Newsletter of the European Working Group
"Multicriteria Aid for Decisions"

Bulletin du Groupe de Travail Européen
"Aide Multicritère à la Décision"

Groupe de Travail Européen "Aide Multicritère à la Décision"
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# Editorial

L'Aide Multicritère à la Décision (AMCD) s'est développée au carrefour de plusieurs disciplines (économie, mathématique, sociologie, gestion,…). Notre communauté constitue donc un lieu privilégié de rencontres et est un centre où convergent beaucoup d'idées provenant de plusieurs branches de la connaissance. On pourrait même se poser la question suivante : où peut-on trouver des gens ayant une ouverture d'esprit comparable à celle que l'on rencontre dans notre filière ? Je n'en vois pas beaucoup ! Je ne vois pas non plus beaucoup de groupes dans lesquels la diversité des formations (gestionnaires, mathématiciens, économistes, sociologues, …), des applications (transport, agriculture, banque, …), des articles (méthodologiques, états de l'art, …) et des idées soit plus riche et diverse qu'au sein de notre groupe.

Le rôle du bulletin (publié deux fois par an, au printemps et à l'automne) consiste précisément à faire connaître aux membres de notre communauté la diversité de la recherche en AMCD effectuée au sein du groupe et au-delà. Lors de la réunion de Cerisy-la-Salle (les 50èmes journées), Bernard Roy et João Clímaco m'ont confié la tâche de continuer la diffusion scientifique des travaux du groupe en tant qu'éditeur de ce bulletin. J'ai l'intention de continuer cette tâche avec le même dévouement, le même soin et la même efficacité que mes prédécesseurs. C'est donc un défi que je me pose à moi-même pour les prochains numéros de cette troisième série et que j'espère pouvoir relever avec succès.

Pour le moment le format du bulletin reste le même, mais j'aimerais profiter de cette occasion pour solliciter votre aide sous la forme de propositions quant à la présentation du bulletin pour cette troisième série. En attendant votre contribution, j'ai déjà quelques suggestions concernant l'introduction de certaines rubriques supplémentaires :

- Je propose la création d'une nouvelle rubrique, appelée « *Forum* », consacrée à des articles qui ne peuvent pas être intégrés dans les rubriques déjà existantes. Cette rubrique pourrait avoir un caractère non permanent, en fonction des articles soumis. Cette solution offrirait une grande souplesse par rapport à la parution du bulletin. Le texte devrait être limité à deux pages maximums ce qui équivaut à quatre colonnes du format actuel.

- Très souvent, les recherches effectuées dans notre communauté aboutissent à la création de logiciels. Il existe aujourd'hui une immense panoplie d'outils qui restent méconnus. Afin de les faire connaître à l'ensemble de notre communauté, je propose la création d'une nouvelle rubrique permanente, intitulée « *Software* » dont le contenu doit être consacré principalement à la présentation d'un logiciel. Le texte sera limité à une page maximum, c'est-à-dire deux colonnes du format actuel du bulletin.

- Des suppléments au bulletin pourraient également être ajoutés dès que cela se justifie. Pour inaugurer cette nouveauté, un premier supplément, concernant un glossaire d'Aide à la Décision (en français et en anglais) proposé par Bernard Roy, est annexé au présent bulletin.

J'aimerais profiter de cette occasion pour dire que ce bulletin ne pourra voir le jour sans la collaboration précieuse de beaucoup de collègues qui m'aideront à écrire quelques sections et à mettre en page le texte. Je pense plus précisément de João Clímaco qui sera le responsable pour la section « Opinion Makers », Maria João Alves e Carlos Henggeler Antunes qui continueront à compiler la section « Articles Harvest » et Luís Dias qui sera responsable pour les sections « Forthcoming Meetings » et « Books » . La mise à jour de la page Web est maintenant de la responsabilité de Luís Dias. C'est toujours un énorme plaisir de pouvoir compter sur leur collaboration.

José Figueira

(E-mail : figueira@fe.uc.pt)

*Je tiens à remercier Dominique François et Jacques Pictet pour les précieuses remarques à une première version de ce texte, à Jacques Pictet et Martin Rogers pour la traduction de cet éditorial en anglais et à José António du CIFEUC pour la construction du format de ce bulletin en Word pour Windows.*

# Editorial

Multiple Criteria Decision Aid (MCDA) as a discipline evolved from a number of areas including economics, engineering, mathematics, sociology and management. Our community can be seen as providing a central place where many ideas from different streams of knowledge converge. One might even ask the following question: where else can open-minded people like those in our community be found? I don't see many! Few other groups at present exist which consist of members with such a diversity in terms of professional backgrounds (managers, mathematicians, economists, sociologists, …), practical and research experience in different fields (transportation, agriculture, banking, …).

The role of this newsletter (published twice a year, Spring and Autumn) is to disseminate to the members of our community, as efficiently as possible, the diversity of the research on MCDA generated both within and outside the group. At Cerisy-la-Salle (the 50th meeting), Bernard Roy and João Clímaco requested that I continue to disseminate information on group's work as the editor of the newsletter. I intend to pursue this task with the same dedication, the same care and the same efficiency as my predecessors. This provides a great personal challenge for me, and one I fully intend to achieve to the best of my ability in the next series of issues.

For the time being, the newsletter format will remain the same, but I would like to take the opportunity to ask for you help with suggestions regarding the layout of this third series. For myself, I already have some suggestions for new features to be introduced:

- I propose to create a new feature, called « *Forum* », which will consist of articles that do not readily fit into existing features. This feature would be an option from issue to issue, depending on the volume of articles submitted. This would give more flexibility in relation to the editing of the newsletter. The text should be two pages-long maximum, or about four columns in the present format.

- Very often, research undertaken in our community implies that computer software has to be developed. Nowadays, there is a huge range of tools that remain unknown. In order to let them be known to our community, I propose to create a new permanent feature, called « *Software* » , which would deal mainly with computer development. The text should be no longer than one page or two columns in the present format.

