

Contents

1	Introduction	7
1.1	Multiple Criteria Decision Aid	7
1.2	PROMETHEE I, II and III	8
1.3	Some developments in the PROMETHEE methodology	12
1.4	Computational performance issues	14
1.5	Extension of PROMETHEE to the sorting problem	15
1.6	Preference learning	18
1.6.1	Preference elicitation	18
1.6.2	Preference learning	18
1.6.3	Preference learning problems	19
1.6.4	Comparing multicriteria decision aid and preference learning	20
1.7	Multicriteria clustering	21
2	Contributions	25
2.1	FlowSort parameters elicitation based on categorization examples	25
2.2	PROMETHEE is Not Quadratic: An $O(qn \log(n))$ Algorithm	46
2.3	Lexicographic constrained multicriteria ordered clustering	54
3	Discussion	81
3.1	FlowSort parameters elicitation based on categorization examples	81
3.1.1	Main conclusions	81
3.1.2	Discussion	82
3.1.3	A step further	83
3.2	PROMETHEE is Not Quadratic: An $O(q.n \log(n))$ Algorithm	85
3.2.1	Main conclusions	85
3.2.2	Discussion	85
3.2.3	A step further	86
3.2.4	Solution for One Criterion - Gaussian preference function	86
3.2.5	uni-criterion flow score incremental	87
3.2.6	Interpretation of the uni-criterion flow score of PROMETHEE	89
3.3	Lexicographic constrained multicriteria ordered clustering	90
3.3.1	Main conclusions	90
3.3.2	Discussion	91

3.3.3	A step further	91
3.3.4	Hierarchical PROMETHEE	92
3.4	Conclusion	94
Appendices		97
.1	MR-SORT	99
.2	UTADIS	99
.3	k-means	101
.4	Hierarchical clustering method	102