

LIST OF TABLES

1	Introduction to Multi-Criteria Decision Making.....	1
2	Multi-Criteria Decision Making Methods	5
3	Quantification of Qualitative Data for MCDM Problems	23
<i>Table 3-1:</i>	Scale of Relative Importances (according to Saaty[1980]).....	27
<i>Table 3-2:</i>	Scale of Relative Importances (According to Lootsma[1988])	28
<i>Table 3-3:</i>	Two Exponential Scales.....	29
4	Deriving Relative Weights from Ratio Comparisons	57
<i>Table 4-1:</i>	RCI Values of Sets of Different Order n	59
<i>Table 4-2:</i>	Data for the Second Extensive Numerical Example	66
<i>Table 4-3:</i>	Comparison of the Weight Values for the Data in Table 4-2.....	67
<i>Table 4-4:</i>	Average Residual and CI Versus Order of Set and CR When the Human Rationality Assumption (HR) and the Eigenvalue Method (EM) is used. Results Correspond to 100 Random Observations	69
5	Deriving Relative Weights from Difference Comparisons	73
<i>Table 5-1:</i>	Proposed Similarity Scale	77
6	A Decomposition Approach for Evaluating Relative Weights Derived from Comparisons	87
<i>Table 6-1a:</i>	Computational Results, Part A.....	101
<i>Table 6-1b:</i>	Computational Results, Part B.....	102
<i>Table 6-1c:</i>	Computational Results, Part C.....	103
<i>Table 6-1d:</i>	Computational Results, Part D.....	104

7	Reduction of Pairwise Comparisons Via a Duality Approach.....	115
8	A Sensitivity Analysis Approach for MCDM Methods	131
<i>Table 8-1:</i>	Decision Matrix for the Numerical Example on the WSM	139
<i>Table 8-2:</i>	Current Final Preferences.....	139
<i>Table 8-3:</i>	All Possible $\hat{\alpha}_{k,i,j}$ Values (Absolute Change in Criteria Weights)	140
<i>Table 8-4:</i>	All Possible $\tilde{\alpha}_{k,i,j}$ Values (Percent Change in Criteria Weights)	141
<i>Table 8-5:</i>	Decision Matrix for the Numerical Example on the WPM.....	143
<i>Table 8-6:</i>	Current Ranking.....	144
<i>Table 8-7:</i>	All Possible K Values for the WPM Example	145
<i>Table 8-8:</i>	Decision Matrix and Initial Preferences for the Example	158
<i>Table 8-9:</i>	Threshold Values $\hat{\delta}_{i,j,k}^/$ (%) in Relative Terms for the WSM/AHP Example	159
<i>Table 8-10:</i>	Criticality Degrees $\hat{A}_{ij}^/$ (%) for each a_{ij} Performance Measure.....	160
<i>Table 8-11:</i>	Sensitivity Coefficients $sens(a_{ij})$ for each a_{ij} Performance Measure.....	160
<i>Table 8-12:</i>	Decision Matrix for Numerical Example	162
<i>Table 8-13:</i>	Initial Ranking	162
<i>Table 8-14:</i>	Threshold Values $\hat{\delta}_{i,j,k}^/$ (%) in Relative Terms for the WPM Example	163
<i>Table 8-15:</i>	Criticality Degrees $\hat{A}_{ij}^/$ (in %) for each a_{ij} Measure of Performance	164
<i>Table 8-16:</i>	Sensitivity Coefficients $sens(a_{ij})$ for each a_{ij} Measure of Performance	164
9	Evaluation of Methods for Processing a Decision Matrix and Some Cases of Ranking Abnormalities	177
<i>Table 9-1:</i>	Contradiction Rate (%) Between the WSM and the AHP.....	181
<i>Table 9-2:</i>	Contradiction Rate (%) Between the WSM and the Revised AHP	182

List of Tables	xxi
<i>Table 9-3:</i> Contradiction Rate (%) Between the WSM and the WPM.....	183
<i>Table 9-4:</i> Rate of Change (%) of the Indication of the Optimum Alternative When a Non-Optimum Alternative is Replaced by a Worse One. The AHP Case	188
<i>Table 9-5:</i> Rate of Change (%) of the Indication of the Optimum Alternative When a Non-Optimum Alternative is Replaced by a Worse One. The Case of the Revised AHP.....	188
<i>Table 9-6:</i> Summary of the Computational Results.....	190
<i>Table 9-7:</i> Contradiction Rate (%) Between the WSM and the TOPSIS Method.....	194
<i>Table 9-8:</i> Rate of Change (%) of the Indication of the Optimum Alternative When a Non-Optimum Alternative is Replaced by a Worse One. The TOPSIS Case	195
10 A Computational Evaluation of the Original and the Revised AHP.....	201
<i>Table 10-1:</i> The Failure Rates are Based on 1,000 Randomly Generated Problems. The AHP Case	208
<i>Table 10-2:</i> The Failure Rates are Based on 1,000 Randomly Generated Problems. The Revised AHP Case	209
11 More Ranking Abnormalities When Some MCDM Methods Are Used.....	213
<i>Table 11-1:</i> Priorities and Rankings of the Alternatives in the "Bridge Evaluation" Case Study [Saaty, 1994]	231
12 Fuzzy Sets and Their Operations	235
13 Fuzzy Multi-Criteria Decision Making	241
14 Conclusions and Discussion for Future Research....	263