- Supplements to the newsletter could also be added when necessary. To start off this 'novelty', a first supplement, consisting of a glossary on Decision Aid (in French and in English), proposed by Bernard Roy, is annexed to the present newsletter.

I would like to take this opportunity to state that this newsletter would not be possible without the valuable collaboration of many colleagues who will help me with the writing of some of the features and with the editing of the text. More precisely, I would like to mention João Clímaco who will remain in charge of the « Opinion Makers » section, Maria João Alves e Carlos Henggeler Antunes in charge of the « Articles Harvest » section and Luís Dias in charge of the « Forthcoming Meetings » and « Books » sections. Editing the Web page is now with Luís Dias. All provide an invaluable back-up service to the newsletter.

José Figueira (E-mail : figueira@fe.uc.pt)



## Opinion Makers Section

(This section is prepared by João Clímaco)

by

Benedetto Matarazzo

The very first studies in multicriteria analysis appeared in the sixties and they rapidly spread all over the word, involving more and more researchers and practitioners. After a very short time, a number of results of primary importance were obtained, and new extremely valuable paths of research were opened up.

As the most interesting of these studies were spread up, the methods and problems of multicriteria analysis began to attract more and more attention from ever-widening range of fields. Specialist groups and scientific societies of international experts were formed (for example EURO Working Group on Multicriteria Decision Aid, Special Interest Group on MCDM, International Society on Multiple Criteria Decision Making). These groups have continued to meet regularly, producing a large mess of results, interesting from methodological and operational points of view.

The most significant example in this sense is represented by the EURO Working Group on Multicriteria Decision Aid, which, under the guide of Bernard Roy

organized regularly, twice a year, meetings for more than 25 years (the 50th meeting that reported the goal of 25 years of fruitful activity was held in Cerisy last September).

Since the first years of activity in the field of multicriteria analysis a group of well known European and North American scientists (the "fathers": B. Roy, Ph Vincke, S, Zionts,…) and a number of young researchers (the "pioneers": E. Jacquert-Lagrèze, J. Spronk, J. Fichefet, G. Colson, D. Bouyssou, A. Ostanello, B. Matarazzo,…) perceived the opportunity to ensure the continuity and the empowerment of their work in these studies, involving also people from the technical and the professional world. With the purpose of promoting the diffusion of the potentialities of the multicriteria approach as valuable supporting instruments in decision-making, they decided to organize, gradually, an International Summer School on Multicriteria Decision Aid: Methods, Applications and Software.

This was the first idea to launch an advanced course in multicriteria analysis, in the form of an international Summer School each two years. This idea was enthusiastically received from the whole community of people involved in this field, with the following main objectives:

- to give a complete and up-to-date picture of multiple criteria problems, methods and software;
- to spread results of the most recent methodological and practical research;
- to encourage contacts and friendliness and to promote scientific cooperation between researchers from different countries and of different education and background;
- to create an important occasion to ensure that new people could enter in the world of multicriteria analysis, since the improvement of the quality of a research field is strongly linked to contributions of young people;
- to promote the implementation of multicriteria approach in real-life decision problems;
- to give each participant the opportunity to fruitfully discuss real specific problems, to the great advantage of the experts and of the scientists, in order to improve their future cooperation;
- to organize small group of participants for case study discussions, in order to really understand how to rightly implement the methods and techniques suggested, to evaluate the available software, and to critically compare them and to discuss about their validation.

In order to achieve as close as possible these objectives, the first and other Summer Schools were organized as residential courses, to render as easy as possible the contacts between teachers and participants, to create numerous opportunities for useful informal debates in a friendly atmosphere (for example, I remember the very stimulating discussions at the "swimming pool class room" during the first Summer School). All participants showed enormous interest to the School, working continuously, with enthusiasm and attending all the lectures; often, they also asked the organizers to arrange for "supplementary sessions" in order to discuss further specific aspects, establishing a real and immediate "family" atmosphere, the same hoped by the organizers. The first School took place in 1983, in Acireale-Catania, Sicily (Italy) and was organised by B. Matarazzo, with the help of J. Spronk. It was attended by almost 40 participants from industry, universities and research institutions from different countries. The teaching staff consisted of 25 instructors and their lectures were later collected in the book "Multiple Criteria Decision Methods and Application" (Fandel and Spronk, eds.), Springer-Verlag, 1985. At the end of this course, both speakers and participants expressed their desire for a periodic repetition of the initiative. Effectively, the second school took place in 1985, in Namur (Belgium). In 1986, a "permanent committee" was set up in order to contact potential organisers of Schools, help them to define the program and to obtain some funds and ensure the continuity of this activity. The following Schools were organised in 1988 in Lisbon (Portugal), in 1991 in Québec City (Canada), in 1994 in Chania (Crete) and in 1997 in Turku (Finland).

The next Summer School will be organized in Acireale-Catania again, June 26th – July 7th, by B. Matarazzo and S. Greco, as a residential course in the same hotel, situated in a small bay of the Ionian sea, where the first one was hold (come back to the origin!). A lot of the "fathers" and "pioneers" of multicriteria analysis accepted the invitation to have lectures during the "First Summer School of the new millenium". But also some well known researchers of the "new generation" will teach important subjects. The philosophy and the main objectives of this new Summer School are the same. But, of course, there is a long and consolidated successful tradition behind it, that can guarantee the scientific and the quality level of the next edition. In this sense, among the many strength points of the Summer School, I like to remember the following two: the very well founded relationships of friendliness and scientific cooperation among the organizers and the lecturers, and the quality guaranteed by the control of an International Committee. I hope that these specific features could in a short time give the possibility of a formal recognition of our Summer Schools within the credit system of the new organization of the European universities.

