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Announcement

A membership directory of the European Working Group on "Multicriteria Aid for Decisions" is now available at:

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Opinion Makers Section

(This section is prepared by João Clímaco)

Nature *in* and Nature *of* MCDA

by

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In this section, I will carry on the topic of T.J. Stewart who wrote in the 2000`s fall edition of the Newsletter. He took up the question of how MCDA practice should respond to behavioural research findings. An answer definitely needs a normative point of view. Without a clear idea about what the nature of decision aid is (or should be), we can not identify any shortcomings of different MCDA streams. What is the point of reference toward which we can define biases (as Stewart calls the shortcomings)? Talking of biases implies that there is a true reference which we – as analysts – should attain. But, at the same time, it is clear that this true reference (i.e. the preferences of the decision maker (dm)) does not exist as such. His preferences may be, and actually are, influenced by all sorts of decision frames: the weather on the decision day, the mood of the dm, the organisational setting, the intellectual (and emotional) capacity of the dm, the decision aid model with all its variables (thresholds, preference functions, etc.), the mood, etc. of the analyst, and many things more. Consequently, we arrive at a complex interrelationship between all these variables without any indication at all of which combination yields the "true" preferences, i.e. our reference point. But it is this point which enables us to define biases, to compare different MCDA (and other) models. Talking of biases implies an underlying idea of optimisation of decision aid which has no place here.

Instead, we should look for a *satisficing* decision aid. Whom do we (the analysts) want to satisfy? Or, rather, *should* satisfy (in order to make the normative aspects clearer)? What are we responsible for? And whom are we responsible to?

As you may suppose, there is a huge debate about these questions of responsibility in Ethics, and it is far beyond my scope to give an answer to them. But in each decision case, the analyst has to have an ethical point of view, and this point of view must be clear to her – otherwise, she may not define the goodness of the decision aid. I will make the topic clearer in using the first part of the heading: "Nature *in* MCDA". Whenever decisions have impacts on nature, the range of concerned beings gets very large. Especially decisions in land planning, conservation issues, traffic and energy systems, agriculture, fishery and forestry have large impacts on nature. Currently living as well as future human generations are concerned by theses decisions as well as other currently living and future animals, plants, and ecosystems. In aiding the dm to take decisions, the analyst is not only responsible to the dm, but – at least – to present human beings. Her responsibility is not as large as the responsibility of the dm himself, but well existent, as she inevitably influences the decision. In my view, and there are good arguments for it, the analyst also has to assume responsibility to future humans as well as to other living beings (to decreasing extents). She is not responsible for the decision itself but for (the part of) the decision process on which she is acting.

How can this responsibility be reflected in the analyst's attitude and action? First, there are limits of co-operation: The analyst is not obliged to accept all types of preferences of the dm, her responsibility to others might outweigh her responsibility to the dm. In extreme cases, she might drop the case, or falsify the decision process. Second, and more importantly, the analyst should

influence the preferences of the dm openly, if the latter neglects his responsibility to others. This open influence is not only legitimate, but might be a necessary part of the decision process, and could be made explicit by the proposal of integration of specific stakeholders, of specific criteria, or of forms of evaluation which consider, for example, the interests of future generations. In supporting the "process of learning and discovery" (as Stewart says), the analyst directs it in some way, and she should do it openly in such a way that she can bear the responsibility of the decision process.

This, then, highlights the value of behavioural decision research to the practice of MCDA. The analyst needs the preference model (constructed with the help of results of behavioural decision research) in order to be able to bear the responsibility for the decision process. It is part of her responsibility to the dm's and to other interests that she models the *ex ante* preferences as best as she can, that she influences them openly, and that she uses the possibly changed preferences to help the dm to come to a resolution (if he wants to do so).

This also highlights the value of (positive and normative) ethical research to the practice of MCDA. Without such a background, the analyst may not assume her responsibility for the decision process.

Let's come back again to "Nature *in* MCDA": There are two domains: 1) Responsibilities to future generations (and for other living beings) are not well reflected in democratic decisions, and to a still smaller extent in markets. But, they are widely acknowledged by the public (at least responsibilities to future human generations and to some vertebrates). It is the duty of the analyst to take up her responsibility. 2) The preferences of a concrete dm who weighs up the pros and the cons of some actions in *nature conservation*, play a far less important role than his preferences in some business decision. Mostly, it is the role of a dm in topics of nature conservation to represent public and private interests of existent and non-existent, human and non-human interests (compare, for example, the preamble of the Convention on Biological Diversity). It is the role of the analyst to remind him of these preferences, and to propose appropriate decision models: Future generations and/or sentient animals (for example) might be treated as decision actors (with the problem of how to represent the preferences of non-existent decision actors). Or they might be represented as criteria (with the problem of how to put weights (or importance) on them).

