Discrete Fourier Analysis and Wavelets. Applications to Signal and Image Processing

Description:
A thorough guide to the classical and contemporary mathematical methods of modern signal and image processing

Discrete Fourier Analysis and Wavelets presents a thorough introduction to the mathematical foundations of signal and image processing. Key concepts and applications are addressed in a thought-provoking manner and are implemented using vector, matrix, and linear algebra methods. With a balanced focus on mathematical theory and computational techniques, this self-contained book equips readers with the essential knowledge needed to transition smoothly from mathematical models to practical digital data applications.

The book first establishes a complete vector space and matrix framework for analyzing signals and images. Classical methods such as the discrete Fourier transform, the discrete cosine transform, and their application to JPEG compression are outlined followed by coverage of the Fourier series and the general theory of inner product spaces and orthogonal bases. The book then addresses convolution, filtering, and windowing techniques for signals and images. Finally, modern approaches are introduced, including wavelets and the theory of filter banks as a means of understanding the multiscale localized analysis underlying the JPEG 2000 compression standard.

Throughout the book, examples using image compression demonstrate how mathematical theory translates into application. Additional applications such as progressive transmission of images, image denoising, spectrographic analysis, and edge detection are discussed. Each chapter provides a series of exercises as well as a MATLAB project that allows readers to apply mathematical concepts to solving real problems. Additional MATLAB routines are available via the book’s related Web site.

With its insightful treatment of the underlying mathematics in image compression and signal processing, Discrete Fourier Analysis and Wavelets is an ideal book for mathematics, engineering, and computer science courses at the upper-undergraduate and beginning graduate levels. It is also a valuable resource for mathematicians, engineers, and other practitioners who would like to learn more about the relevance of mathematics in digital data processing.

Contents:

PREFACE xi

ACKNOWLEDGMENTS xv

1 VECTOR SPACES, SIGNALS, AND IMAGES 1
1.1 Overview 1
1.2 Some Common Image Processing Problems 1
1.3 Signals and Images 3
1.4 Vector Space Models for Signals and Images 9
1.5 Basic Waveforms—The Analog Case 17
1.6 Sampling and Aliasing 21
1.7 Basic Waveforms—The Discrete Case 26
1.8 Inner Product Spaces and Orthogonality 29
1.9 Signal and Image Digitization 41
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct.

Product Name: Discrete Fourier Analysis and Wavelets. Applications to Signal and Image Processing
Web Address: http://www.researchandmarkets.com/reports/2173825/
Office Code: SCEJ DyEE

Product Format
Please select the product format and quantity you require:

<table>
<thead>
<tr>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Copy (Hard Back):</td>
</tr>
<tr>
<td>USD 132 + USD 28 Shipping/Handling</td>
</tr>
</tbody>
</table>

* Shipping/Handling is only charged once per order.

Contact Information
Please enter all the information below in BLOCK CAPITALS

Title:  [ ] Mr  [ ] Mrs  [ ] Dr  [ ] Miss  [ ] Ms  [ ] Prof
First Name: ______________________ Last Name: ______________________
Email Address: * ______________________
Job Title: ______________________
Organisation: ______________________
Address: ______________________
City: ______________________
Postal / Zip Code: ______________________
Country: ______________________
Phone Number: ______________________
Fax Number: ______________________

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:

Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:

Account number 833 130 83
Sort code 98-53-30
Swift code ULSBIE2D
IBAN number IE78ULSB9853308331083
Bank Address Ulster Bank,
27-35 Main Street,
Blackrock,
Co. Dublin,
Ireland.

If you have a Marketing Code please enter it below:

Marketing Code:

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp