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Opinion Makers Section

(This section is prepared by João Clímaco)

How should MCDA practice respond to behavioural research findings?

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The decision sciences in general, and MCDA in particular, have wrestled agonizingly over discrepancies between the decision support or aiding models being used for analysis, and the results from behavioural decision science (for example that of Kahnemann and Tversky). Well some at least have agonized ... there are those who don't seem to care much about empirical behavioural results. I recall one well-known figure stating during a conference debate that he had little patience with concern over behavioural axioms, preferring to get to the mathematics where one can prove theorems! Nevertheless, I am sure that the readership of this newsletter are as concerned as I am about these issues, and for this reason I thought I would take this opportunity to put forward some personal views on the debate.

What is the purpose of a model designed for decision aid or support? It surely is not to *describe* how people make decisions unaided by MCDA. If we simply try to mimic what decision makers are going to do without our aid, then we are not adding much value to the process. On the other hand, it would be arrogant to suggest that we can direct decision makers to what they *ought* to do, as no model which we develop will ever capture the full richness of human decision making values, preferences and goals. Thus the role of MCDA (and I am aware that I am repeating what many others have said before me) is to support the process of learning and discovery by which decision makers arrive at a satisfactory solution to their decision problem.

Two immediate questions face the decision analyst or decision aiding scientist when confronted with a discovery that decision makers act in a manner which is systematically at variance with one's favoured decision models. These are:

- Do the discrepancies reflect fundamental human values and desires, or are decision makers adopting heuristics to cope with highly complex tasks which are not fully attuned to their fundamental aspirations? If the latter is the case, is it then appropriate to incorporate the same heuristics into the decision support model? I am reminded of a comment by Simon (in the introduction to the 3rd edition of *Administrative Behavior)*, to the effect that people Asatisfice because they have not the wits to optimize).
- Will adaptation of the decision models, to incorporate greater realism in modelling of observed preferences, aid or hinder understanding of the model (and thus ultimately the learning and discovery process) by decision makers?

What, then, is the real value of behavioural decision research to the practice of MCDA? As I have argued, the right response may often not be to develop more complicated models. My view is that the most vital contribution from behavioural research relates to the manner in which we seek inputs from decision makers as part of the process of constructing our preference model. The realization that the perceived acceptability of specific tradeoffs can be strongly influenced by the framing of the problem has serious implications for the manner in which value measurement techniques are applied in practice. Whether certain tradeoffs are viewed as losses or as the foregoing of gains would appear to derive from the problem framing, and on the basis of research results concerning the effect of framing would be likely to have a substantial influence on the form of value function model derived. Simulation studies which I have conducted have revealed how sensitive value function models can be to the functional shape of the partial value functions, and it is precisely these functional shapes which may be influenced by the perceptions of what are gains or losses. I strongly suspect that similar framing issues might also influence perceptions of appropriate veto thresholds in outranking, or aspiration levels in goal programming. Certainly, similar potential biases may well creep into all methodologies of MCDA. In particular, all methods make use of some form of direct or indirect weighting of the criteria, which are

undoubtedly susceptible not only to framing, but also to anchoring and availability biases.

The implications of the above is that perhaps the greatest challenge to research in MCDA is not so much to refine our decision models any further, but to gain greater understanding of how judgmental biases in user inputs affect the outputs and recommendations of the models, and how we can compensate for these (or at least ameliorate their effects). Perhaps in this way we can also move closer to meta-MCDA, i.e. a philosophy of MCDA that integrates the various streams of thought which appear sometimes divergent, but which should more appropriately be seen as different responses to the search for balance between transparent and simple decision support on the one hand, and the infinitely rich complexity of real human judgments on the other.



MCDA Research Groups

Les activités de recherche en aide multicritère à la décision au CERMID

Par

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1. Bref historique et orientation générale

Le CERMID (Centre de Recherche en Modélisation, Information et Décision) est un regroupement de chercheurs de la faculté des sciences de l'administration (FSA) et d'autres institutions, qui s'intéressent à la modélisation des processus organisationnels, à l'analyse des technologies de l'information, et aux méthodes d'aide à l'évaluation et à la décision dans les organisations. Il succède au CRAÉDO (Centre de recherche sur l'aide à l'évaluation et à la décision dans les organisations) donc il retient cinq chercheurs réguliers et auxquels se sont ajoutés sept nouveaux chercheurs.

Les chercheurs du CERMID s'intéressent donc aux problèmes organisationnels, socio-économiques, environnementaux et technologiques qui influencent la performance des organisations et des entreprises, et particulièrement aux impacts de ces phénomènes sur la gestion et la prise de décision. Ils s'intéressent également aux fondements sur lesquels repose l'étude de ces phénomènes, tels l'épistémologie, la théorie de l'organisation, les systèmes d'information, l'analyse multicritère, la programmation mathématique, les probabilités appliquées, les statistiques, la programmation dynamique, et les technologies de l'information. Les principaux objectifs du CERMID sont de contribuer, d'une part, au développement et à la transmission des connaissances dans ces domaines d'expertise et, d'autre part, à la formation de chercheurs et de personnel qualifié.

2. Le programme de recherche du CERMID

Le programme de recherche du CERMID est fortement multidisciplinaire. C'est pourquoi son équipe de chercheurs offre un éventail d'expertises diversifiées et complémentaires. Ainsi, le Centre regroupe des spécialistes en recherche opérationnelle, génie industriel, économie appliquée, gestion des technologies de d'information, marketing et épidémiologie.

Ce programme a pour thème le développement et l'expérimentation d'outils prescriptifs (au sens faible du terme) d'aide à la décision pour la planification et le contrôle dans les organisations. Les problèmes abordés présentent à des degrés divers un ou plusieurs aspects fondamentaux suivants : (M) le caractère multi-dimensionnel du problème, (I) un niveau important d'imperfection de l'information, (C) un niveau de complexité élevé, ainsi que (T) la présence des technologies de l'information.

(M) La plupart des modèles unicritères déterministes prescriptifs quantitatifs que l'on retrouve dans la littérature font des hypothèses très simplificatrices. Nous nous sommes tournés vers le développement de modèles multicritères qui permettent de mieux prendre en compte la multi-dimensionalité de nombreux problèmes de planification stratégique.

(I) Avec le deuxième aspect fondamental, nous nous intéressons à modéliser explicitement, à l'aide d'un langage approprié l'imperfection due à des facteurs aléatoires, imprécis, …, hors du contrôle du décideur.

(C) Le troisième aspect fondamental présent à travers nos projets est celui de la complexité. Celle-ci se manifeste tant dans la taille des problèmes et la quantité des données à traiter, dans la conception de modèles à haut niveau

d'intégration que dans les difficultés de calcul qui en découle.

(T) Avec le dernier aspect fondamental, nous examinons l'impact des technologies de l'information (TI) sur les organisations et leur gestion, la gestion des TI, le changement organisationnel dû au changement technologique, et la gestion du commerce électronique.

Ainsi, notre équipe concentre ses efforts sur le développement et l'expérimentation d'outils de planification et de contrôle qui incorporent explicitement ces quatre aspects.

3. Le volet aide multicritère à la décision

Dans le cadre de ce volet, nous développons et appliquons des méthodologies multicritères pour des problèmes où l'aspect multi-dimensionnel est très important et où le plus souvent on est en présence d'imperfection de l'information. Les principaux projets qui s'inscrivent dans ce volet sont :

- La programmation mathématique à objectifs multiples (PMOM) ; notamment l'introduction des préférences du décideur dans le goal programming ;
- L'efficacité en PMOM stochastique ;
- Les méthodes multicritères en contexte incertain (la valeur de l'information additionnelle) ;
- L'obtention d'un résultat robuste en aide multicritère en contexte d'imperfection de l'information ;
- Le choix d'une procédure d'agrégation multicritère ;
- L'analyse multicritère et l'enveloppement des données ;
- La décision de groupe, l'aide à l'obtention d'un consensus ;
- Les démarches (participatives) de concertation ;
- La phase de structuration d'un problème organisationnel complexe ;
- L'application des méthodologies multicritères en gestion et en génie.

Les membres du CERMID contribuant de manière (plus ou moins) importante à ce volet sont :

B. Aouni, Université Laurentienne, Sudbury.
G. D'avignon, FSA, Université Laval
A. Guitouni, Centre de recherche pour la défense de Valcartier (CRDV)
P. Lang, FSA, Université Laval
J.M. Martel, FSA, Université Laval
R. Nadeau, FSA, Université Laval
B. Urli, Université de Québec à Rimouski

Comme vous pourrez l'observer à partir de la liste des publications d'autres membres du CERMID collaborent à ce volet (C. Banville, M. Gravel, B. Lamond, L. Kiss, W. Price et K. Zaras). Des liens de collaboration étroits ont été conservés avec plusieurs étudiants après leur diplômation (Aouni, Azondékon, Ben Abdelaziz, Boulaire, Couillard, Guitouni, M'Zali, Ouellet, Rebai, Twarabimenye, Urli, Veilleux, Yolalan).