As you noticed, I have come back to the "Nature *of* MCDA". Both topics are heavily interrelated, and it is not possible (in my view) to extend the field of application of MCDA to questions involving nature preservation or nature destruction without changing the understanding of MCDA itself.

P.S.: By the way, the heading of my small contribution is also the title of the 55th meeting of the working group which will take place from 14th to 16th of march 2002 in Leipzig and to which all of you are very welcome.

Answer to Theo Stewart's article (in Opinion Makers Section, Newsletter, series 3, no 2, automne 2000)

by

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When one looks backward to find what stands out in the MCDM literature one may distinguish the continuous effort, although not declaratively, to evade normative models of preferences. This is in distinction to DT (Decision Theory) which focuses on and develops such models. MCDM emerged from Operations Research and led to the Pareto frontier and interactive programming followed by decision aiding to shape and stabilize ill-defined preferences. The alternatives advanced to center stage. It is true that preferences are, and will be, always on the stage because, eventually, most of MCDM methods (except mainly those which generate the Pareto set) wish to come up with preferred alternatives. However, it is the difficulty (theoretical or operational) that the decision makers have in expressing "rational" preferences which motivates most MCDM methods. Somehow, human beings refuse to be "rational".

As a methodology which cares about real life and derives many ideas from it, the inclination of MCDM to bypass normative preferences is not surprising. Indeed, realizing the difficulties that DT underwent in experimentation and application this inclination is well justified. One might even say that the flourishing of MCDM is due, at least partially, to the difficulties that DT confronts in application (contrary to its brilliant theoretical achievements).

I was surprised therefore to read Theo Stewart's article (Opinion Makers Section, Newsletter of the European Working Group "Multicriteria Aid for Decisions", series 3, no 2, automne 2000) about "How should MCDA practice respond to behavioral research findings" which gives the impression that the agonizing discrepancies between "decision models ... and the results from behavioral decision science" is new to MCDM. As I suggested above, this is the "*raison d'être*" for the existence of MCDM methodology in the first place. MCDM methodology exists because of the incompliance of the decision maker with normative models of preferences. By the way, similar calls were heard before (see references in Editorial MCDA: Theory, Practice and the future" J. Multi-Crit. Decis. Anal. 8: 1-2 1999).

It seems that Theo talks about the problems in utility theory which is backed by an axiomatic system. Only when you have a theory (i.e., scientific theorems) can discrepancy arise. However, no MCDM method, to the best of my knowledge, is backed by such a system of axioms, so they are not vulnerable to any paradox. Many

MCDM methods are associated, naturally, with some assumptions, mainly to assure convergence, but they do not claim to be rules to be followed in order to attain the best "rational" decision.

The contribution of MCDM is not in establishing and formulating "rational" preferences but rather in understanding and even complying with revealed preferences. It is about accommodating the revealed preferences without any restriction, whereas normative models are, by their nature, presupposed and expect a certain behavior on behalf of the decision maker. In MCDM we tailor the suit to the client whereas DT fits one from stock. Understanding is more general than mapping and assessing preference relations. It is less a functional representation of preferences and more an identification of the motivation, desires and expectations in terms of criteria, attributes and alternatives and relating them to each other. As an example consider a situation of a contradiction in preferences. In DT it will start a search into new postulates. Depending on the MCDM method it is either ignored, triggers a new iteration, or, which in my opinion is the right way, motivates a "soul search" for understanding.

Theo rightly observes the failure of constructing a preference model in terms of tradeoffs and value functions and that it "is not so much to refine our decision models any further". Then instead of elaborating he suggests "to gain greater understanding of how judgmental biases in user inputs affect the outputs and recommendations of the model". I doubt that we can do much beyond what we know now. Besides, even if we know the biases it will be a problem to apply them. I believe that we will never fully understand how we make decisions. It seems that Theo shares this opinion when he observes that our methods are "transparent and simple" versus the "infinitely rich complexity of real human judgments". There is a call to balance and integrate them, but this is what researchers are doing all the time. Is not it true that DT is a ping pong game played between behaviorists who find counterexamples and mathematicians who modify the theorems?

MCDM methodology may not be scientific enough (in terms of Popper's) for some researchers. Indeed, the methodology gave rise to a assortment of methods "which work" without a reasonable measure justifying the claim. Nevertheless, MCDM suggests a methodology which is close and tuned to the decision maker and by doing that has its share of "scientific" achievements.

Unfortunately, the flourishing of the MCDM literature has not led to a flood of MCDM applications. However, the reason for that is totally different than those observed in DT. The reason for the failure of many MCDM methods and the success of only few (like AHP) are in spite of circumventing the behavioral discrepancies. I believe that this failure, at least partially, motivated Theo's article (and motivates mine).

