; 3.6 Other Microstructural Models; 3.6.1 Bolotin model of energy continualization; 3.6.2 Achenbach-Hermann model of effective stiffness; 3.6.3 Models of effective stiffness of high orders; 3.6.4 Asymptotic models of high orders; 3.6.5 Drumheller-Bedford lattice microstructural models; 3.6.6 Mindlin microstructural theory; 3.6.7 Eringen microstructural model. Eringen-Maugin model; 3.6.8 Pobedrya microstructural theory; 3.7 Structural Model of Elastic Mixtures; 3.7.1 Viscoelastic mixtures; 3.7.2 Piezoelastic mixtures
3.8 Computer Modelling Data on Micro- and Nanocomposites

Sommario/riassunto

This seminal book unites three different areas of modern science: the micromechanics and nanomechanics of composite materials; wavelet analysis as applied to physical problems; and the propagation of a new type of solitary wave in composite materials, nonlinear waves. Each of the three areas is described in a simple and understandable form, focusing on the many perspectives of the links among the three. All of the techniques and procedures are described here in the clearest and most open form, enabling the reader to quickly learn and use them when faced with the new and more advanced problem