4. Liste de quelques publications

1. Xu, X. Martel, Jean-M. et Lamond B., " A Multicriterion Ranking Procedure Based on Distance Between Partial Preorders " , accepté pour publication dans *EJOR*.
2. Ben Khelifa, S. et Martel, Jean-M., " A Distance-Based Collective Weak Ordering ", accepté pour publication dans *Group Decision and Negociation*.
3. Rebai, A., et Martel, Jean-M., " Que doit-on attendre d'une procédure d'agrégation multicritère pour des évaluations non cardinales ou mixtes ? ", accepté pour publication dans *INFOR*.
4. Azondékon, S.H. et Martel, Jean-M., " 'Value' of Additional Information in Multicriterion Analysis under Uncertainty ", *EJOR*, vol. 117, 1999, 45-62.
5. Urli, B. et Nadeau, R., " Evolution of MCDM/A : A Scientometric Analysis ", *Journal of Multicriteria Decision Analysis*, vol. 8, 1, janvier 1999, 31-43.
6. Ben Abdelaziz, F., Lang, P. et Nadeau, R., "Dominance and Efficiency in Multicriteria Decision under Uncertainty", *Theory and Decision*, vol. 47, 1999, 191-211.
7. Hababou, M. et Martel, Jean-M., " A Multicriterion Approach for Selecting a Portfolio Manager ", *INFOR*, vol. 36, 3, 1998, 1-17.
8. Guitouni, A. et Martel, Jean-M., " Tentative Guidelines to Help Choosing an Appropriate MCDA Method ", *EJOR*, vol. 109, 2, 1998, 501-521.
9. Martel, Jean-M., et Aouni, B., " Diverses Imprecise Goal Programming Model Formulations ", *Journal of Global Optimisation*, vol. 12, 1998, 127-138.
10. Rioux, Michaud, Urli, B. et Gosselin, " Mise en œuvre concerté d'un programme de développement régional : le cas du Québec côtier ", *Revue d'économie régionale et urbaine*, vol. 4, 1998, 661-678.
11. Banville, C., Boulaire, C., Landry, M. et Martel, Jean-M., " A Stakholders Supported Approach to Multiple Criteria Decision Aid ", *Systems Research Behavioral Sciences*, vol. 14, 1997, 15-32.
12. Rebai, A. et Martel, Jean-M., " A Fuzzy Bag Approach to Choosing the 'Best' Multiattributed Potential Actions in a Multiple Judgement and Non Cardinal Data Context ", *Fuzzy Sets and Systems*, vol. 87, 6, 1997, 159-166.

13. Diaby, M., et Martel, Jean-M., “ Preference Structure Modelling for Multi-Objective Decision Making : A Goal Programming Approach ”, *Journal of Multi-Criteria Decision Analysis*, vol. 6, 1997, 150-154.
14. Laaribi, A., Chevalier, J.J., et Martel, Jean-M., “ A Spatial Decision Aid : A Multicriterion Evaluation Approach ”, *Comput., Environ. and Urban Systems*, vol. 20, 6, 1996, 351-366.
15. Bergeron, M., Martel, Jean-M., et Twarabimenye, P., “ The Evaluation of Corporate Loan Applications Based on the MCDA ›, *Journal of Euro-Asian Management*, vol. 2, 2, 1996, 16-46.
16. Boulaire, C., Landry, M. et Martel, Jean-M., “ Le mythe entourant l'outil quantitatif réexaminé à partir d'une étude de terrain”, *Science de la Société*, vol. 39, 1996, 87-105.
17. D’avignon, G. et Sauvageau, M., “ l’aide multicritère à la décision : un cas d’intégration de critères techniques, économiques et environnementaux à Hydro-Québec ”, *RAIRO, Recherche Opérationnelle/Operations Research*, vol. 30, 3, 1996, 317-332.
18. Lang, P. et Yolalan, R., “On Finite Multiplier Bounds in Data Envelopment Analysis”, *ITOR*, vol. 8, 1, 1996, 1-8.
19. Lang, P., Yolalan, R. et Kettani, O., “Controlled Envelopment by Face Extension in Data Envelopment Analysis”, *JORS* , vol. 46, 1995, 473-491.
20. Ben Abdelaziz, F., Lang, P. et Nadeau, R., “Distributional Efficiency in Multiobjective Stochastic Linear Programming”, *EJOR*, vol. 85, 2, 1995, 399-415.
21. Ben Abdelaziz, F., Lang, P. et Nadeau, R., “Pointwise Efficiency in Multiobjective Stochastic Linear Programming”, *JORS*, vol. 45, 11, 1995, 1324-1334.
22. Ouellet, F. et Martel, Jean-M., “ Méthode multicritère d'évaluation et de sélection de projets de R&D interdépendants ”, *Canadian Journal of Administrative Sciences*, vol. 12, 3, 1995, 195-209.
23. Martel, Jean-M. et Zaras, K., “ Stochastic Dominance in Multicriterion Analysis Under Risk ”, *Theory and Decision*, vol. 35, 1, 1995, 31-49.
24. Urli, B. et Beaudry, D., “ Une approche multicritère d’allocation des ressources financières dans le domaine de la santé ”, *RAIRO/Operations Research*, vol. 29, 4, 1995.
25. Gravel, M., Kiss, L., Martel, Jean-M. et Price, W., “ A DSS for Production Planning ”, *ITOR*, vol. 1, 3, 1994, 363-373.
26. Martel, Jean-M. et Kiss, L.N., “ A Support to Consensus Reaching in Group Decision ”, *Group Decision and Negotiation*, vol. 3, 1, 1994, 93-119.
27. Kiss, L. Martel, Jean-M. et Nadeau, R., “ ELECCALC - A DSS for Modeling Decision Maker's Preferences ”, *Journal of Decision Support Systems*, vol. 12, 1994, 311-326.
28. Ndeau, R., Urli, B. et Kiss, L.N., “ PROMISE : A DSS for multiple objective stochastic linear programming problems ”, *Annals of Operations Research*, vol. 51, 1994, 45-59.
29. Martel, Jean-M, Azondékon, S.H. et Zaras, K., “ Multicriterion Analysis Under Uncertainty with Partial Linear Information ”, *Journal of Information Science and Technology*, vol. 2, 2, 1993, 124-135.
30. Khoury, N., Martel, Jean-M., et Veilleux, M., “ Méthode multicritère de sélection de portefeuilles indiciels internationaux ”, *L'Actualité Économique*, vol. 69, 1, mars 1993, 171-190.
31. Gravel, M., Martel, Jean-M., Nadeau, R., Price, W. et Tremblay, R., “ A Multicriterion View of Optimal Resource Allocation in Job-Shop Production ”, *EJOR*, vol. 61, 1-2, 1992, 230-244.
32. Martel, Jean-M., et Aouni, B., “ Méthode multicritère de choix d'un emplacement : le cas d'un aéroport dans le Nouveau Québec ”, *INFOR*, vol. 30, 2, 1992, 97-117.
33. Martel, Jean-M., Azondékon, S.H., et Zaras, K., “ Preference Relations in Multicriterion Analysis Under Risk ”, *JORBEL*, vol. 3, 3-4, 1991, 55-83.
34. Urli, B. et Nadeau, R., “ An Interactive Method to Multiobjective Linear Problems with Interval Coefficient ”, *INFOR*, Vol. 30, 2, 1992, 127-137.
35. Oral, M., Kettani,O. et Lang, P., “ A Methodology for Collective Evaluation and Selection of Industrial R&D Projects ”, *Management Science*, vol. 37, 7, 1991, 871-885.
36. Martel, Jean-M., Khoury, N. et M'Zali, B., “ Comparaison Performance - Taille des fonds mutuels par une analyse multicritère ”, *L'Actualité Économique*, vol. 67, 3, 1991, 306-324.
37. Martel, Jean-M., et Aouni, B., “ Incorporating the Decision Maker's Preferences in the Goal Programming Model ”, *JORS*, vol. 41, 2, 1990, 1121-1132.
38. d'Avignon, G. and Mareschal, B. “ Specialization of Hospital Services in Quebec : an application of the PROMETHEE and GAIA Methods ”, *Mathematical and Computer Modelling*, 1989,1393-1400.
39. D’Avignon, G. and Vinck, Ph., “ An Outranking Method under Uncertainty ”, *EJOR*, vol. 36, 3, 1988, 311-321.
40. Martel, Jean-M., d'Avignon, G. et Couillard, J., “ Fuzzy Outranking Relation in Multicriterion Decision Making ”, *EJOR*, vol. 25, 2, 1986, 258-271.

Forum

A question of vocabulary

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Some weeks ago, our colleague Alexander Lotov sent a message to the Multicriteria Discussion List, proposing a discussion around the following question: "What does mean a real-life application of a MCDM technique ?"

The main reason for this proposition was the fact that, in his opinion, it is often argued in publications or conferences, that MCDM tools and approaches fairly seldom find real-life applications. In his message, he recalled a definition, given by E. Kasanen et al. (EJOR, Vol. 120, 2000, pp. 496-510), based on the following 4 elements:

- an actual problem of an actual organization must be studied,
- using real data,
- in which decision makers participate,
- and where the obtained results are implemented.

Not completely satisfied by this definition, A. Lotov proposed another one, as starting point for a discussion which should have been finalized in the Ankara conference of the International MCDM Society. His definition was the following: "A MCDM technique is said to have real-life applications if some institutions or people have mastered the technique and use it independently from the author for a relatively long time". Some colleagues participated in a e-discussion during a few weeks but no conclusion was inferred from it and, to my knowledge, the point was not treated in the Ankara conference. Interested by the subject, the editor of our working group bulletin, José Figueira asked me to reproduce here my modest contribution to the previous discussion.

This could be the starting point of a new exchange and, maybe, to some common conclusion.

Reading the e-discussion introduced by A. Lotov, I had the feeling that all the participants had different definitions and that they all were right. So, the fact is that several different "objects" are called real-life applications by different colleagues: if we want to avoid misunderstanding and futile discussions, the best way is probably to be more precise in the vocabulary that we use.

On basis of the messages which were exchanged, here is a first and non-exhaustive list of objects which were called real-life applications:

- Object A: description of a situation where a scientist used a multicriteria method to work on real data in view to help a client to solve a decision problem.
- Object B: object A where the approach was proved to be well-founded on a theoretical point of view.
- Object C: object A which led to new methodological developments.
- Object D: object A where the client was satisfied by the work done by the scientist (several reasons are possible).
- Object E: object A where the result was effectively implemented.
- Object F: object A which led to an important evolution in the decision process of an organization.

A possible terminology (English natives will certainly propose better terms) could be: A = real-life application (rla), B = well-founded rla, C = methodologically interesting rla, D = satisfying rla, E = successful rla, F = revolutionary rla.

Everybody is invited to introduce new objects an new terms in order to build a common dictionary on the rla's (we all know how important is the existence of a common vocabulary in a working group).