Theo is concerned about future research and advancement of MCDM. So let me direct him to his own words in the article. He writes rightly that "the role of MCDA is to support the process of learning and discovery". I cannot accept, however, the end of this sentence about "a satisfactory solution to the decision problem". What is "a satisfactory solution"? What is a solution to a decision problem anyway? This goal of finding a solution is, in my opinion, the source of many of the ad hoc solutions in MCDA (and possibly one of the reasons for the failure of these methods). I guess that "satisfactory" is there to soften any critiques of a solution: we never promised an optimal solution only a satisfactory one.

Let me dare to say that the goal of "finding a satisfactory solution" or even modeling the preferences may block real comprehension of the preferences and creativity. Instead let me suggest another goal (see, among others, my work with J. Buchanan, Solving MCDM Problems: Process Concepts, *Journal of Multi-Criteria Decision Analysis* 5, 1996, pp. 3-12): to ensure that there exists a good process of decision making and that such a process "will force the decision maker to comprehend his preferences and allow the set of alternatives to be expanded". There is more to decision making than selecting an alternative.



MCDA Research Groups

Financial Engineering Laboratory

by

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The Financial Engineering Laboratory was founded in 1999 after decision of the Greek Ministry of Education. Its objective is to provide high-level educational support to under-graduate and graduate students of the Department of Production Engineering and Management of the Technical University of Crete, as well as to conduct high-level scientific research on the field of financial engineering and management.

From the methodological point of view, the research conducted by members of the Financial Engineering Laboratory involves both theoretical developments and applications in financial engineering, of advanced operations research techniques (multicriteria decision aid, optimization), artificial intelligence tools (expert systems, fuzzy sets, neural networks), as well as the design and

implementation of decision support systems for financial engineering problems. The tools that have already been developed by the members of the laboratory have been applied successfully on several fields of financial engineering and management, including but not limited to:

- *Corporate performance.*
- *Assessment of bankruptcy and credit risk.*
- *Financial planning.*
- *Corporate mergers and acquisitions.*
- *Venture capital investments.*
- *Portfolio selection and management.*
- *Credit cards evaluation.*
- *Assessment of the efficiency of bank branches.*
- *Country risk evaluation and the impact of exchange rates on corporate performance.*
- *Efficiency of small business enterprises.*

In addressing these problems, the members of the laboratory have developed three decision support systems that implement sophisticated multicriteria decision aid methods based on the preference disaggregation approach. These systems include:

1. The FINCLAS system: The FINCLAS system (Zopounidis and Doumpos, 1998) is a multicriteria decision support system developed to study financial decision making problems in which a classification (sorting) of the alternatives is required. The present form of the system is devoted to corporate credit risk assessment, and it can be used to develop classification models to assign a set of firms into predefined credit risk classes. The Ionian Bank of Greece, the Commercial Bank of Greece, the General Bank of Greece and the Bank of Greece are currently using the FINCLAS system in their daily practice regarding the assessment and monitoring of corporate performance and viability. Furthermore, the University of Macedonia, the Athens University of Business and Economics and the Technological and Educational Institute of Crete, also use the FINCLAS system for educational purposes with regard to the financial analysis and the contribution of MCDA in this field.
2. The INVESTOR system: The INVESTOR system (Zopounidis and Doumpos, 1999a) is developed to study problems related to portfolio selection and management. The system implements preference disaggregation analysis techniques as well as goal programming to support portfolio managers and investors in their daily practice.
3. The PREFDIS system: The PREFDIS system (Zopounidis and Doumpos, 2000) is a multicriteria decision support system developed to address classification problems. The system implements a series of preference disaggregation analysis techniques, namely the family of the UTADIS methods, in order to develop an additive utility function to be used for classification purposes.

Except for the above decision support systems, the Laboratory is equipped with several statistical, econometric and optimization software packages (SPSS, LIMDEP, MATLAB) that can be used to model and address complex financial engineering problems.

The research and educational activities of the Laboratory have been funded by several grants obtained from the European Union, the Greek Government, and private companies.

At moment, the members of the laboratory include:

- Professor Constantin Zopounidis (Director)
- Associate Professor George Kouretas
- Lecturer Augustinos Dimitras
- Adjunct Professor Michael Michalopoulos
- Dr. Michael Doumpos
- Kiki Kosmidou, PhD candidate
- Konstantina Pentaraki, PhD candidate
- Maria Bakatsaki, PhD candidate
- Michael Spanos, PhD candidate
- Panagiotis Antonakakis, PhD candidate

Furthermore, these is a number of post-graduate students and under-graduate students who are working in the Laboratory.

The laboratory is equipped with nine PCs (three Pentium III/600Mhz, three Pentium II/450Mhz, one Pentium Pro/200Mhz, one Pentium 200Mhz, one Pentium 100Mhz), four laser printers (one network printer), one inkjet printer, a scanner, and a photocopy machine.

