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Flandrin, Patrick
Time frequency. (Temps-fréquence.) 2ème éd., revue et corrigée.
Paris: Édition Hermès. viii, 395 p. FF 450.00 (1998).

[The first ed. (1993) was not reviewed.] This is the second, revised edition providing the reader with a panorama of a variety of points of view and approaches pertaining to the time-frequency description of signals. Now, it is a sound fact that there is not a universal approach to an adequate description of arbitrary signals. For regular in shape, or stationary signals, Fourier analysis offers a lot of consistent characterization parameters, whereas for irregular in shape, or nonstationary signals, Fourier analysis is of little use. The advent of Wavelet analysis provided a new tool for describing signals that are very irregular in shape. In the Preface Yves Meyer, from Institut de France, plainly explains the main stages in the domain of Signal Processing (SP). Between 1940 and 1960 one processed: a) only analog signals and subsequently b) digital ones, with emphasis on their informational contents (i.e. their statistics); c) after 1970 up to our days the methods of mathematical physics, particularly those of quantum mechanics, came on the scene of SP. Quoting again Y. Meyer, SP is on the common boundary of numerous scientific and technical domains and it requires various knowledge that are rarely to be found in a single scientist. The book of Patrick Flandrin is a (successful) challenge against this opinion. In order for the reader to have an idea of the topics included in the book, we list its contents: Preface; Foreword; (1) The Time-Frequency Problem; 1.1. The Time-Frequency Duality; 1.2. Abandoning the Fourier Approach?; 1.3. Towards Time-Frequency Multiple Approaches; (2) Classes of Solutions; 2.1. An Introduction and a Brief History; 2.2. Atom Decomposition; 2.3. Energy Distributions; 2.4. Power Distributions; (3) Interpreting the Time-Frequency Approach; 3.1. On the Bilinear Classes; 3.2. Geometry of Wigner Wille Transform; 3.3. On the Positivity; (4) Thinking in the Time-Frequency Manner; 4.1. Localising Time or Energy; 4.2. Analysing; 4.3. Taking a Decision; References; Index. After each chapter, interesting remarks are presented. There are a lot of interesting aspects that are discussed in the book. Instead of enumerating them, we prefer to quote some famous names included in the References (hundreds of books and papers) and their main contributors: *J. Carson* and *T. Fry* (quasistationary method in frequency modulation), *L. Cohen* (phase state description in quantum mechanics), *A. Cohen* (basic results in Wavelet analysis), *I. Daubechies* (compactly supported Wavelets), *A. Grossman* and *J. Morlet* (initiators of Wavelet Theory), *S. Mallat* (multiresolution approach to Wavelets), *Y. Meyer* (basic representation theorems on Wavelets), *J. Wille* (introducing the analytical signal), *E. Wigner* (basic results in quantum mechanics), *D. Gabor* (windowed analysis of signals) and many papers written by the author of this book. The book under review is a great success and we are happy to learn that an English version is in preparation (or has already been issued). The reader is invited to find himself new facts concerning the Time-Frequency duality, so that we can conclude in saying: about this subject many books have been written, the present one is an excellent one and it paves the way for new ones to come!

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