For our community, it can be interesting to be informed on as many rla's as possible to improve our experience and to convince potential "clients" (or colleagues) that our tools are effectively used. So, I strongly support the idea, given by one of the discussants, of a Web Site built as a library and a discussion room about rla's.

Finally, a last question was "when does a rla justify a publication in a scientific journal ?". Of course, this depends on the editorial strategy of the journal. What we should avoid, in my opinion, is purely academic numerical examples which are "disguised" in real-life applications, the ideal is to have well-founded methodologically interesting revolutionary rla's, but it is clear that we can also learn from more modest works.

Software

Presentation of the Electre Tri 2.0a software 

(V. Mousseau, R. Slowinski & P. Zielniewicz)

ELECTRE TRI is a Multiple Criteria Sorting Method ([Yu 92], [Roy, Bouyssou 93]) which aims at assigning a set of alternatives $A=\{a_1, a_2, ..., a_l\}$ evaluated by n criteria $g_1, g_2, ..., g_n$ to one of the preference-ordered and pre-defined categories. The assignment of an alternative a_k to a specific category results from a comparison of its evaluation on all criteria to the profiles defining the limits between consecutive categories.

We present in this section a new implementation of ELECTRE TRI. It integrates specific functionalities supporting the Decision Maker (DM) in the preference elicitation process. These functionalities grouped in a module called ELECTRE TRI Assistant aim at reducing the cognitive effort required from the DM in the phase of calibration of the preference model. The main characteristic feature of ELECTRE TRI Assistant is the inference of the ELECTRE TRI preferential parameters from assignment examples supplied by the DM.

The ELECTRE TRI software version 2.0a (Mousseau et al. 1999, 2000) is the result of a collaboration between LAMSADE (University of Paris-Dauphine, France) and the Institute of Computing Science (Poznan University of Technology, Poland). It is developed in C++ programming language and runs under Microsoft Windows 3.1, 95, 98, NT.

The structure of the options available in the software is the following:

File: this option allows the user to create a new project, load an existing project and save the current project. Additional print and import options are provided. Generation of project reports is also available,

Edit: enables the user to enter the data required by Electre Tri (criteria, alternatives, weights, profiles and thresholds) and/or to use the ELECTRE TRI Assistant functionalities.

Results: allows the user to visualize the results (including intermediary results such as degree of credibility of the outranking relation, comparison of alternatives to profiles,...); also gives a graphical representation of alternatives and profiles.

Help: provides the user an online help.

Support for Parameters Elicitation: ELECTRE TRI Assistant

One of the main difficulties that an analyst must face when interacting with a DM in order to build a decision aid procedure is the elicitation of various parameters of the DM's preference model. In the ELECTRE TRI method, the analyst should give values to profiles, weights and thresholds. Even if these parameters can be interpreted, it is difficult to fix directly their values and to have a clear global understanding of the implications of these values on the output of the model.

[Mousseau, Slowinski 98] proposed a methodology that avoids this problem by substituting assignment examples for direct elicitation of the model parameters. The values of the parameters are inferred through a certain form of regression on assignment examples. ELECTRE TRI Assistant implements this methodology in a way that requires from the DM much less cognitive effort: the elicitation of parameters is done indirectly using holistic information given by the DM through assignment examples, i.e. alternatives assigned by the DM to categories according to his/her comprehensive preferences.

The ELECTRE TRI Software 2.0 includes an assistant that is able to infer preference model parameters from assignment examples provided by the user. The present version supports the user in defining the weights of criteria and the cutting level λ for the pessimistic assignment procedure only (the next version will include similar functionalities for profiles and thresholds). The use of ELECTRE TRI Assistant functionalities proceeds according to the following scheme:

- **(a)** input the list of assignment examples composed of alternatives for which the DM gives a holistic assignment (such alternative can be an existing alternative of a fictitious one designed for this purpose); imprecise assignments are accepted, i.e, the DM can express an hesitation in the assignment of an alternative *a* by specifying a subset of consecutive categories to which *a* could be assigned,
- **(b)** give preferential information on the weights and/or cutting level (preorder, comparisons of specific coalitions, bounds on weights, on the cutting level λ) - optional,
- **(c)** run the inference procedure to find the most adequate values of the weights,
- **(d)** check for the acceptability of the obtained weight vector and, either:
  - accept the proposed weights so as to use them by the assignment procedure,
  - or reject them and revise the information provided in step **(a)** and/or **(b)**, then perform **(c)** again.

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References:

- V. Mousseau & R. Slowinski, (1998) "Inferring an ELECTRE TRI model from assignment examples", *Journal of Global Optimization*, vol 12, n°2, pp 157-174.
- V. Mousseau, R. Slowinski & P. Zielniewicz, (1999) "ELECTRE TRI 2.0a : Methodological guide and User’s manual", *Document du LAMSADE n°111*, Université Paris-Dauphine, 1999
- V. Mousseau, R. Slowinski & P. Zielniewicz, (2000) "A user-oriented Implementation of the Electre Tri method integrating support for parameter elicitation", *Computers and Operations Research*, 27 (7-8), 757-777.
- Roy B. & Bouyssou D. (1993): *Aide multicritère à la décision : Méthodes et Cas*, Economica.
- W. Yu, (1992), "Aide multicritère à la décision dans le cadre de la problématique du tri : concepts, méthodes et applications", PhD dissertation, Université Paris-Dauphine.



Persons and Facts

New address of Prof. Thomas Hanne: Institute for Techno and Economathematics (ITWM), Department of Optimization, Gottlieb Daimler Strasse 49, D-67663, Kaiserslautern, Germany. E-mail: hanne@itwm.uni-kl.de

Prof. Stanley Zionts: New e-mail address is now szionts@buffalo.edu.

Au mois de septembre dernier, le professeur Roman Slowinski a reçu le Diplôme et les Insignes de Docteur Honoris Causa de la Faculté Polytechnique de Mons en Belgique.



About the 51st Meeting

Henrikas Pranevichius, Leonidas Sakalauskas, Edmundas-Kazimieras Zavadskas, and Arturas Kaklauskas

The 52nd Meeting of the European Working Group on “Multicriteria Decision Aid” took place on October 5-6, 2000, at the Academy of Sciences of Lithuania, in Vilnius (Lithuania). The Meeting was organised by Henrikas Pranevichius, Leonidas Sakalauskas, Edmundas-Kazimieras Zavadskas and Arturas Kaklauskas. There were 62 participants from 18 countries and 20 communications were presented. The social program consisted of the Meeting Dinner at the “Freskos” Restaurant on Friday evening, October 6. A bus tour to the Open Air Museum of the Center of Europe was organised on Saturday morning, October 7. The organisations that contributed financial support to the Meeting were: the Lithuanian State Foundation on Study and Research, Institute of Mathematics and Informatics, and Vilnius Gediminas Technical University.

Those attending the Meeting were: Artyom Asanov, Violeta Baltusiene, Audrius Banaitis, Jean-Pierre Barthelemy, Aleksandra Bat, Foued Ben Abdelaziz, Arkadij Borisovs, Willem K. Brauers, Anna Cavallo, Vitalij Denisov, Danae Diakoulaki, Dimitar Dimitrov, Gintautas Dzemyda, Flourentzos Flourentzov, Maria del Carmen Garcia Centeno, Salvatore Greco, Walter Habenicht, Jean-Marie Hauglustaine, Jaroslava Halova, Adam Janiak, Artûras Kaklauskas, Mindaugas Krutinis, Nerija Kvederyte, Oleg Larichev, Sven-Olov Larsson, Philippe Lenca, Vitalij Levin, Alexander Lotov, Ilona Magdisyuk, Jean-Marc Martel, Vitalij Molostvov, Tomasz Mroz, Abdelkerim Mselmi, Yevgeny Naryzhny, Vladimir Noghin, Maria-Franca Norese, Friedel Peldschus, Tomas Petkus, Alexey Petrovsky, Henrikas Pragarauskas, Henrikas Pranevichius, Saulius Raslanas, Sharunas Raudys, Felix Rauschmayer, Bernard Roy, Leonidas Sakalauskas, Mifodijus Sapagovas, Yakov Shafransky, Roman Slowinski, Sergey Strahov, Tomasz Thiel, Eriks Tipans, Nikolay Tonchev, Francis Condis y Troyano, Alexander Tuzikov, Leonas Ustinovichius, Ottu Vaarmann, Premysl Zak,

Edmundas-Kazimieras Zavadskas, Antanas Zhilinskas and Vladislav Zhukovsky

The Meeting was run in an excellent way and the discussions were very exciting. The communications were divided into six sessions, each considering a special subject, and each of the communications has been successfully presented by their respective speaker. Two plenary lectures were delivered by Prof. Sharunas Raudys "Statistical and neural classifiers while solving multicriterial problems" and Prof. Walter Habenicht "Multimode optimization in logistics", that aroused an interest comments and discussions.

The presented papers are accessible at the web-site of the Meeting:

http://www.science.mii.lt/MCDA-52

and the volume of Proceedings of the Meeting are to be published at the beginning of 2001 in a special issue of the journal "Informatika" :

(http://www.vtex.lt/informatica/).

The Meeting was opened by a Vice-Mayor of Vilnius Habil. Dr. Algis Kudzys, who noted the exceptional role of this event, because this was the first meeting of EURO Groups in the Baltic and NIS countries. It gave an exceptional opportunity for interaction between the experienced group members and new ones from Eastern Europe, who took an active part in the Meeting. The participants were pleasantly surprised as the charms of rapidly renewed architecture of Vilnius Old Town as well as modern public service at hotels, banks, transport, etc. The experience of MCDA-52 will be undoubtedly important for organising new EURO events and attracting new members from Eastern Europe.

The next meetings will be: the 53rd Meeting in Athens, Greece, March 2001, and the 54th Meeting in Belgium, October 2001 (for more details see the Forthcoming Meetings section).

