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Multicriteria Evaluation in a Fuzzy Environment. Theory and Applications in Ecological Economics

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xiv + 255 pages, 28 figures.
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The referred book suggests mathematical approach to the actual problem of conflicts between economic progress and the environmental protection. The linkage between the growth of production and consumption on one side and the ecological risks on the other one has led, on the general “ideological” level, to the formulation of the “*sustainable development*” concept. The book offers mathematical reflection of that idea. It is based on the paradigm considering efficiency, equity and sustainability for determining conflictual values of modern ecological economics. The main goal is to develop and verify multicriteria evaluation method being able to suggest effective compromises between their demands.

The environmental systems are complex, characterized by uncertainty, subjectivity and incompleteness which can be mathematically modelled namely by fuzzy set theoretical tools adequately reflecting the typical features of such vague qualitative and quantitative information. The referred work suggests a new approach to the multicriteria evaluation based on the semantic distance. It overcomes different weak points of the traditional comparison methods, and its evaluation matrices include crisp, as well as stochastic and fuzzy measurements of the performance of decision alternatives. The multicriteria evaluation method is based on some aspects of the partial comparability axiom, and it is relatively flexible for applications.

The text is divided into twelve chapters which are formed (except the first one devoted to the introductory presentation of starting notions) in three main parts of the book. The first part presents the *Theoretical Analysis of Cost-Benefit Analysis and Multicriteria Evaluation*, the second part is entitled *Multicriteria Evaluation in a Fuzzy Environment* and it is the main part of the book. The last part, *Application to a Real-World Environmental Management Problem*, illustrates the previous theoretical methods on the example of river Po basin environmental policy (Po is an Italian river). The book is completed by a short *Preface* and representative *References and Bibliography* including more than 400 items.

The book is written in a lucid style, the text is well organized into relatively short sections and subsections. Some sections are heuristic or preavailably heuristic, several of them demand elementary knowledge of mathematical logic and some tools of the higher mathematics (including some parts of Calculus).

The task of the author was not easy. The transdisciplinary character of the presented problems demanded to find a unitary style for presentation of mathematical, logical, economical, ecological (and in certain sense also philosophical and politological) topics. All of them touch the subject of the referred book and, on the other hand, none of them is sufficiently dominant to determine one “binding” style. The author has succeeded to overcome this difficulty and to create a consistently effecting text.

The problems of ecological economics belong to the typical features of the contemporary world. The referred book can be useful for any reader wishing to find their analysis based on mathematical approaches and analysis of their quantitative and qualitative, however uncertain, components.

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