

Contents

1	Intuitionistic Fuzzy Aggregation Techniques	1
1.1	Rankings of Intuitionistic Fuzzy Values	2
1.1.1	Intuitionistic Fuzzy Values	2
1.1.2	Methods for Ranking IFVs	2
1.1.3	The Application of Ranking IFVs Using the Similarity Measure and the Accuracy Degree in Multi-Attribute Decision Making	12
1.2	Intuitionistic Fuzzy Power Aggregation Operators	17
1.2.1	Power Aggregation Operators	17
1.2.2	Some Operational Laws of IFVs	18
1.2.3	Power Aggregation Operators for IFVs	20
1.2.4	Approaches to Multi-Attribute Group Decision Making with Intuitionistic Fuzzy Information	25
1.2.5	Practical Example	29
1.3	Interval-Valued Intuitionistic Fuzzy Power Aggregation Operators	33
1.3.1	Interval-Valued Intuitionistic Fuzzy Values	33
1.3.2	Power Aggregation Operators for IVIFVs	36
1.3.3	Approaches to Multi-Attribute Group Decision Making with Interval-Valued Intuitionistic Fuzzy Information	41
1.4	Intuitionistic Fuzzy Geometric Bonferroni Means	47
1.4.1	Geometric Bonferroni Mean	47
1.4.2	Intuitionistic Fuzzy Geometric Bonferroni Mean	48
1.4.3	The Weighted Intuitionistic Fuzzy Geometric Bonferroni Mean and Its Application in Multi-Attribute Decision Making	56

1.5	Generalized Intuitionistic Fuzzy Bonferroni Means	65
1.5.1	Generalized Bonferroni Means	65
1.5.2	Generalized Intuitionistic Fuzzy Weighted Bonferroni Mean.	67
1.5.3	Generalized Intuitionistic Fuzzy Weighted Bonferroni Geometric Mean.	74
1.6	Intuitionistic Fuzzy Aggregation Operators Based on Archimedean t-conorm and t-norm	80
1.6.1	Intuitionistic Fuzzy Operational Laws Based on t-conorm and t-norm.	80
1.6.2	Intuitionistic Fuzzy Aggregation Operators Based on Archimedean t-conorm and t-norm	86
1.6.3	An Approach to Intuitionistic Fuzzy Multi-Attribute Decision Making.	94
1.7	Generalized Intuitionistic Fuzzy Aggregation Operators Based on Hamacher t-conorm and t-norm.	99
1.8	Point Operators for Aggregating IFVs	123
1.9	Generalized Point Operators for Aggregating IFVs	130
2	Intuitionistic Fuzzy Clustering Algorithms	159
2.1	Clustering Algorithms Based on Intuitionistic Fuzzy Similarity Matrices.	160
2.2	Clustering Algorithms Based on Association Matrices	177
2.3	Intuitionistic Fuzzy Hierarchical Clustering Algorithms	192
2.4	Intuitionistic Fuzzy Orthogonal Clustering Algorithm	199
2.5	Intuitionistic Fuzzy C-Means Clustering Algorithms	209
2.6	Intuitionistic Fuzzy MST Clustering Algorithm.	221
2.7	Intuitionistic Fuzzy Clustering Algorithm Based on Boole Matrix and Association Measure	229
2.7.1	Intuitionistic Fuzzy Association Measures	229
2.7.2	Intuitionistic Fuzzy Clustering Algorithm.	232
2.7.3	Numerical Example.	234
2.7.4	Interval-Valued Intuitionistic Fuzzy Clustering Algorithm.	241
2.8	A Netting Method for Clustering Intuitionistic Fuzzy Information	247
2.8.1	An Approach to Constructing Intuitionistic Fuzzy Similarity Matrix.	247
2.8.2	A Netting Clustering Method	250
2.8.3	Illustrative Examples.	251

2.9	Direct Cluster Analysis Based on Intuitionistic Fuzzy Implication	259
2.9.1	The Intuitionistic Fuzzy Implication Operator and Intuitionistic Fuzzy Products	259
2.9.2	The Applications of Two Intuitionistic Fuzzy Products . . .	262
2.9.3	The Application of the Intuitionistic Fuzzy Triangle Product	262
2.9.4	The Application of the Intuitionistic Fuzzy Square Product	264
2.9.5	A Direct Intuitionistic Fuzzy Cluster Analysis Method. . .	265
	References	269
	Index	275