I believe that a lot of the participants of the next Summer School will be able to reach the same success achieved by people that attended the previous editions and that in a few years these "young boys" of multicriteria, speaking one another and to "new generations" of researchers and practitioners, will always remember this Summer School saying: me too attended that, when I met

my colleague (now a well known scientist) at those times participant …

Finally, I would like to propose some reflections about motivations for participation to the next Summer School. Thus, what are the reasons of a summer school at the beginning of the new millenium?

I think that there are some reasons which are common to each summer school but that have in this moment a special flavor. I suggest only two examples in this sense:

1) new theories and methodologies and new results are continuously proposed and therefore a summer school should take into account these advances. With respect to this summer school, this means some time dedicated to some emerging themes like robustness analysis and rough set analysis and some more time and a new approach dedicated to some other themes, always considered in the previous summer schools, but now approached in a new perspective: this is the case of fuzzy sets
2) many applications are continuously performed and new domains are explored with the methodologies of multicriteria analysis with very successful results. Each summer school should transmit the main ideas and concepts on which these applications are based. With respect to this summer school, this aspect will be considered by devoting regular sessions during the whole school to several case studies analysis.

I think, however, that for this summer school, which is the first of the new millennium, there are some more specific reasons. I think that we are living a revolution which shall modify our way of life. I refer to new technologies and the new economy, to internet and to the information technology. Thus, we need to rethink the basis of multicriteria analysis taking into account these deep modifications of our society. Of course, this reflection is at the very beginning, perhaps it would be better to say that it should be begun. Therefore, you cannot find some specific lectures in the summer school about these evolution of our society. However, we are sure that none of the teachers of the Summer School in their lectures shall prescind from these themes. Several times, each lecturer, motivated by some questions of the students, could propose his/her first ideas on the subject. Moreover, we are sure that starting form this Summer School probably many teachers and surely all the participants shall start their reflections about these new themes which will become basic subject in next summer schools. Within some years, multicriteria analysis will have tools and methodologies to deal with the nowadays modifications of our society and I hope that some of these will be originated by discussions during the next Summer School. In this sense this school is not only the first of the new millennium but overall the first of a new era.

To conclude, I would say to all the young researchers in multicriteria decision analysis wishing to be the pioneers of this new era: "The gold rush is starting from the next summer school in Acireale-Catania. You cannot miss this occasion!"



## MCDA Research Groups

**by**

**John Buchanan**

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I believe that we meet the minimum requirement for the constitution of a research group – that is, two researchers! Professor Jim Corner and I have worked together for the last nine years on a variety of research, both individually and collaboratively, in the general area of MCDA. This research has been very fruitful and has at times involved colleagues from other universities, notably Professor Mordecai Henig from Tel Aviv University. Other colleagues include Professor Craig Kirkwood from Arizona State University, Professor Lorraine Gardiner from Auburn University and Professor Daniel Vanderpooten from LAMSADE. Professor Hans Daellenbach of the University of Canterbury, who was responsible for my original interest in MCDA, has recently retired.

Our work has been somewhat eclectic, not being centred on a large research project. However, there has been a strong emphasis on behavioural decision making as we have tried to understand what decision makers actually do as a precursor to suggesting what, perhaps, they should do. We have investigated how behavioural characteristics of decision makers affect the performance of solution methods - including decision analysis, the Zionts-Wallenius method and a naïve guess method. Recently with the assistance of a doctoral student, we have been investigating the structuring of decision problems. Other current work includes the decision making of experts, a review of decision analysis applications and a project ranking exercise for a large New Zealand company.

What is the future of this "group?" We shall continue to work in the softer areas of behaviour and philosophy and welcome the opportunity to collaborate with others in this area. In the longer term it is our goal to establish a centre for decision research. Does anyone want to visit New Zealand?

Selected publications include:

1. Corner, Jim, John Buchanan and Mordecai Henig (2000), A dynamic model for structuring decision problems, *Department of Management Systems, Research Report Series 2000-02*.
2. Buchanan, John, Phillip Sheppard and Daniel Vanderpooten (1999), Project ranking using Electre III, *Department of Management Systems, Research Report Series 1999-01*.
3. Buchanan, John, Mordecai Henig and Jim Corner (1999), Comment on "Rethinking value elicitation for personal consequential decisions," by G. Wright and P. Goodwin, *Journal of Multi-Criteria Decision Analysis*, 8(1), 15-17.
4. Buchanan, John T., Erez J. Henig and Mordecai I. Henig (1998), Objectivity and subjectivity in the decision making process, *Annals of Operations Research*, 80, 333-345.
5. Buchanan, John T. and James L. Corner (1997), The effects of anchoring in interactive MCDM solution methods, *Computers and Operations Research*, 24(10), 907-918.
6. Corner, James L. and John T. Buchanan (1997), Capturing decision maker preference: Experimental comparison of decision analysis and MCDM techniques, *European Journal of Operational Research*, 98(1), 85-97.
7. Henig, Mordechai I. and John Buchanan (1997), Tradeoff directions in multiobjective optimisation, *Mathematical Programming*, 78(3), 357-374.
8. Buchanan, John (1997), A naive approach for solving MCDM problems: The GUESS method, *Journal of the Operational Research Society*, 48(2), 202-206.
9. Henig, Mordechai I. and John T. Buchanan (1996), Solving MCDM problems: Process concepts, *Journal of Multi-Criteria Decision Analysis*, 5(1), 3-12. And, Response to comments, 19-21.
10. Corner, J.L. and C.W. Kirkwood (1996), Magnitude of the errors in approximate multiattribute utility functions, *Management Science*, 42(7), 1033-1042.
11. Corner, J.L. and J.T. Buchanan (1995), Experimental consideration of preference in decision making under certainty, *Journal of Multi-Criteria Decision Analysis*, 4(2), 107-121.
12. Corner, J.L. and P.D. Corner (1995), Characteristics of decisions in decision analysis practice, *Journal of the Operational Research Society*, 46, 304-314.
13. Corner, J.L. (1994), Operationalizing approximate multiattribute utility functions for use in practice, *European Journal of Operational Research*, 79, 73-84.
14. Buchanan, John (1994), An experimental evaluation of interactive MCDM methods and the decision making process, *Journal of the Operational Research Society*, 45(9), 1050-1059.
15. Corner, J.L. and C.W. Kirkwood (1991), Decision analysis applications in the Operations Research literature, 1970-1989, *Operations Research*, 39, 206-219.