PROGRAMME DEFINITIF/FINAL PROGRAM

Jeudi 5 / Thursday 5

14:00 - 14:15 Introduction aux Journées / Introduction to the Meeting

Session 1. Statistical and neural classifiers in multicriterial analysis (*Président de session* / Chairman: Roman SLOWINSKI):

1. 14:15 - 15:15 Sharûnas RAUDYS. *Statististical and neural classifiers while solving multicriterial problems.*
2. 5:15 - 15:45 Ilona MAGDISYUK. *Using the cascade-correlation network to evaluate investment protection.*
3. 15:45 - 16:15 Alexey PETROVSKY. *On Method for Approximation of Diverse Individual Sorting Rule.*

Papiers soumis à discussion / Papers submitted to discussion

- Eriks TIPANS. *Overcoming of "combinatorial explossion" in classification algorithm "Cora".*

16:15 - 16: 45 Cafe / Coffee Break

Session 2. MCDM in architecture and building construction *(Président de session* / Chairman: Leonidas SAKALAUSKAS**):**

1. 16:45 - 17:15 Edmundas Kazimieras ZAVADSKAS, Artûras KAKLAUSKAS, Saulius RASLANAS, Audrius BANAITIS. *Multiple criteria analysis, modelling and forecasting of real estate sector in Lithuania*.
2. 17:15 - 17:45 Jean-Marie HAUGLUSTAINE. *Multicriteria and Multiactors aspects of an interactive tool aiding to sketch the building envelope during the first stages of the architectural design.*
3. 17:45 - 18:15 Flourentzos FLOURENTZOV. *Construire le jugement du jury d'un concours d'Architecture.*
4. 18:15 - 18:45 Tomasz THIEL, Tomasz MROZ. *Application of multicriteria decision aid method for ranking heating systems for museums building* .

Papiers soumis à discussion / Papers submitted to discussion

- Edmundas-Kazimieras ZAVADSKAS, Artûras KAKLAUSKAS, Nerija KVEDERYTE. *Decision support system for Buiding Life Cycle*.
- Edmundas-Kazimieras ZAVADSKAS, Artûras KAKLAUSKAS, Saulius RASLANAS, Mindaugas KRUTINIS. *A multiple criteria property E-bussiness system.*

Vendredi 6 / Friday 6

Session 3. Multimode and multiobjective optimization (*Président de session* / Chairman: Willem K. BRAUERS):

1. 8:30 - 9:30 Walter HABENICHT. *Multimode optimization in logistics*.

2. 9:30 - 10:00 Vladimir KALIKA. *An approach to account for uncertainty in multicriteria optimization*.

3. 10:00 - 10:30 Adam JANIAK, Yakov SHAFRANSKY, Alexander TUZIKOV. *Permutation scheduling problems with ordered criteria.*

Papiers soumis à discussion / Papers submitted to discussion

- Vitalij LEVIN. *Fuzzy sets and collective decision making in fuzzy environment*.
- Gintautas DZEMYDA, Tomas PETKUS. *Application of computer network to solve the complex applied multicriterial optimization problems.*
- Leonidas SAKALAUSKAS. *On stochastic approach to multiobjective programming.*
- Antanas ZHILINSKAS. *Statistical models in multiextremal optimization.*

10:30 - 11:00 Cafe / Coffee Break

Session 4. Methods and software for MCDM (*Président de session* / Chairman: Arkadij BORISOVS**) :**

1. 11:00 - 11:30. Friedel PELDSCHUS, Edmundas-Kazimieras ZAVADSKAS, Leonas USTINOVICHIUS. *LEVI 3.0 – A Program For Multiple Criteria Evaluation.*

2. 11:30 - 12:00 Oleg LARICHEV. *Method ZAPROS for ranking multicriteria alternatives and the problem of alternatives incomparability*.

3. 12:00 - 12:30 Artyom ASANOV, Oleg LARICHEV, Yevgeny NARYZHNY, Sergey STRAHOV. *ESTHER – expert system for decision aid in cases of acute drug poisonings.*

Papiers soumis a discussion / Papers submitted to discussion

- Gabriela Fernandez BARBERIS. *Multicriteria decision aid. An application using the D-PAD methodology.*
- Zak PREMYSL, Jaroslava HALOVA. *Quantitative structure-activity relationships by GUHA method.*
- Vladislav ZHUKOVSKY, Vitalij MOLOSTVOV. *One Feature of Multi-Criteria Problems in Uncertainty*.

12:30 - 14:00 - Le déjeuner / Lunch

14:00 - 14:30 Bernard ROY. EURO WG matters, next meetings.

Session 5. Economy - environmental multiple interactions (*Président de session* / Chairman: Jean-Pierre BARTHELEMY**) :**

1. 14:30 - 15:00 Aleksandra BAT, Francis Condis y TROYANO. *The competitiveness of industrial sectors in EECC countries as the base for their successful economic integration to the EU.*

2. 15:00 - 15:30 Sven-Olov LARSSON. *Multicriterial decision aid and economic choice theory.*

3. 15:30 - 16:00 Anna CAVALLO, Maria Franca NORESE. *GIS and multicriteria analysis to evaluate map erosion and landslide hazards.*

Papiers soumis à discussion / Papers submitted to discussion

- Violeta BALTUSIENE. *On the Application of Multicriterial Optimization in Bussiness.*
- Nikolay TONTCHEV, Dimitar DIMITROV. *Technology Offer Method and Software for Multicriterial Aid Decisions Making*.

16:00 - 16:30 Cafe / Coffee Break

Session 6. Theoretical aspects of preference and comparability (*Président de session* / Chairwoman: Maria-Franca NORESE):

1. 16:30 - 17:00 Jean Pierr BARTHELEMY. *Aspects de la théorie du consensus*.

2. 17:00 - 17:30 Vladimir NOGHIN. *Introduction to the theory of relative importance of criteria.*

3. 17:30 - 18:00 Salvatore GRECO, Benedetto MATARAZZO, Roman SLOWINSKI. *Customer sattisfaction analysis using a rough set based inference of decision rules.*

4. 18:00 - 18:30 Felix RAUSCHMAYER. *Philosophical aspects of incommensurability and incomparability.*

Papiers soumis à discussion / Papers submitted to discussion

- Escribano RODENAS, Maria del Carmen GARCIA CENTENO. *Modélisation multicritère de l'Aide Humanitaire.*
- Foued Ben ABDELAZIZ, Jean-Marc MARTEL, Abdelkerim MSELMI. *MIADEG: une méthode interactive d'aide à la décision de groupe.*

20:00 - Le Banquet des Journées / Meeting Dinner



Forthcoming Meetings

(This section is prepared by Luís Dias)

INFORMS 2000 Fall Meeting, San Antonio, USA, November 5-8, 2000.

The Decision Science Institute 2000 Annual Meeting, Orlando, Florida, USA, November 18-21, 2000.

Congresso sobre técnicas de ayuda a la décision en la defensa. I reunión de estadística militar (I REM); II reunión de investigación militar operativa (II RIMO). Del 12 al 15 diciembre de 2000. Escuela Politécnica Superior del Ejército, Madrid. Información Adicional: Fax: 91 205 40 20. E-mail: ceiodef@oc.mde.es. Internet: www.ceiodef.mde.es.

First International Conference on Evolutionary Multi-Criterion Optimization (EMO'01), March 7-9, 2001 (Wednesday to Friday), ETH Zurich, Switzerland. http://www.tik.ee.ethz.ch/emo/.

53rd Meeting of the EWG "Multicriteria Aid for Decisions", Athens, Greece, 29-30, March 2001, organized by Danae Diakoulaki, ass. Professor at the National Technical University of Athens, Tel: +30-1-772-3254, e-mail: diak@chemeng.ntua.gr. Place: Training and Conference Center of the National Mortgage Bank of Greece, Glyfada. Suggested topic: Economy-Energy-Environment (3E) interactions.

10th IFORS Special Conference: IFORS – SPC 10. Topic: New Trends in Banking Management. Athens – Greece, April 1-3, 2001. Conference Chair: Prof. Constantin Zopounidis (kostas@ergasya.tuc.gr). Place: Training and Conference Center of the National Bank of Greece, Glyfada. Conference Secretariat: Phone: +30 1 3819892, Fax: +30 1 3847578, e-mail: eeee@otenet.gr.

3e Conférence Francophone de MOdélisation et SIMulation (MOSIM'01), 25-27 avril, 20001, Université de Technologie de Troyes. http://www.univ-troyes.fr/mosim01

CORS-OD 2001, Canadian Operational Research Society and Optimization Days Joint Conference. Theme**:** *"Decision-Aid for Performance Enhancement"* Quebec City (Canada), May 6th-9th, 2001. Contact: Prof. Bernard Lamond, bernard.lamond@fsa.ulaval.ca, Dr. Adel Guitouni, adel.guitouni@drev.dnd.ca Or visit the conference web site: http://www.fsa.ulaval.ca/scro-jopt/.

FRANCORO III**.** Journées francophones de recherche opérationnelle. Thème: *L'aide à la décision pour l'amélioration de la performance.* Ville de Québec (Canada), 9 au 12 mai, 2001.Prof. Jean-Marc Martel, jean-marc.martel@fsa.ulaval.ca. Dr Adel Guitouni, adel.guitouni@drev.dnd.ca. Ou visitez le site Internet de la conférence: http://www.fsa.ulaval.ca/francoro

International Conference on Multiple Criteria Decision Making: Theory and Applications in Technology, Business and Economics, Cairo, Egypt, May 27-30, 2001. Organizer: Prof. Mohamed Osman, The Higher Technological Institute, (Ramadam Tenth City).

Sixth International Conference of the Decision Sciences Institute, July 8-11, 2001, Tec de Monterrey Campus in Chihuahua, Mexico.

EURO 2001, The European Operational Research Conference, Rotterdam, the Netherlands, July 9-11, 2001. Information & Registartion: www.euro2001.org; info@euro2001.org.

MIC'2001, 4th Metaheuristics International Conference, Porto, Portugal, 2001 July 16-19. URL: www.mic2001.com.

