Miloslav Duchoň

Book Reviews

Mathematica Slovaca, Vol. 53 (2003), No. 2, 213--214

Persistent URL: http://dml.cz/dmlcz/136884

Mathematica
Slovaca
© 2003
Mathematical Institute
Slovak Academy of Sciences

Math. Slovaca, **53** (2003), No. 2, 213–214

BOOK REVIEWS

Addison, P. S.:
THE ILLUSTRATED WAVELET TRANSFORM HANDBOOK.
Introductory Theory and Applications in Science, Engineering, Medicine and Finance.
Institute of Physics Publishing, Bristol-Philadelphia 2002, 353 pp.
ISBN 0 7503 0692 0

The book furnishes the reader an overview of theory and practical applications of wavelet transforms methods, a new time-frequency decomposition tool for data analysis.

The work is divided into two parts.

The first three chapters present a theory of wavelet transforms methods. *Chapters 4* to *7* are devoted to applications areas whose number is still growing.

Let us turn now in more detail to the contents of a material of the book.

A brief first chapter introduces the main text. It is noted that wavelet transform analysis is particularly useful for analysing signals which can be described as aperiodic, noisy, intermittent, transient and so on, and that it has now be applied in the investigation of a multitude of diverse physical phenomena, from climate analysis to the analysis of financial indices, from heart monitoring to the condition monitoring of rotating machinery, from seismic denoising to the denoising of astronomical images, from crack surface characterization to the characterization of turbulent intermittency, from video image compression to the compression of medical signal records, e.g., ECG, EEG, MR, DNA and so on.

Chapter 2 and *Chapter 3* deal respectively with the theory of continuous wavelet transform and the discrete wavelet transform.

The rest of the book provides an overview of a variety of applications.

Chapter 4 deals with fluid mechanics, in particular statistical measures, engineering and geophysical flows.

Chapter 5 provides a close look at the engineering testing, monitoring and characterization.

Chapter 6 deals with a variety of medical research topics. Namely wavelet transform methods have been used to characterize a wide range of medical signals, including the ECG, EEG, EMG, pathological sounds (lung sounds, heart sounds and arterial sounds), blood flows, blood pressures, DNA sequences and medical images (optical, X-ray, NMR, ultrasound etc.).

Chapter 7, the final chapter, is devoted to fractal geometry, finance and geophysics. It provides also a brief account of the role played by wavelet transform analysis in such area as astronomy, plasma physics, electrical power systems, chemical analysis and more.

The appendix contains websites concerning wavelet transform theory and application, and other things to support presentation of the subject of the book. As is, of course, clear from the title of the book, there is plenty od figures in the text of this book.

The book can be recommended to the people interested above all in applications in science, engineering, medicine, finance or elsewhere. An account of the theory of continuous and discrete wavelet transforms, with a large number of examples of their use across a wide range of

disciplines, is convenient both for newcomers to the subject and readers already acquainted with wavelets methods working in a particular area of application.

Miloslav Duchoň, Bratislava