# About the 51st Meeting

by

Gabriela M. Fernández Barberis; Mª del Carmen Escribano Ródenas;
Jacinto González-Pachón and Javier Montero

The 51st Meeting of the European Working Group on "Multicriteria Aid for Decision" took place on March 30-31, 2000, at the Faculty of Economics, University of San Pablo-CEU, in Madrid (Spain). The Meeting was organised by Gabriela Fernández Barberis, Mª del Carmen Escribano Ródenas, Jacinto Gónzalez-Pachón and Javier Montero de Juan. There were 76 participants from 13 countries and 22 communications were presented. The social program consisted of a Spanish dinner at the "El Horno" Restaurant on Friday evening, March 31st. An excursion to the historical city of Alcalá de Henares was organised on Saturday morning, April 1st. Organisations contributing financial support to the Meeting were three Universities of Madrid: University of San Pablo-CEU, Technical University and Complutense University.

Those in attendance at the Meeting were: Amine Aït Younes, Cecile Arondel, José Carlos Ayusi Elvira, Donald Bain, Gabriella Balestra, Stephanie Baltolu, Carlos Bana e Costa, Christophe Barré, Begoña Barreiro, Nabil Belace, Blondine Bricaud, Rafael Caballero, Meri Emilia Calvo Martín, Mercedes Casas Guillén, Alain Chevalier, María de Vicente, Ana del Amo, Danae Diakoulaki, José Díez de Castro, Jesús Doña Fernández, María del Carmen Escribano Ródenas, Jacobo Feas Vázquez, Gabriela Mónica Fernández Barberis, José Figueira, Christian Fonteix, María del Carmen García Centeno, Jutta Geldermann, Daniel Gómez, Jacinto González-Pachón, Salvatore Greco, Jyoti Gupta, Walter Habenicht, Pierre-André Haldi, Jaroslava Hálová, Raquel Ibar Alonso, Michel Installe, Antonio Jiménez, Kikh Kosmidou, Juan Carlos Leyva López, Thierry Marchant, Amparo Mármol, Manuel Matos, Benedetto Matarazzo, Alfonso Mateos, Nikos Matsatsinis, María Dolores Mínguez Salido, Román Mínguez Salido, Luisa Monroy, Linett Montano Guzmán, Javier Montero de Juan, Céline Mousset, María Franca Norese, Pascal Oberti, Pilar Ordás Amo, Iannis Papadimitriou, Massimo Paruccini, Domenico Patassini, Eric Plottu, Sixto Ríos-Insua, Sixto Ríos García, María Isabel Rodríguez Galiano, María Victoria Rodríguez Uría, Martín Rogers, Bernard Roy, Leónidas Sakalauskas, Pekka Salminen, Ari Simonen, Yannis Siskos, Alexis Tsoukias, Bruno Urli, Philippe van Asbroeck, Jean-Claude Vansnick, Hountou Vasso, Philippe Vincke and Miguel Virto García.

The meeting was run in an excellent way and the discussions were very exciting. It consisted of six session and every of the communications have been successfully presented by their respective speaker.

The banquet was rendered agreeable by the "serenading party" of the University San Pablo and a sing was dedicated to the organisers. The sing was written by Jean-Claude Vansnick with music of Georges Brassens. The interpreters of the sing were: Céline Mousset, Jea-Claude Vansnick, Carlos Bana e Costa and Philippe Vincke.

The next meetings will be: The 52nd Meeting in Vilnius, Lithuania, the 5-6 October 2000. Information can be found in the web page: http://www.science.mii.lt/MCDA-52 and you can contact with Prof. Dr. Leónidas Sakalauskas; the 53rd Meeting in Athens, Greece, in March 2001, will be organised by Danae Diakoulaki (diak@chemeng.ntua.gr).

## FINAL PROGRAM/PROGRAMME DEFINITIF

**Thursday 30/Jeudi 30**

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

***Session 1. Chairman/ Président de session: Benedetto MATARAZZO***

14:15-14:45 Philippe VINCKE. Comment comparer des actions sur base d'évaluations non ponctuelles et en présence de seuils.

14:45-15:15 Cecile ARONDEL. Grille d'aide multicritère à l'analyse et à la conception de mécanismes incitatifs destinés à promouvoir une agriculture durable.

15:15-15.45 Walter HABENICHT. Searching strategies in outcomespace.

15:45-16:15 Alexis TSOUKIAS. On the use of positive and negative reasons in multi-criteria classification methods.

Papers submitted to discussion/papier soumis à discussion:

- Juan PIÑEIRO CHOUSA; Carmen REDONDO LÓPEZ; Jacobo FEAS. Using real options as criteria in environmental appraisal.
- Constantin ZOPOUNIDIS; Michael DOUMPOS; Kikh KOSMIDOU. Credit risk assessment using a multicriteria sorting approach: a comparative analysis.

16:15-16:45 Coffee break/café

***Session 2. Chairman/ Président de session: Alexis TSOUKIAS***

16:45-17:15 Martín ROGERS. Using VISA Decision Model to Evaluate Dublin's Transportation Policy to 2011.

17:15-17:45 Amine AÏT YOUNES; Bernard ROY. Construction d'un pseudo-critère à partir d'un rangement des actions.

17:45-18:15 Pierre-André HALDI; Ch. FREI; L. BEURSKENS; G. SARLOS. Comparative Sustainability Assessment of Electricity Generating Scenarios by a Multicriteria Approach. (Alliance for Global Sustainability: SESAMS project).

18:15-18:45 Juan Carlos LEYVA LÓPEZ; Eduardo FERNÁNDEZ GONZÁLEZ. A Method for Group Decision Support Based on ELECTRE III.