AIRO 2001, XXXII Annual Conference of the Operational Research Society of Italy, Cagliari, September 4-7, 2001. E-mail: airo2001@cinque.unica.it. Web page: http://pcserver.unica.it/AIRO2001.

54rd Meeting of the EWG "Multicriteria Aid for Decisions", Belgium, 4-5, October 2001, organized by Marc Roubens and Philippe Vincke.

MOPGP'02 The Fifth International Conference on Multi-Objective Programming and Goal Programming: Theory & Applications, Nara, Japan, June 4-7, 2002. URL: http://vanilla.eie.eng.osaka-u.ac.jp/mopgp02/index.html.

IFORS 2002, Edinburgh, UK, 8-12 July 2002. URL: www.ifors.org.



Books

(This section is prepared by Luís Dias)

Evaluation and decision models: A critical perspective

by

Denis Bouyssou (ESSEC), *Thierry Marchant* (Ghent Univ.), *Marc Pirlot* (SMRO, Faculté Polytechnique de Mons), *Patrice Perny* (LIP6, Univ. Paris VI), *Alexis Tsoukiàs* (LAMSADE, Univ. Paris-Dauphine), and *Philippe Vincke* (SMG-ISRO, Univ. Libre de Bruxelles)

Abstract: The purpose of Evaluation and Decision Models: A Critical Perspective is to provide a critical thinking framework for all individuals utilizing decision and evaluation models, whether it be for research or applications. It is axiomatic that all evaluation and

decision models suffer some limitations. There are situations where a decision model will not perform to expectations. This book argues that there is no best decision or evaluation model, but that decision-makers must understand the principles of formal evaluation and decision models and apply them critically. Hence, the book seeks to deepen our understanding of evaluation and decision models and encourage users of these models to think more analytically about them.
The authors work in six different European universities. Their backgrounds are varied: mathematics, economics, engineering, law, and geology, and they teach in engineering, business, mathematics, computer science, and psychology in their universities. As a group, the authors have particular expertise in a variety of decision models that include preference modelling, fuzzy logic, aggregation techniques, social choice theory, artificial intelligence, problem structuring, measurement theory, operations research, and multiple criteria decision support. In addition to their decision analysis research, all the authors have been involved in a variety of high-impact applications which include software evaluation, location of a nuclear repository, the rehabilitation of a sewer network, and the location of high-voltage lines. It is this variety within the authorship that unifies this book into a systematic examination of how best formal decision models can be used. The monograph is an excellent tool for researchers of decision analysis and decision-makers.

Contents: 1. Introduction, 2. Choosing on the basis of several options, 3. Building and aggregating evaluations, 4. Constructing measures, 5. Assessing competing projects, 6. Comparing on several attributes, 7. Deciding automatically, 8. Dealing with uncertainty, 9. Supporting decisions, 10. Conclusion, Bibliography, Index.

Kluwer Academic Publishers, Boston , Hardbound, ISBN 0-7923-7250-6, November 2000, 288 pp.

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Multicriteria Optimization

by

Matthias Ehrgott

Summary
The book provides an introduction to multicriteria optimization. It covers theoretical topics such as existence of optimal solutions as well as methodological issues. A classification of multicriteria optimization problems is developed and used as a guideline throughout the book. First, fundamental solution concepts are defined and their properties and relations discussed. Then a variety of methods to find optimal solutions is described. Chapters on multicriteria linear optimization, uncommon solution concepts, and combinatorial problems conclude the book.

The text contains material which cannot be found in other textbooks on the subject, because several chapters are based on new research results. It is suitable for a mathematically oriented course on multicriteria optimization. The material can be covered in the order in which it is presented, but it is also possible to select topics from various chapters. The exercises at the end of each chapter provide possibilities to practice as well as some outlooks to more general settings, when appropriate.

Contents:
1 Introduction
2 Pareto Optimality and Efficiency
3 Weighted Sum Scalarization
4 Other Methods for Pareto Optimality
5 Multicriteria Linear Programming
6 Other Optimality Concepts
7 Combinatorial Problems with Multiple Objectives

Bibliography, List of Figures, List of Tables, Author Index, Subject Index

VIII + 243 pages, 86 figures, 10 tables, 64 exercises

ISBN 3-540-67869-7, 2000, Lecture Notes in Economics and Mathematical Systems vol. 491, Berlin: Springer

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Elicitation of Preferences

edited by

Baruch Fischhoff
Dept. of Social and Decision Sciences, Carnegie Mellon University, Pittsburgh, PA,
USA
Charles F. Manski
Dept. of Economics, Northwestern University, Evanston, IL, USA

Abstract:
Economists and psychologists have, on the whole, exhibited sharply different perspectives on the elicitation of preferences. Economists, who have made preference the central primitive in their thinking about human behavior, have for the most part rejected elicitation and have instead sought to infer preferences from observations of choice behavior. Psychologists, who have tended to think of preference as a context-determined subjective construct, have embraced elicitation as their dominant approach to measurement.

This volume, based on a symposium organized by Daniel McFadden at the University of California at Berkeley, provides a provocative and constructive

engagement between economists and psychologists on the elicitation of preferences.

Contents and Contributors:
Contents and Contributors. The Effects of Financial Incentives in Experiments: A Review and Capital-Labor-Production Framework; C.F. Camerer, R.M. Hogarth. Commentary 1; D.V. Budescu. Commentary 2; C. Eckel. Analysis of Choice Expectations in Incomplete Scenarios; C.F. Manski. Commentary 1; K.I. Wolpin. Commentary 2; E.U. Weber. Rationality for Economists? D. McFadden. Commentary 1; M.J. Machina. Commentary 2; J. Baron. Anchoring and Acquiescence Bias in Measuring Assets in Household Surveys; M.D. Hurd. Commentary 1; A. Kapteyn. Construal Processes in Preference Assessment; B. Fischhoff, et al. Commentary 1; J. Dominitz. Commentary 2; T.L. McDaniels. Choice Bracketing; D. Read, et al. Commentary 1; G. Keren. Commentary 2; D. Laibson. Economic Preferences or Attitude Expressions? An Analysis of Dollar Responses; D. Kahneman, et al. Commentary 1; S.J. Sherman. Commentary 2; H.R. Varian. Measuring Constructed Preferences: Towards a Building Code; J.W. Payne, et al. Commentary 1; N. Schwarz. Commentary 2; R. Gregory.

Kluwer Academic Publishers, Boston, Hardbound, ISBN 0-7923-7743-5, February 2000, 284 pp.

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Preferences and Decisions under Incomplete Knowledge

by

Fodor, J.,
Szent Istvan, University, Budapest, Hungary
De Baets, B.,
University of Gent, Belgium
Perny, P.,
University of Paris, France
(Eds.)

Nowadays, decision problems are pervaded with incomplete knowledge, i.e., imprecision and/or uncertain information, both in the problem description and in the preferential information. In this volume leading scientists in the field address various theoretical and practical aspects related to the handling of this incompleteness. The problems discussed are taken from multi-objective linear programming, rationality considerations in preference modelling, non-probabilistic utility theory, data fusion, group decision making and multicriteria decision aid. The book is oriented towards researchers, graduate and postgraduate students in decision analysis, fuzzy sets and fuzzy logic, and operations research/management science.

Keywords: Fuzzy Logic, Fuzzy Sets, Preferences, Decision Making, Utility Theory, Incomplete Information

Contents: P. Vincke: (P, Q, I, J) - Preference Structures.- P. Fortemps, J. Teghem: Multi-Objective Fuzzy Linear Programming: The MOFAC Method.- V. Cutello, J. Montero: An Extension of the Axioms of Utility Theory Based on Fuzzy Rationality Measures.- D. Dubios, E. Pap, H. Prade: Hybrid Probabilistic-Possibilistic Mixtures and Utility Functions.- J. Montero, A. del Amo, E. Molina: Additive Recursive Rules.- R.R. Yager: Maximizing the Information Obtained from Data Fusion.- H. Nurmi, J. Kacprzyk: Social Choice under Fuzziness: A Perspective.- S. Greco, B. Matarazzo, R. Slowinski: Fuzzy Extension of the Rough Set Approach to Multicriteria and Multiattribute Sorting.- J.-L. Marichal: Behavioral Analysis of Aggregation in Multicriteria Decision Aid.- M. Grabisch, C. Labreuche: To be Symmetric or Asymmetric? A Dilemma in Decision Making.- J.-P. Barthélemy: Monotone Functions on Finite Lattices: An Ordinal Approach to Capacities, Belief and Necessity Functions.-

Series: Studies in Fuzziness and Soft Computing.VOL. 51

Springer-Verlag Berlin/Heidelberg 1999

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Fuzzy Measures and Integrals Theory and Applications

by

M. Grabisch, T. Murofushi, M. Sugeno (eds)

Resumé: Concepts similar to fuzzy measure have been introduced independently in many domains: in non-expected utility theory, cooperative game theory, complexity analysis, measure theory, etc. This book reflects all these facets. It gathers survey papers written by leading researchers in the field, covering a selection of most significant topics. The first part is devoted to fundamental and theoretical material, while the second part deals with more applied topics such as decision making and pattern recognition. The book is of interest to researchers in decision making, artificial intelligence, applied mathematics, mathematical social sciences, etc.

