

ANNOUNCEMENT

## Introduction into wavelet analysis for physicists

### A friendly guide to wavelet

G Kaiser (Boston, Basel, Berlin: Birkhauser, 1994) 300 pp.

PACS numbers: **02.30.–f**, **02.90. + p**

The wavelet analysis has firmly entered the modern physics. Selecting the kernel corresponding to the problem under study and varying the shifting parameter, a researcher obtains a unique flexible tool — an integral transformation producing a two-dimensional scan of a one-dimensional signal and allowing to look at the signal with a ‘microscope’, construction of which is mostly adequate to the analysis of the signal, at the point the researcher is interested in and with the appropriate magnification.

The permanent readers of the *Physics–Uspekhi* have already had time to learn the basics of the wavelet analysis and its applications (mainly geophysical) in the paper by N M Astaf'eva [*Usp. Fiz. Nauk* **166** (11) 1145 (1996), *Phys. Usp.* **39** (11) 1085 (1996)]. However, those who would like to study in more detail the new powerful means for analysis of complex signals will inevitably meet two obstacles: the total absence of handbooks and monographies on the wavelet analysis in Russian, and the lack in a rather wide world literature of the wavelet analysis presentation that would be comprehensible for a physicist and devoted to a user and not to a mathematician, who is primarily interested in the justification and further development of the methodics.

The book by Gerald Kaiser is a pleasant exception and has a surprisingly precise and impressive title “A friend guide to wavelet”. This is the first handbook in the world literature that presents the basic facts of the wavelet analysis in a friendly way with a maximal account of the needs, requests, and interests of a reader-user, first of all a physicist. Not requiring too much from the mathematical background of the reader (the book starts with reminding the basics of linear algebra and gradually, with an amazing pedagogical tact and the feel of measure, introduces the reader into the notions of Gilbert and functional spaces), Gerald Kaiser creates a self-sufficient textbook that needs not appealing to other handbooks. The scheme ‘definition–theorem–proof’ accepted in the mathematical literature for mathematicians is safely changed, for the reader’s profit, by the explanations revealing the essence of the introduced concepts for a potential user, preventing him from possible errors, and attracting his attention to some subtleties important for applications. Exercises at the end of each chapter help in active learning the material and not only inform, but instruct, too.

The book consists of two parts. In the first part entitled “The basics of the wavelet analysis” (Chapters 1–8) the

reader is acquainted with necessary concepts and obtains the knowledge of the skilled and successful use of the wavelet analysis. In the second, more special part “Physical wavelets” (Chapters 9–11), the author presents the results of his own studies by showing how one should construct wavelets in the framework of a model. Electromagnetic and acoustic wavelets constructed by the author reveal a deep relation between physical wavelets and those appeared during the signal analysis in the theory of communications.

This interesting, needed, and actual book by Gerald Kaiser is worth translating into Russian.

*Yu A Danilov*