Papers submitted to discussion/ papiers soumis à discussion:

- Manuel MATOS. Some reflections on the multicriteria nature of risk evaluation.
- Leónidas SAKALAUSKAS. The Method for Planning of Efficient Alternatives in Multiobjective Stochastic Optimization.
- Silvia ANGILELLA; Salvatore GRECO, Fabio LAMANTIA; Benedetto MATARAZZO. Representation of non-additive and nontransitive preferences using Choquet integral.

19:30-20:30 Dinner/ dîner

**Friday 31/ Vendredi 31**

***Session 3. Chairman/ Président de session: Philippe VINCKE***

8:30-9:00 Jaroslava HÁLOVÁ; Premysl ZAK. Fingerprint descriptors in tailoring new drugs using GUHA method.

9:00- 9:30 Danae DIAKOULAKI; I. KORMENTZA; V. HONTOU. A MCDA approach to burden sharing among industrial branches for combating climate change.

9:30-10:00 Jesús DOÑA FERNÁNDEZ; A. HOLGADO; O. HIDALGO. Analysis of the genetic algorithm GAMIC for multicriteria classification of inventories.

Papers submitted to discussion/ papier soumis à discussion:

- Salvatore GRECO; Benedetto MATARAZZO; Roman SLOWINSKI. Rough approximation of data tables with missing values, using indiscernibility, similarity and dominance together.
- María Isabel RODRÍGUEZ GALIANO. Ranking alternatives in a choice problem with Inconsistencies.
- Christophe BARRÉ; Paul VERSTEVEN. Sélection Pro.

10:00-10:30 Coffee break/ café

***Session 4. Chairman/ Président de session: Thierry MARCHANT***

10:30-11:00 Sixto RÍOS-INSUA; Alfonso MATEOS; Antonio JIMÉNEZ. A utility based DSS for ranking remedial options in aquatic ecosystems contaminated by radionuclides.

11:00-11:30 Laszlo Nandor KISS; Christian FONTEIX; Silvère MASSEBEUF. Robustesse décisionnelle et robustesse technique définie à l'aide de l'enveloppe de la zone de Pareto – Application en Génie des Procédé.

11:30-12:00 Linett MONTANO GUZMÁN. Une metholodologie d'aide multicritère à la décision pour le diagnostic d'entreprise.

Papers submitted to discussion/ papiers soumis à discussion:

- Begoña BARREIRO; José DÍEZ; Guillermo SÁNCHEZ. Multicriteria Evaluation of Urban Life Quality: The case of Lugo City.
- Kazimiers ZARAS; Laszlo Nandor KISS; Frantz FOURNIER; Christian FONTEIX. Comparaison entre des méthodes de classement par bilans de flux et par Rough Sets des conditions de fonctionnement d'un procédé de granulation.
- Risto LAHDELMA; Pekka SALMINEN; Ari SIMONEN; Joonas HOKKANEN. Choosing a reparation option for a landfill by a multicriteria method.

12:00-13:00 Lunch/ déjeuner

13:30-14:00 **Bernard Roy. EURO Working Group matters, next meetings.**

***Session 5: Chairman/Président de session: Sixto RÍOS-INSUA***

14:00-14:30 Gabriella BALESTRA; M.F. NORESE, M. KNAFLITZ. Model structuring by ELECTRE III to assess the progression of muscular dystrophy in a pharmacological trial.

14:30-15:00 Jutta GELDERMANN; Otto RENTZ. Bridging the Gap between American and European MADM-Approaches.

15:00-15:30 Donald BAIN; Massimo PARUCCINI. MCA in the European Union-the need for a paradigm shift.

15:30-16:00 Nabil BELACEL. Fuzzy classification procedure PROCFTN: Methodology and Medical Application.

Papers submitted to discussion/ papiers soumis à discussion:

- Javier MONTERO; A. Del AMO; G. BIGING. A comparative view of two approaches for classification in remote sensing.
- S. BALTOLU; Pascal OBERTI. La gestion du patrimoine bâti à l'échelle des territoires volontaires: Restauration, maintien des savoirs-faire et réhabilitation.
- Pascal OBERTI; M. ROMBALDI. Principe de prévention et politique publique régionale: Analyse de projects d'éducation à l'environnement.
- Nikos MATSATSINIS; P. MORAÏTIS; Yannis SISKOS. A multicriteria approach for task allocation in a multi-agent system.

16:00-16:30 Coffee break/ café

***Session 6. Chairman/ Président de session: Massimo PARUCCINI***

16:30-17:00 Jyoti GUPTA; Alain CHEVALIER; Chen CAHO-FU. Multicriteria approach to test the efficiency of a stock market: the case of the Taiwan stock exchange.

17:00-17:30 Iannis PAPADIMITRIOU; Dimos LOUKAS; George CHATZIKONS-TANTINOU. Determination des poids de l'analyse multicritère à l'aide de l'analyse des correspondences et de la classification hierarchique.

17:30-18.00 Céline MOUSSET; Jean-Claude VANSNICK. Représentation numérique d'informations précardinales.

18:00-18:30 Thierry MARCHANT. A new approach to the axiomatization of MCDA methods.

Papers submitted to discussion/ papier soumis à discussion:

- Eric PLOTTU. Evaluer un projet d'infrastructure du territoire dans une optique de développement durable.
- Bernard FUSTIER. Agregation floue et ϕ-floue.
- Jean-Marie HAUGLUSTAINE. Multicriteria and multiactors aspects of an interactive tool aiding to sketch the building envelope during the first stages of the design.

21:00 Banquet



## Forthcoming Meeting

(This section is prepared by Luís Dias)

XV-th International Conference on Multiple Criteria programming Decision Making, Ankara, Turkey, 10-14 July 2000. Organizer: Murat Koksalan, Middle East Technical University, Turkey. Fax: 90-312-210-1268. E-mail: koksalan@ie.metu.edu.tr.