Contents:
Foreword: P. Wakker. Preface: M. Grabisch, T. Murofushi, M. Sugeno. PART 1 : THEORY: Fuzzy measures and integrals (T. Murofushi, M. Sugeno), Non-additive measure and integral, basic concepts and their role for applications (D. Denneberg), The interaction and

Mobius representation of fuzzy measures on finite spaces, k-additive measures: a survey (M. Grabisch), Hierarchical decomposition of the Choquet integral (K. Fujimoto, T. Murofushi), Towards generalized Belief functions (I. Kramosil), Integration in possibility theory (G. de Cooman), On the autocontinuity of set functions (Z. Wang, K. Xu), Pseudo-convolution and its applications (E. Pap), Integrals with respect to a general fuzzy measure (P. Benvenuti, R. Mesiar), Triangular norm-based measures: properties and integral representations (P. Klement, D. Butnariu), On Choquet and Sugeno integrals as aggregation functions (JL Marichal), Comparison between three fuzzy integrals (H. Imaoka). PART 2 : APPLICATIONS: Choquet expected utility : a new approach to individual behaviour under uncertainty and to social welfare (A. Chateauneuf, M. Cohen), Qualitative decision theory with Sugeno integrals (D. Dubois, H. Prade, R. Sabbadin), The Choquet integral in multiattribute decision making (T. Murofushi, M. Sugeno), Application of the Choquet integral in multicriteria decision making (M. Grabisch, M. Roubens), Fuzzy measure-based subset interactive models for subjective evaluations (S. Kwon, M. Sugeno), The Choquet integral in a rough software cost decision system (J.F. Peters III, L. Han, S. Ramana, Fuzzy integral for classification and feature extraction (M. Grabisch), Fuzzy integrals in image processing and recognition (Jim Keller, P. Gader, A.K. Hocoaglu), An algorithm for calculating natural extensions with respect to lower probabilities (Z. Wang, G. Klir, J. Swan-Stone, K. Xu).

Physica-Verlag, Heidelberg (1999).

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Energy Decisions and the Environment: A Guide to the Use of Multicriteria Methods

by

Benjamin F. Hobbs
Johns Hopkins University, Baltimore, MD, USA
Peter Meier
International Development and Energy Associates,
London, UK

Planning, operating, and policy making in the electric utility and natural gas sectors involves important trade-offs among economic, social, and environmental criteria. These trade-offs figure prominently in ongoing debates about how to meet growing energy demands and how to restructure the world's power industry. Energy Decisions and the Environment: A Guide to the Use of Multicriteria Methods reviews practical tools for multicriteria (also called multiobjective) decision analysis that can be used to quantify trade-offs and contribute to more consistent, informed, and transparent decision making. These methods are designed to generate and effectively communicate information about trade-offs; to help people form, articulate, and apply value judgments in decision making; and to promote effective negotiation among stakeholders with competing interests. Energy Decisions and the Environment: A Guide to the Use of Multicriteria Methods includes explanations of a wide range of methods, tutorial applications that readers can duplicate, a detailed review of energy–environment applications, and three in-depth case studies.

Contents:

Acknowledgments. 1. Introduction. 2. The Application of MCDM Methods. 3. Screening and Tradeoff Analysis. 4. Scaling, Weighting, and Amalgamation. 5. Resolving Differences (Step 10). 6. An Illustrative Numerical Example. 7. A Review of MCDM Applications in Energy Planning and Policy. 8. MCDM at BC Hydro: The 1995 Electricity Plan. 9. Multi-Method MCDM at BC Gas. 10. An Experimental Comparison of MCDM Methods at Seattle City Light. 11. Closing Remarks. References. Index.

Kluwer Academic Publishers, Boston, Hardbound, ISBN 0-7923-7875-X, July 2000, 272 pp.

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Large Scale Interactive Fuzzy Multiobjective Programming: Decomposition Approaches

by

Masatoshi Sakawa

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Simultaneous considerations of multiobjectiveness, fuzziness and block angular structures involved in the real-world decision making problems lead us to the new field of interactive multiobjective optimization for large scale programming problems under fuzziness. The aim of this book is to introduce the latest advances in the new field of interactive multiobjective optimization for large scale programming problems under fuzziness on the basis of the author's continuing research. Special stress is placed on interactive decision making aspects of fuzzy multiobjective optimization for human-centered systems in most realistic situations when dealing with fuzziness. The book is intended for graduate students, researchers and practitioners in the fields of operations research,

industrial engineering, management science and computer science.

Keywords:
Fuzzy Logic, Multiobjective Programming, Interactive Decision Support, Decomposition

Contents:
Introduction: Introduction and historical remarks. Organization of the book.
- Mathematical Preliminaries: Fuzzy sets. Fuzzy numbers. Fuzzy decision. Mutliobjective linear programming. Interactive fuzzy multiobjective linear programming. Genetic algorithms.
- The Dantzig-Wolfe Decomposition Method: Linear programming problems with block angular structures. Development of the decomposition algorithm. Initial feasible basic solution. Unbounded subproblem. Restricted master problem.
- Large Scale Fuzzy Linear Programming: Linear programming problems with block angular structures. Fuzzy goal and fuzzy constraints. Fuzzy linear programming. Numerical example.
- Large Scale Fuzzy Multiobjective Linear Programming: Multiobjective linear programming problems with block angular structures. Fuzzy goals. Fuzzy multiobjective linear programming. Interactive fuzzy multiobjective linear programming.
- Large Scale Multiobjective Linear Programming with Fuzzy Numbers: Introduction. Interactive multiobjective linear programming with fuzzy numbers. Interactive fuzzy multiobjective linear programming with fuzzy numbers. Conclusion.
- Genetic Algorithms with Decomposition Procedures: Introduction. Multidimensional 0-1 knapsack problems with block angular structures. Genetic algorithms with decomposition procedures. Numerical experiments.
- Large Scale Fuzzy Multiobjective 0-1 Programming: Multiobjective multidimensional 0-1 knapsack problems with block angular structures. Fuzzy goals. Fuzzy multiobjective 0-1 programming. Interactive fuzzy multiobjecticve 0-1 programming.
- Large Scale Interactive Multiobjective 0-1 Programming with Fuzzy Numbers: Introduction. Interactive multiobjective 0-1 programming with fuzzy numbers.
Ineteractive fuzzy multobjective 0-1 programming with fuzzy numbers.
Conclusion.
- Further Research Directions: Large sclae interactive fuzzy multiobjective linear fractional programming. Large scale fuzzy multiobjective nonlinear programming.

Fields: Operations Research/Decision Theory; Artificial Intelligence; Optimization and Optimal Control
Written for: Researchers, students; practitioners Book category: Monograph.

Series: Studies in Fuzziness and Soft Computing. VOL. 48, Physica-Verlag, A Springer-Verlag Company May 2000.

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New Frontiers of Decision Making for the Information Technology Era

by

Yong Shi (University of Nebraska, Omaha)

and

Milan Zeleny (Fordham University, New York)

The volume provides users and developers of the IT/S (information technology and systems) with information about the advances in decision making and decision-making support that empower and enable information technology in the direction of productivity and effectiveness of decision making in business. The chapters have been written by well-known international experts in decision making and they explore the frontiers of decision making in the era of IT/S.

The book is intended to serve as a research source, scientific reference and business support source, as well as a book of student readings that will appeal to a larger international audience.

Contents:
Behavioral Issues in Decision Making; Multiple Criteria and Decision Support Systems; Objective Space Analysis; Risk and Efficiency Management; Tradeoff Analysis in Decision Making; Data Environment Analysis; Multiple Criteria System Engineering; Multiple Criteria Applications.

Readership:
Students, professors, researchers and practitioners in business, management and operations research.

World Scientific, May 2000. ISBN: 981-02-4299-9.

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Aide à la décision – Une approche par les cas

par

Ph. Vallin et D. Vanderpooten
(LAMSADE, Univ. Paris-Dauphine)

Cet ouvrage présente la démarche de modélisation et de résolution de problématiques d’aide à la décision par l’analyse et le commentaire de cas provenant, pour la majorité, de problèmes réels. Les domaines abordés couvrent la logistique, la gestion de production, la gestion des ressources humaines, le marketing, la finance.

L’originalité de cet ouvrage est l’éclairage mis sur l’analyse et le processus de modélisation (conception du modèle). Pour accompagner le lecteur non spécialiste, chaque cas est traité intégralement, de l’analyse à la résolution de chaque problème. Les difficultés sont présentées graduellement, le recours à un ouvrage théorique spécialisé n’est donc pas nécessaire.

Les cadres de modélisation présentés sont la **théorie des graphes** (chemins, flots, arbres), la **programmation linéaire** (continue et en nombres entiers), l’**ordonnancement** et **la gestion des stocks**, la **théorie de la décision** et l’**analyse multicritère**.

Les résultats obtenus sont analysés et commentés en termes de décisions concrètes pour expliquer les apports et les limites de la modélisation mathématique.

Sont concernés par cet ouvrage :

- les étudiants (formation initiale et continue) en gestion, mathématiques appliquées, informatique, des universités, écoles de commerce et d’ingénieurs,

- les professionnels confrontés aux problématiques de prise de décision dans les diverses fonctions de l’entreprise (études stratégiques, systèmes d’information, logistique, production, finance, marketing, relations humaines).

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Articles Harvest

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Aguarón, J. and J. M. Moreno-Jiménez. Local stability intervals in the analytic hierarchy process. European Journal of Operational Research, vol. 125, no 1, 113-132, 2000.

Ahn, B. S. The analytic hierarchy process in an uncertain environment: A simulation approach by Hauser and Tadikamalla (1996). European Journal of Operational Research, vol. 124, no 1, 217-218, 2000.

Ahn, B. S., K. S. Park, C. H. Han and J. K. Kim. Multi-attribute decision aid under incomplete information and hierarchical structure. European Journal of Operational Research, vol. 125, no 2, 431-439, 2000.

Alves, M. J. and J. Clímaco. An interactive method for 0-1 multiobjective problems using simulated annealing and tabu search. Journal of Heuristics, vol. 6, no 3, 385-403, 2000.

Alves, M. J. and J. Clímaco. An interactive reference point approach for multiobjective mixed-integer programming using branch-and-bound. European Journal of Operational Research, vol. 124, no 3, 478-494, 2000.

Belacel, N. Multicriteria assignment method PROAFTN: Methodology and medical application. European Journal of Operational Research, vol. 125, no 1, 175-183, 2000.

Bender, M. J. and S. P. Simonovic. A fuzzy compromise approach to water resource systems planning under uncertainty. Fuzzy Sets and Systems, vol.115, no 1, 35-44, 2000.

