PREFACE

ⁱ This special issue of "Telecommunication and Radio Engineering" is composed of the works presented at the First International Workshop on Mathematical Modeling of Physical Processes in Inhomogeneous Media (20–22 March 2001, Guanajuato, Mexico). These reports were mainly dedicated to problems of modeling in information and signal processing, mathematical physics, and modeling for emerging techniques and instrumentation. Among new interesting methods used for solving the aforementioned problems one must note techniques based on R-functions, atomic functions, wavelet approximation, and fractals. Thus, atomic functions, as infinitely differentiable compactly supported solutions to functional-differential equations, possess good approximation properties. The R-function method (RFM) was developed for solving the inverse problem of analytical geometry. For a long time it was used mainly in boundary value problems for complex-shaped domains. However, in combination with atomic functions, the RFM allows us to construct multi-dimensional weighting windows with arbitrary apertures. Here, we say nothing about the fractals and wavelet techniques. Now they are well known and have a very wide scope of applications. New non-classic mathematical tools provide accurate and convenient approaches for solving different complex problems of modeling such as signal processing on the base of window functions, integral equations (including ill-posed ones), adaptive filtering, remote sensing, antenna analysis and synthesis, digital radar, signal coding and compression, internal and external electrodynamic problems, acousto-optics, etc. Both mathematical and physical aspects of problems are considered. Hope that presented works will give the power impulse for development and investigation of new methods for mathematical modeling of physical processes. This issue will be useful both for mathematicians and for engineers. New ideas and results may find applications in solving other classes of theoretical and practical problems.

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