CSM'2000 - 14th JISR-IIASA Workshop on Methodologies and Tools for Complex System Modeling and Integrated Policy Assessment will be held at IIASA (Laxenburg, Austria) on July 3-5, 2000. http://www.iiasa.ac.at/~marek

EURO XVII, Budapest, Hongrie, 16-19 juillet 2000. Contact: EURO XVII Secretariat, Dr. Gustav Henczey, Kende u. 13-17, H-111 Budapest, Hungary. E-mail: hencsey@sztaki.hu.

ISMP 2000, 17th International Symposium on Mathematical Programming, Georgia Institute of Technology, Atlanta, GA, U.S.A., August 7-11, http://2000www.isye.gatech.edu/ismp2000.

X CLAIO, X Latin-Ibero-American Congress on Operations Research and Systems, Mexico, D.F., Mexico, September 4-8, 2000. http://www.inescc.pt/~apdio/Claio2000.html.

**52nd Meeting of the EWG "Aide Multicritère à la Décision",** Vilnius, Lithuania, 5-6 October 2000, organized by Leonidas Sakalauskas (sakal@ktl.mii.lt), H. Pranevichius (hepran@if.ktu.lt), E. Zavadskas (edmundas.zavadskas@adm.vtu.lt) and A.Kaklauskas (property@st.vtu.lt). Web page: http://www.science.mii.lt/MCDA-52.

VII congress of the international society for Fuzzy Management and Economy: "Decision Making under Uncertainty in the Global Environment of the 21th Century", Chania, Crete, Greece, September 18th, 19th, 20th, 2000. Organizer: Prof. Constantin Zopounidis (Contact: sigef_cha@ergasya.tuc.gr).

II Conferencia Internacional de Ciencias Empresariales Universidad Central "Marta Abreu" de Las Villas Santa Clara, Cuba Octubre 18 - 20, 2000 (Web page: http://www.mantener.com).

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.

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).



## Books (This section is prepared by Luís Dias)

### Evaluation and decision models: A critical perspective

by

**Denis Bouyssou**
*ESSEC*
**Thierry Marchant**
*Ghent University*
**Marc Pirlot**
*SMRO, Faculté Polytechnique de Mons*
**Patrice Perny**
*LIP6, Université Paris VI*
**Alexis Tsoukiàs**
*LAMSADE, CNRS, Université Paris-Dauphine*
**Philippe Vincke**
*SMG-ISRO, Université Libre de Bruxelles*

**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.

**Forthcoming**: Kluwer Academic Publishers

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### Valutazione di interventi pubblici in ambiti conflittuali, applicazione di un metodo multicriteri di aiuto alla decisione al problema della regolazione del Lago Maggiore.

(Tesi di dottorato, Università di Friborgo.
Ed. Sapiens, Lugano. 1999.)

### Evaluation des interventions de l'Etat dans des situations de conflit : Application d'une méthode multicritère d'aide à la décision au problème de la régulation du lac Majeur.

*par*

**Fabio B. Losa**

**Abstract:** The main concern of *Evaluation of public interventions in conflicting environments* is to produce an aid to decision making and its related application to the management of a multipurpose regulated reservoir.

From a methodological point of view, the resulting "decision-aid tool" falls within the framework of the French or European School, the so-called *multicriteria decision-aid* (MCDA). This consists of two complementary elements: an information support, by means of the explicit structuring of the decision process in its various stages; and a primarily analytical support, which is the application of an *outranking method* to the evaluation of, and subsequent comparison between, alternative solutions. This instrument fulfils a twofold function. On the one hand, it aims to strengthen the decision-making capacities of public corporations when faced with complex social issues, and consequently to boost the effectiveness and efficiency of public intervention. On the other hand, it is intended to ensure greater transparency in its decision process, which indeed reflects the growing demand for external auditing or scrutiny and for a more democratic public decision-making.

From an empirical point of view, this method is applied to the real case of the regulation of Lake Maggiore. Also known as Verbano, it is a regulated natural lake situated between Italy and Switzerland. It is known as the most important basin of the sub-alpine area on account of its multiple - occasionally conflicting - socio-economic uses (tourism and leisure activities, electrical power production, agricultural production, etc.). Its large alpine watershed is characterised by extremely variable weather conditions, which cause important outbreaks of flood and drought periods of both the lake and its outflow, the Ticino river, with consequent substantial damages to the socio-economic systems related to them.

There are a number of significant aspects to this application. First, the decision process is the result of a straightforward structuring operation whereby an exhaustive descriptive and analytical picture can be drawn of the various facets of the problem and of the problem solving. Secondly, the procedure of definition, analysis and evaluation of alternative solutions is based upon the successive utilisation of two multidimensional methods: the solution of a multiobjective optimal-management problem for the definition and analysis of the alternatives, conceived as a triple composed of structural action, a normative action and an optimal-regulation policy; and (secondly) the application of ELECTRE III as a multicriteria ranking method for the comparison of the

alternatives. Thirdly, there is the use of sensitivity analysis not merely for testing the robustness of results, but also as a decision-aid tool in solving conflicts and in negotiating settlements between the Italian and the Swiss part.

Although largely exemplary, the results of the application are far from uninteresting. To begin with, adopting optimal-regulation policies usually turns out to be very advantageous for all involved, hence preferable to the current management model, which relies exclusively on the manager's experience. Secondly, the method that has been elaborated, with both its information and analytical-evaluative components, seems to have a lot to offer in terms of decision aids for the analysis and assessment of alternative solutions and, consequently, in terms of greater decision power on the part of public corporations, of negotiation skills of the various interest groups involved as well as of the transparency of decision making.