Benson, H. P. Outcome space partition of the weight set in multiobjective linear programming. Journal of Optimization Theory and Applications, vol. 105, no 1, 17-36, 2000.

Beroggi, G. E.G. An experimental investigation of preference elicitation methods in policy decision-making. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 76-89, 2000.

Bichler, M. An experimental analysis of multi-attribute auctions. Decision Support Systems, vol. 29, no 3, 249-268, 2000.

Borges, P. C. CHESS – Changing horizon efficient set search: a simple principle for multiobjective optimization. Journal of Heuristics, vol. 6, no 3, 405-418, 2000.

Bots, P. W.G. and J. A. M. Hulshof. Designing multi-criteria decision analysis processes for priority setting in health policy. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 56-75, 2000.

Bots, P. W.G., and F. A. Lootsma. Decision support in the public sector. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 1-6, 2000.

Cai, X. and K. N. Li. A genetic algorithm for scheduling staff of mixed skills under multi-criteria. European Journal of Operational Research, vol. 125, no 2, 359-369, 2000.

Carlsson, C. and R. Fullér. Multiobjective linguistic optimization. Fuzzy Sets and Systems, vol.115, no 1, 5-10, 2000.

Chandra, S. Technical note on symmetric duality in multiobjective programming: Some remarks on recent results. European Journal of Operational Research, vol. 124, no 3, 651-654, 2000.

Chang, N.-B. and Y.L. Wei. Siting recycling drop-off stations in urban area by genetic algorithm-based fuzzy multiobjective nonlinear integer programming modeling. Fuzzy Sets and Systems, vol. 114, no 1, 133-149, 2000.

Chen, C.-T. Extensions of the TOPSIS for group decision-making under fuzzy environment. Fuzzy Sets and Systems, vol. 114, no 1, 1-9, 2000.

Choi, D.-Y. and K.-W. Oh. ASA and its application to multi-criteria decision making. Fuzzy Sets and Systems, vol.114, no 1, 89-102, 2000.

Deng, H., C.-H. Yeh and R. J. Willis. Inter-company comparison using modified TOPSIS with objective weights. Computers and Operations Research, vol. 27, no 10, 963-973, 2000.

Despic, O. and S. dan P. Simonovic. Aggregation operators for soft decision making in water resources. Fuzzy Sets and Systems, vol.115, no 1, 11-33, 2000.

Dias, L. and J. Clímaco. ELECTRE TRI for groups with imprecise information on parameter values. Group Decision and Negotiation, vol. 9, no 5, 355-377, 2000.

Dias, L. C. and J. N. Clímaco. Additive aggregation with variable interdependent parameters: the VIP analysis software. Journal of the Operational Research Society, vol. 51, no 9, 1070-1082, 2000.

Doumpos, M. and C. Zopounidis. Assessing financial risks using a multicriteria sorting procedure: the case of country risk assessment. Omega, Vol.29, no 1, 97-109, 2001.

Easley, R. F., J. S. Valacich and M. A. Venkataramanan. Capturing group preferences in a multicriteria decision. European Journal of Operational Research, vol. 125, no 1, 73-83, 2000.

El-Wahed, W. F. A. A multi-objective transportation problem under fuzziness. Fuzzy Sets and Systems, vol.117, no 1, 27-33, 2000.

Ehrgott, M., On matroids with multiple objectives, Optimization, 38:73 - 84, 1996.

Ehrgott, M. H.W. Hamacher, K. Klamroth, S. Nickel, A. Schöbel, and M.M. Wiecek A note on the equivalence of balance points and Pareto solutions in multiple-objective programming, Journal of Optimization Theory and Applications, 92:209 - 212, 1997.

Ehrgott, M. and K. Klamroth Connectedness of efficient solutions in multiple criteria combinatorial optimization, European Journal of Operational Research, 97:159 - 166, 1997.

Ehrgott, M. Integer solutions of multicriteria network flow problems, Investigação Operacional, 19:229-243, 1999.

Ehrgott, M. H.W. Hamacher and S. Nickel, Geometric methods to solve max-ordering location problems, Discrete Applied Mathematics, 93:3-20, 1999.

Ehrgott, M. and A. Rau, Bicriteria cost versus service analysis of a distribution network - a case study, Journal of Multicriteria Decision Analysis, 8(5):256-267, 1999.

Ehrgott, M. Approximation algorithms for combinatorial multicriteria optimization problems, International Transactions in Operational Research, 7:5-31, 2000

Ehrgott, M. On connectivity of efficient matroid bases, in "Operations Research 93", 142 - 144. Physica Verlag, 1994.

Ehrgott, M. Lexicographic max-ordering - a solution concept for multicriteria combinatorial optimization, in "Methods of Multicriteria Decision Theory, Proceedings of the 5th DGOR workshop Decision Theory and Applications", 55 - 66, 1995.

Ehrgott, M. A characterization of lexicographic max-ordering solutions, in "Methods of Multicriteria Decision Theory, Proceedings of the 6th DGOR-Workshop Decision Theory and Applications", 193 - 202, Verlag Hänsel-Hohenhausen, Egelsbach, 1997.

Ehrgott, M. and S. Nickel, Reducing the number of criteria in quasi-convex multicriteria optimization, in "Operations Research Proceedings 1996", 319 - 324. Springer Verlag, Berlin, 1997.

Ehrgott, M. and K. Klamroth, Nonconnected efficiency graphs in multiple criteria combinatorial optimization, in "Advances in Multiple Objective and Goal Programming", 140 - 150, Springer Verlag, Berlin, 1997.

Ehrgott, M. Discrete decision problems, multiple criteria optimization classes and lexicographic max-ordering, in "Trends in Multicriteria Decision Making", 31 - 44, Springer Verlag, Berlin, 1998.

Fabella, R. V. A contractarian approach to pareto efficiency in teams: a note. Theory and Decision, vol. 48, no 2, 139-149, 2000.

Fischer, G. W., J. Jia and M. F. Luce. Attribute conflict and preference uncertainty: the RandMAU model. Management Science, vol. 46, no 5, 669-684, 2000.

Fülöp, J. Branch-and-bound variant of an outcome-based algorithm for optimizing over the efficient set of a bicriteria linear programming problem. Journal of Optimization Theory and Applications, vol. 105, no 1, 37-54, 2000.

Gandibleux, X. and A. Freville. Tabu search based procedure for solving the 0-1 multiobjective knapsack problem: the two objectives case. Journal of Heuristics, vol. 6, no 3, 361-383, 2000.

Gardiner, L. R. and D. Armstrong-Wright. Employee selection under anti-discrimination law: implications for multi-criteria group decision support. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 99-109, 2000.

Geldermann, J., T. Spengler and O. Rentz. Fuzzy outranking for environmental assessment. Case study: iron and steel making industry. Fuzzy Sets and Systems, vol.115, no 1, 45-65, 2000.

Giokas, D.I. and G.C. Pentzaropoulos. Efficient storage allocation for processing in backlog-controlled queueing networks using multicriteria techniques. European Journal of Operational Research, vol. 124, no 3, 539-549, 2000.

Güngör, Z. and F. Arikan. A fuzzy outranking method in energy policy planning. Fuzzy Sets and Systems, vol.114, no 1, 115-122, 2000.

Hanne, T. Global multiobjective optimization using evolutionary algorithms. Journal of Heuristics, vol. 6, no 3, 347-360, 2000.

Hansen, M. P. Use of substitute scalarizing functions to guide a local search based heuristic: the case of moTSP. Journal of Heuristics, vol. 6, no 3, 419-431, 2000.

Hapke, M., A. Jaszkiewicz and R. Slowinski. Pareto simulated annealing for fuzzy multi-objective combinatorial optimization. Journal of Heuristics, vol. 6, no 3, 329-345, 2000.

Herrera, F. and E. Herrera-Viedma. Linguistic decision analysis: steps for solving decision problems under linguistic information. Fuzzy Sets and Systems, vol.115, no 1, 67-82, 2000.

Hong, D. H. and C.-H. Choi. Multicriteria fuzzy decision-making problems based on vague set theory. Fuzzy Sets and Systems, vol.114, no 1, 103-113, 2000.

Hough, J. Commentary on Belton (1985): The use of a simple multi-criteria model to assist in selection from a shortlist. Journal of the Operational Research Society, vol. 51, no 8, 895-896, 2000.

Huang, X. X. Extended well-posedness properties of vector optimization problems. Journal of Optimization Theory and Applications, vol. 106, no 1, 165-182, 2000.

Hummel, J. M., W. V. Rossum, G. J. Verkerke and G. Rakhorst. The effects of team expert choice on group decision-making in collaborative new product development: a pilot study. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 90-98, 2000.

Karasakal, E, K. and M. Köksalan. A simulated annealing approach to bicriteria scheduling problems on a single machine. Journal of Heuristics, vol. 6, no 3, 311-327, 2000.

Kim, G. C. and J. Emery. An application of zero-one goal programming in project selection and resource planning – a case study from the Woodward Governor Company. Computers and Operations Research, vol. 27, no 14, 1389-1408, 2000.

Kim, Y.-M., J.-H. Kim and S.-H. Kim. Use of multi-attribute decision analysis for designing operations system framework in telecommunications management network. Computers and Operations Research, vol. 27, no 14, 1375-1388, 2000.

Koch, T. and M. Ridgley. The Condorcet‘s jury theorem in a bioethical context: the dynamics of group decision making. Group Decision and Negotiation, vol. 9, no 5, 379-392, 2000.

Leung, L.C. and D. Cao. On consistency and ranking of alternatives in fuzzy AHP. European Journal of Operational Research, vol. 124, no 1, 102-113, 2000.

Li, H.-L. and C.-S. Yu. Solving multiple objective quasi-convex goal programming problems by linear programming. International Transactions in Operational Research, vol. 7, no 3, 265-284, 2000.

Li, L. and K. K. Lai. Fuzzy dynamic programming approach to hybrid multiobjective multistage decision-making problems. Fuzzy Sets and Systems, vol.117, no 1, 13-25, 2000.

