

Preface

In conventional mathematical programming, coefficients of problems are usually determined by the experts as crisp values in terms of classical mathematical reasoning. But in reality, in an imprecise and uncertain environment, it will be utmost unrealistic to assume that the knowledge and representation of an expert can come in a precise way.

The wider objective of the book is to study different real decision situations where problems are defined in inexact environment. Inexactness are mainly generated in two ways – (1) due to imprecise perception and knowledge of the human expert followed by vague representation of knowledge as a DM; (2) due to hugeness and complexity of relations and data structure in the definition of the problem situation. We use interval numbers to specify inexact or imprecise or uncertain data. Consequently, the study of a decision problem requires answering the following initial questions –

How should we

- ⊙ compare and define preference ordering between two intervals?
- ⊙ interpret and deal inequality relations involving interval coefficients?
- ⊙ interpret and make way towards the goal of the decision problem?

The present research work consists of two closely related fields: first-one approaches towards defining a generalized preference ordering scheme for interval attributes. We have suggested two indices, *viz.*, Acceptability Index and Fuzzy Preference Ordering for interval attributes. But, before that a detailed comparative study on the existing ordering indices was necessary to identify the lacunae. Here we liked to incorporate possibly all relevant and even the most recent literatures up to 2008. Naturally, this part of our contribution, spanned more or less within Chapter 1 – 4, has taken considerable room in this book.

The next related field approaches to deal with some issues having application potential in many areas of decision making. Here we tried to develop mathematical description of relationships using interval arithmetic or re-structure some

optimization models in inexact environment using interval numbers. Development of working algorithm for these models has also been attempted.

This book consists of nine chapters including the introductory first chapter, which gives a brief review of the literature and basic intention of this study. Our research contribution constitutes Chapter 2 to Chapter 8. The last chapter gives the chapter-wise summary and indicates the direction and scope in brief of the future research.

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