**Indice:**

Introduzione. Parte Prima (Gli approcci multicriteriali di aiuto alla decisione): Capitolo 1, L'evoluzionne dell'aiuto alla decisione dall'analisi costi-benefici agli approcci multidimensionali; Capitolo 2, Processo decisionale e aiuto alla decisione: principi, contenuti e metodi degli approcci della scuola francese. Parte Seconda (Studio di caso: applicazione di un metodo multicriteri di aiuto alla decisione al problema della regolazione del Lago Maggiore): Capitolo 3, Il problema della regolazione del Lago Maggiore; Capitolo 4, Gli elementi del processo decisionale del problema del Lago Maggiore; Capitolo 5, Valutazione delle alternative e analisi dei risultati del problema del Lago Maggiore. Conclusioni. Opere consultate.

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## Multicriterion Decision in Management: Principles and Practice

by

**Jean-Charles Pomerol**
*LAFORIA, CNRS, Paris, France*
**Sergio Barba-Romero**
*Dept. Fundamentos de Economia, Universidad de Alcala, Madrid, Spain*

Multicriterion Decision in Management: Principles and Practice is the first multicriterion analysis book devoted exclusively to discrete multicriterion decision making. Typically, multicriterion analysis is used in two distinct frameworks: Firstly, there is multiple criteria linear programming, which is an extension of the results of linear programming and its associated algorithms. Secondly, there is discrete multicriterion decision making, which is concerned with choices among a finite number of possible alternatives such as projects, investments, decisions, etc. This is the focus this book.

The book concentrates on the basic principles in the domain of discrete multicriterion analysis, and examines each of these principles in terms of their properties and their implications. In multicriterion decision analysis, any optimum in the strict sense of the term does not exist. Rather, multicriterion decision making utilizes tools, methods, and thinking to examine several solutions, each having their advantages and disadvantages, depending on one's point of view. Actually, various methods exist for reaching a good choice in a multicriterion setting and even a complete ranking of the alternatives. The book describes and compares these methods, so-called `aggregation methods', with their advantages and their shortcomings. Clearly, organizations are becoming more complex, and it is becoming harder and harder to disregard complexity of points of view, motivations, and objectives. The day of the single objective (profit, social environment, etc. ) is over and the wishes of all those involved in all their diversity must be taken into account. To do this, a basic knowledge of multicriterion decision analysis is necessary. The objective of this book is to supply that knowledge and enable it to be applied.

The book is intended for use by practitioners (managers, consultants), researchers, and students in engineering and business.

**Contents:**

Foreword. Table of main symbols used. 1. What is multicriterion decision making? 2. Basic principles and tools. 3. Analysis of dominance and satisfaction. 4. Weighting methods and associated problems. 5. Ordinal multicriterion methods. 6. Additive utility functions and associated methods. 7. Outranking methods. 8. Other multicriterion decision methods. 9. Computers, Artificial Intelligence, Interactivity and Multicriterion Decision. 10. Software for discrete multicriterion decision. 11. Multicriterion decision in practice. 12. Multicriterion methods: features and comparisons. References. Author Index. Subject Index.

INTERNATIONAL SERIES IN OPERATIONS RESEARCH AND MANAGEMENT SCIENCE, Volume 25, Kluwer Academic Publishers, Boston Hardbound, ISBN 0-7923-7756-7, January 2000, 408 pp.

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## Multicriteria Design Optimization and Identification

*by*

**Roman B. Statnikov**
*Mechanical Engineering Research Institute, Russian Academy of Sciences,*

*Moscow, Russia*

This book presents the fundamentals of the Parameter Space Investigation method for the statement and solution of optimization problems, a powerful new tool for multicriteria optimization in engineering. Unlike the majority of other optimization techniques, the PSI method combines the formation of the set of feasible solutions, the sensitivity analysis of performance criteria, and optimization.

The PSI method is original. It offers designers an instrument which enables the construction of the feasible solution set with allowance for any number of performance criteria, to select Edgeworth–Pareto optimal solutions which cannot be improved in all performance criteria simultaneously, to find relationships between different performance criteria and between the criteria and the design variables, and to correct the mathematical model of the object to be designed if necessary.

A distinctive feature of this volume is that it contains a number of essays by leading specialists from various industries in which the PSI method has been successfully applied. The work is richly illustrated with numerous examples.

**Audience:** This volume will be of interest to research workers and graduate students who work in the field of aerospace engineering, mechanics, electrical and electronic engineering, mechanical engineering and the mathematics of engineering.

**Contents:**

Preface. Introduction: What is this Book Needed for? 1. On a Highly Widespread Class of Engineering Optimization Problems. 2. How to Help the Designer Formulate a Multicriteria Optimization Problem. 3. Multicriteria Analysis in Optimal Design. 4. Multicriteria Approaches in Mechanical Engineering. 5. Multicriteria Optimization of Large-Scale Systems. 6. Multicriteria Identification. 7. Optimal Design and Multicriteria Control. Instead of Epilogue: What Next? Addendum. References. Index.

APPLIED OPTIMIZATION, Volume 26
Kluwer Academic Publishers, Dordrecht
Hardbound, ISBN 0-7923-5560-1
March 1999, 220 pp.

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## Model-Based Decision Support Methodology with Environmental Applications

*edited by*

**Andrzej P. Wierzbicki**
*International Institute for Applied Systems Analysis, Laxenburg, Austria*
**Marek Makowski**
*International Institute for Applied Systems Analysis, Laxenburg, Austria*
**Jaap Wessels**
*International Institute for Applied Systems Analysis, Laxenburg, Austria*

This is the first book to develop a decision support methodology for strategic environmental decision problems, and
provides several generic as well as specific tools.

The proposed methodology is based on modelling the underlying physical and economic processing. These substantial models are used for single criterion optimization and for multi-objective model analysis based on the reference point approach. It is shown that in this way learning and decision processes may be supported, using concepts like soft constraints, inverse simulation and search for compromise solution.

The last part of the book consists of four chapters on applications. Each chapter treats an area of environmental decision making: water quality management in river basins, land use planning, cost-effective policies for improving air quality, and energy planning. For each area decision support systems are presented and it is shown how they are
used for supporting decision making and negotiations.

