

<<数学分析与工程中的小波方法>>

图书基本信息

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前言

The texts of this book grew from an ISFMA ( Sino-French Institute of Applied Mathematics ) symposium on Wavelet Methods in Mathematical Analysis and Engineering that took place in August 2007 on the Zhuhai campus of Sun Yat-Sen University. This symposium was composed of a one week summer school mainly directed towards Chinese PhD students and postdocs, followed by a one week conference attended by researchers from all over the world. This event was co-organized by Sun Yat-Sen University in Guangzhou and the ISFMA in Shanghai. The purpose of the courses was to give the students the required level in wavelet analysis and in the main applications that would be treated during the conference, so that they would be able to follow it with profit. The courses were given by Albert Cohen, Daoqing Dai, Stéphane Jaffard, Lixin Shen, Zuowei Shen and Lihua Yang; they covered basic materials concerning construction of properties of wavelet bases, and alternative decomposition methods; they gave an overview of the main applications in the numerical analysis of PDEs, and signal and image processing. The workshop exposed new techniques such as Empirical Mode Decomposition ( EMD ) and new trends in the recovery of missing data, such as compressed sensing, and a sample of a few recent key applications of wavelets in several scientific areas. This event was part of a long term collaboration between Chinese, Singaporean and French mathematicians in the area of wavelet analysis, and a second event took place one year later, with the Chinese-French-Singaporean Joint Workshop on Wavelet Theory and Applications in Singapore ( June 2008 ). These texts essentially correspond to the courses that were given during the summer school. Put together, they give a comprehensive overview of both the fundamentals of wavelet analysis and related tools, and of the most active directions of applications that developed recently. They offer a state of the art in several active areas of research where wavelet ideas, or more generally multiresolution ideas have proved particularly effective.

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### 内容概要

This book gives a comprehensive overview of both the fundamentals of wavelet analysis and related tools, and of the most active recent developments towards applications. It offers a state of the art in several active areas of research where wavelet ideas, or more generally multiresolution ideas have proved particularly effective. The main applications covered are in the numerical analysis of PDEs, and signal and image processing. Recently introduced techniques such as Empirical Mode Decomposition (EMD) and new trends in the recovery of missing data, such as compressed sensing, are also presented. Applications range for the reconstruction of noisy or blurred images, pattern and face recognition, to nonlinear approximation in strongly anisotropic contexts, and to the classification tools based on multifractal analysis.

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