Linares, P. and C. Romero. A multiple criteria decision making approach for electricity planning in Spain: economic versus environmental objectives. Journal of the Operational Research Society, vol.5 1, no 5, 736-743, 2000.

Liu, F.-H. F., C.-C. Huang and Y.-L. Yen. Using DEA to obtain efficient solutions for multi-objective 0-1 linear programs. European Journal of Operational Research, vol. 126, no 1, 51-68, 2000.

Lootsma, F. A. Distributed multi-criteria decision making and the role of the participants in the process. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 45-55, 2000.

Lootsma, F. A. The decision analysis and support project. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 7-10, 2000.

Marichal, J.-L. and M. Roubens. Determination of weights of interacting criteria from a reference set. European

Journal of Operational Research, vol. 124, no 3, 641-650, 2000.

Metev, B. and D. Gueorguieva. A simple method for obtaining weakly efficient points in multiobjective linear fractional programming problems. European Journal of Operational Research, vol. 126, no 2, 386-390, 2000.

Mohan, C. and H. T. Nguyen. An interactive satisficing method for solving multiobjective mixed fuzzy-stochastic programming problems. Fuzzy Sets and Systems, vol.117, no 1, 61-79, 2000.

Monnikhof, R. A. H. and P. W.G. Bots. On the application of MCDA in interactive spatial planning processes: lessons learnt from two stories from the swamp. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 28-44, 2000.

Nickel, S. and M. M. Wiecek. Multiple objective programming with piecewise linear functions. Journal of Multi-Criteria Decision Analysis, vol. 8, no 6, 322-332, 1999.

Nishizaki, I. and M. Sakawa. Solutions based on fuzzy goals in fuzzy linear programming games. Fuzzy Sets and Systems, vol.115, no 1, 105-119, 2000.

Nuci, G. and G. Toletti. Selecting quality-based programmes in small firms: a comparison between the fuzzy linguistic approach and the analytic hierarchy process. International Journal of Production Economics, vol. 67, no 2, 113-133, 2000.

Nurmi, H. and T. Meskanen. Voting paradoxes and MCDM. Group Decision and Negotiation, vol. 9, no 4, 297-313, 2000.

Nutt, P. C. Context, tactics, and the examination of alternatives during strategic decision making. European Journal of Operational Research, vol. 124, no 1, 159-186, 2000.

Park, Y.-B. A solution of the bicriteria vehicle scheduling problems with time and area-dependent travel speeds. Computers and Industrial Engineering, vol. 38, no 1, 173-187, 2000.

Parlar, M. Probabilistic analysis of renewal cycles: an application to a non-markovian inventory problem with multiple objectives. Operations Research, vol. 48, no 2, 243-255, 2000.

Raveh, A. Co-plot: A graphic display method for geometrical representations of MCDM. European Journal of Operational Research, vol. 125, no 3, 670-678, 2000.

Romero, C. Extended lexicographic goal programming: a unifying approach. Omega, vol. 29, no 1, 63-71, 2001.

Rotmans, J. and M. B. A. V. Asselt. Towards an integrated approach for sustainable city planning. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 110-124, 2000.

Sabri, E. H. and B. M. Beamon. A multi-objective approach to simultaneous strategic and operational planning in supply chain design. Omega, vol. 28, no 5, 581-598, 2000.

Sakawa, M. and K. Yauchi. Interactive decision making for multiobjective nonconvex programming problems with fuzzy numbers through coevolutionary genetic algorithms. Fuzzy Sets and Systems, vol.114, no 1, 151-165, 2000.

Sakawa, M., I. Nishizaki and M. Hitaka. Interactive fuzzy programming for multi-level 0-1 programming problems with fuzzy parameters through genetic algorithms. Fuzzy Sets and Systems, vol.117, no 1, 95-111, 2000.

Sakawa, M., I. Nishizaki and Y. Uemura. Interactive fuzzy programming for two-level linear fractional programming problems with fuzzy parameters. Fuzzy Sets and Systems, vol.115, no 1, 93-103, 2000.

Sedeño-Noda, A. and C. González-Martín. The biobjective minimum cost flow problem. European Journal of Operational Research, vol. 124, no 3, 591-600, 2000.

Shiromaru, Isao, M. Inuiguchi and M. Sakawa. A fuzzy satisficing method for electric power plant coal purchase using genetic algorithms. European Journal of Operational Research, vol. 126, no 1, 218-230, 2000.

Teich, J., P. Korhonen, H. Wallenius and Jyrki Wallenius. Conducting dyadic multiple issue negotiation experiments: methodological recommendations. Group Decision and Negotiation, vol. 9, no 4, 347-354, 2000.

Triantaphyllou, E. Reduction of pairwise comparisons in decision making via a duality approach. Journal of Multi-Criteria Decision Analysis, vol. 8, no 6, 299-310, 1999.

Tuyttens, D., J. Teghem, Ph. Fortemps and K. V. Nieuwenhuyze. Performance of the MOSA method for the bicriteria assignment problem. Journal of Heuristics, vol. 6, no 3, 295-310, 2000.

Valls, A. and V. Torra. Using classification as an aggregation tool in MCDM. Fuzzy Sets and Systems, vol.115, no 1, 159-168, 2000.

Vetschera, R. A multi-criteria agency model with incomplete preference information. European Journal of Operational Research, vol. 126, no 1, 152-165, 2000.

Walker, W. E. Policy analysis: a systematic approach to supporting policymaking in the public sector. Journal of Multi-Criteria Decision Analysis, vol. 9, no 1-3, 11-27, 2000.

Wanka, G. Multiobjective control approximation problems: duality and optimality. Journal of Optimization Theory and Applications, vol. 105, no 2, 457-475, 2000.

Wei, Q, H. Yan, J. Ma and Z. Fan. A compromise weight for multi-criteria group decision making with individual preference. Journal of the Operational Research Society, vol. 51, no 5, 625-634, 2000.

Wright, G. and P. Goodwin. Future-focussed thinking: combining scenario planning with decision analysis. Journal of Multi-Criteria Decision Analysis, vol. 8, no 6, 311-321, 1999.

Zheng, X. Y. Scalarization of Henig proper efficient points in a normed space. Journal of Optimization Theory and Applications. vol. 105, no 1, 233-247, 2000.

Zhu, J. Generalized variational principle and vector optimization. Journal of Optimization Theory and Applications, vol. 106, no 1, 201-217, 2000.

Séminaires du LAMSADE

"MODÉLISATION DES PRÉFÉRENCES ET AIDE MULTICRITÈRE À LA DÉCISION"
Responsables: Bernard ROY et
Daniel VANDERPOOTEN
(le mardi, de 14:00 à 17:00, en salle P510)

14 nov 2000	Exploration progressive des préférences à l'aide de l'approche MACBETH, par Jean-Marie De Corte, Jean-Claude Vansnick et Carlos Bana e Costa.
5 dec 2000	The decision making process and guidelines, by Mordecai Henig.
9 jan 2001	Construction de modèles d'affectation par règles, par Riad Azibi.
27 fev 2001	Réflexions sur la notion de robustesse, par Philippe Vincke.

Other Works

(Communicated by the authors)

Collections du LAMSADE

Ngo The, A. et Mousseau V. (2000): "Using assignment examples to infer category limits for the ELECTRE TRI method", Cahier du LAMSADE Nº 168.

Roy, B. (2000): "Optimisation lexicographique d'une séquence de dysfonctionnements non nécessairement quantitatifs", Cahier du LAMSADE Nº 169.

Dias, L., Mousseau V., Figueira, J. and Clímaco, J. (2000): "An aggregation/disaggregation approach to obtain robust conclusions with ELECTRE TRI", Cahier du LAMSADE Nº 174.

Aït Younes, A. Azibi, R. et Roy, B. (2000): "ELETRE IS – Manuel d'Utilisation (Tome 1)", Document du LAMSADE Nº 118.

Aït Younes, A. Azibi, R. et Roy, B. (2000): "ELETRE IS – Manuel d'Utilisation (Tome 2)", Document du LAMSADE Nº 118bis.

Número spécial Escargots d'Or 2000, Document du LAMSADE Nº 120.

Preprints of the SMG/ULB

Ezzegaf, M. and Mareschal, B. , Utilisation d'Echelles Qualitatives dans les Méthodes PROMETHEE, 2000/19

Bufardi, A., A general framework for fuzzy preference structures, 2000/14.

Belacel, N. Une approche du choix flou pour les problèmes de classification multicritère, 2000/13.

Ngo The A., Tsoukias A., Vincke, Ph., A polynomial time algorithm to detect PQI interval orders,2000/10

Working Papers of GEMME

(Université de Liège)

MARICHAL J.-L. et ROUBENS M.: The use of the discrete Sugeno integral in decision making, février 04/2000.

MARICHAL J.-L. et ROUBENS M.: Entropy of discrete fuzzy measures, mars 05/2000.

MARICHAL J.-L.: Behavioral Analysis of Aggregation in Multicriteria Decision Aid, mai 06/2000.

MARICHAL J.-L.: On perfect, amicable, and sociable chains, juin 07/2000.

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MARICHAL J.-L.: On some linear transformations of set-functions over a finite set, septembre 11/2000.

Management Science Research Report of the FEUC

(Faculty of Economics,
University of Coimbra)

Lourenço, R., e Costa, J.P. (2000): "Algoritmo interactivo para classificação de soluções não-dominadas em programação linear inteira multi-objectivo", Research Report Nº 1/2000.

Captivo, M.E., Clímaco, J., Figueira, J., Martins, E., and Santos, J.L (2000): "Solving multiple criteria knapsack problems using labeling algorithms", Research Report Nº 2/2000.

Figueira, J., (2000): “On the bi-criteria integer network flow problem: A branch-and-bound approach”, Research Report Nº 3/2000.

Gomes da Silva, C., Figueira, J., and Lisboa, J. (2000): “An aggregate production planning model based on mixed integer multiple criteria linear programming”, Research Report Nº 4/2000.