The applications as well as the methodology presented in this book have been developed at The International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, in close cooperation with
several other institutes and organisations.

**Audience**: This work will be of interest to researchers and practitioners in the fields of environmental modelling and analysis, decision support, mathematical programming and political analysis.

**CONTENTS**

Contributors. Acknowledgments. Aim and Audience. Introduction; J. Wessels, A.P. Wierzbicki. Part I: Methodological Background. 1. Model-Based Decision Support; J. Wessels, A.P. Wierzbicki. 2. The Modern Decision Maker; A.P. Wierzbicki, J. Wessels. 3. Architecture of Decision Support Systems; M. Makowski, A.P. Wierzbicki. 4. Reference Point Methodology; A.P. Wierzbicki. 5. Multi-Objective Modeling; A.P. Wierzbicki. Part II: Decision Support Tools. 6. Modeling Tools; J. Paczynski, et al. 7. Optimization Tools; J. Granat, et al. 8. Multi-Objective and Reference Point Optimization Tools; A.P. Wierzbicki. 9. Tools Supporting Choice; A.P. Wierzbicki, H. Nakayama. 10. Interfaces; M. Makowski, J. Granat. Part III: Environmental Applications. 11. River Basin Water Quality Management; M. Makowski, L. Somlyody. 12. Land Use Planning; G. Fischer, M. Makowski. 13. Effect-Focused Air Quality Management; M. Amann, M. Makowski. 14. Energy Planning; S. Messner, et al. Part VI: Conclusions. Epilogue; J. Wessels, A.P. Wierzbicki. Appendix:

Software Description; M. Makowski. References. Subject Index. Author Index.

Kluwer Academic Publishers, MATHEMATICAL MODELLING: THEORY AND APPLICATIONS Volume: 9 Hardbound, ISBN 0-7923-6327-2, May 2000, 492 pp.

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## Intelligent Decision Aiding Systems Based on Multiple Criteria for Financial Engineering

*by*

**Constantin Zopounidis**
*Technical University of Crete,*
*Chania, Greece*
**Michael Doumpos**
*Technical University of Crete,*
*Chania, Greece*

This book provides a new point of view on the field of financial engineering, through the application of multicriteria intelligent decision aiding systems. The aim of the book is to provide a review of the research in the area and to explore the adequacy of the tools and systems developed according to this innovative approach in addressing complex financial decision problems, encountered within the field of financial engineering.

**Table of Contents:**
PROLOGUE. CHAPTER 1: FINANCIAL ENGINEERING (Mathematical modeling and financial management, Financial engineering, The relationship between financial engineering and financial risk management, Financial engineering methodologies, The multicriteria character of financial engineering, Multicriteria decision aid). CHAPTER 2: DECISION SUPPORT SYSTEMS (Decision support systems: General framework and main features, DSSs' structure, DSSs applications in financial engineering, Illustrations from credit granting and portfolio management, DSSs' contribution and limitations, Appendix: The UTADIS methods and its variants). CHAPTER 3: EXPERT SYSTEMS (General framework, ESs' definition and basic characteristics, ESs' structure, ESs applications in financial engineering, Illustration of ESs development and implementation: The ES part of the FINEVA system, ESs benefits and limitations). CHAPTER 4: KNOWLEDGE_BASED DECISION SUPPORT SYSTMES (Connectives between Dsss and Ess technologies, Knowledge-based decision support systems, Alternative artificial intelligence techniques for intelligent decision support, KBDSSs in financial engineering). CHAPTER 5: INTELLIGENT MULTICRITERIA DSSs (brief history on multicriteria decision support, MCDSSs functionality and main features, the contribution of artificial intelligence, applications of intelligent MCDSSs to financial engineering). CHAPTER 6: INTELLIGENT MCDSSS IN FINANCIAL ENGINEERING PRACTICE (Is there any need for intelligent multicriteria decision support? The road ahead ). REFERENCES, SUBJECT INDEX.

**Audience**: Researchers and professionals such as financial managers, financial engineers, investors, operations research specialists, computer scientists, management scientists and economists.

APPLIED OPTIMIZATION, Volume 38, Kluwer Academic Publishers, Dordrecht, Hardbound, ISBN 0-7923-6273-X, May 2000, 232 pp.



## Articles Harvest

(This section is prepared by Maria João Alves with the help of Carlos Henggeler Antunes)

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*Séminaire "Rationalité et Intelligence Artificielle" Responsables : Suzanne Pinson, Alexis Tsoukiàs (le jeudi, de 14.00 a 16.00, en salle A 709) :*

- 8 juin 2000 - Conférence de Philippe Lenca (ENST Bretagne, Brest) : Une technique d'acquisition d'objets de référence.

*Seminaire "Modélisation des Préférences et Aide Multicritère a la Décision" Responsables : Bernard Roy, Daniel Vanderpooten (le mardi, de 14.00 a 17.00, en salle P 510) :*

- 16 mai 2000 - Conférence de Patrice Perny et Jean-Daniel Zucker (LIP6, Université Paris 6) : L'aide a la décision collaborative : Une nouvelle approche de l'aide a la décision en vue d'applications sur Internet.

*Séminaire "Instruments d'Aide a la Décision et Dynamique des Organisations" Responsables : Albert David, Michel Nakhla, Louis-George Soler (le vendredi de 9.45 a 12.00, en salle A 707) :*

- 16 juin 2000 - Conférence de Marienne Cerf (Chargee de Recherche INRA) : Systèmes d'information et apprentissage collectif - Cas : Gestion des exploitations agricoles en Picardie.

*Séminaire "Gestion des Connaissances et Décision" Responsables : Michel Grundstein, Eric Jacquet-Lagrèze, Camille Rosenthal-Sabroux, Manuel Zacklad (le mardi de 10.30 a 13.00) :*

- 30 mai 2000 - Conférence de Armand Hatchuel (CGS, Ecole des Mines de Paris) : Théorie de la conception et gestion des connaissances.

# Other Works

(Communicated by the authors)

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