Furthermore, the Financial Engineering Laboratory has recently initiated a working paper series in order to provide a mean of communication on financial engineering and multicriteria decision aid topics. This series includes monographs and articles by members of the laboratory as well as papers of joint projects conducted by visiting scholars in cooperation with members of the laboratory. The topics covered by the working paper series involve any aspect of financial engineering and financial risk management, including the aforementioned list of issues and other topics related to financial derivatives, investment and commercial banking, trading, hedging strategies, corporate finance, portfolio management, risk management, financial planning, asset/liability management, etc. All articles submitted for publication in this working paper series are refereed by an external reviewer for evaluation and discussion with the authors. Articles appearing in the series may subsequently be submitted for publication to international journals. Those interested in submitting an article for publication in the working paper series of the Financial Engineering Laboratory should contact the Editor of the series, Prof. Constantin Zopounidis, at the following address:

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Further information on the activities of the Laboratory are available at the website:

http://www.dpem.tuc.gr/fel/

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Forum

Multicriteria Optimisation in (Large Scale) Real World Applications

by

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When I read the Forum column in the last newsletter, I mentioned in an email to José Figueira, that I found it interesting, and that hopefully current projects I am involved with will be among objects D, E, or F according to Vincke's classification of applications. José invited me to write the next column. So here it is.

Discussion about applications of MCDM/MCDA technologies has been going on for a while in our community. What constitutes a "real" application? Which methods are the "best"? are some questions that might never really find a final answer. I don't want to discuss the former question. As for the latter: Probably it just depends on the situation. Often decision aiding techniques are the appropriate tools, especially in cases where a relatively

small number of alternatives is considered and they certainly have had their well-deserved success. Interactive methods work well when the intermediate computational steps can be carried out quickly. But sometimes both are not applicable due to the structure of the decision problem underlying the application. Here I would like to put forward some arguments for using multicriteria *optimisation* methodology in real world projects

Let us consider the situation of a large scale application, where a very large number or a continuity of alternatives might exist. Solution of such a problem could involve multi-million dollar savings, or could make the difference between survival and death of a patient. I would like to report on two ongoing projects of that kind. The problems themselves are very well known and more or less routinely solved as single objective optimisation problems. Perhaps this familiarity with the models is the reason for the arising insight that what would really be needed in both applications is the consideration of more than just the cost criterion or another aggregate measure of performance.

Airline Crew Scheduling at Air New Zealand

In the competitive airline markets of today, major airlines can no longer rely solely on minimal cost solution of their scheduling and rostering problems. Robustness of solutions is of increasing importance to avoid the cascading effects of delayed flights and to gain an edge in the business. In a project in co-operation with Air New Zealand we set up a model of bicriteria optimisation of the classic crew scheduling problem, where we consider both the cost and robustness criterion as a linear objective function. The resulting mathematical model is a large scale set partitioning problem. Its solution requires sophisticated problem specific technologies in integer programming – such as constraint branching and column generation – as well as multiobjective (linear programming) techniques. The system will provide the users with a trade-off analysis of the two criteria and the possibility to navigate among solutions by specifying certain parameters, e.g. the increase in cost management is willing to cover in order to obtain a more robust schedule. In this case the decision makers (DM) involved, i.e. the network logistics department at Air New Zealand, are familiar with optimisation software for more than 15 years (previous work by Air New Zealand and the University of Auckland was presented in the finalist round of last years Edelmann prize). Thus they are comfortable with OR technology and understand well what OR can do for them and what their role in the process can be. In fact, they prefer a system, in which they have the ability to steer the process – and which shows them the range of possibilities they have – to one, in which the preferences would be considered from the start, as they felt that this would have them searching around "in darkness".

Radiation Therapy Planning in Cancer Treatment

The inverse planning problem in radiation therapy planning is a key issue to increase the effectiveness of therapy plans (in Germany, about one third of patients diagnosed with curable cancer die nevertheless). In this problem, the goal is to find optimal intensity profiles of radiation beams, given a desired dose distribution, provided by the physician. This turns out to be a precarious problem of keeping the balance between an ineffective underdosing of the tumour and a dangerous overdosing of healthy organs. Traditionally, the model involves minimising a weighted sum of deviations from prescribed doses with a trial and error approach for adjusting the weights. However, the more natural formulation is a multicriteria model, in which one objective occurs for the target volume (tumour) and each of the organs at risk. Using a discretisation of digitised CT or MRT images and beam heads, a large scale multiobjective linear program results. For this problem a good representation of efficient solutions can be computed and maintained in a database (what, exactly, constitutes a "good" representation is an ongoing topic of research). Note that (perhaps except from setting some initial parameters) this does not need the involvement of the physician. The DM (physician) can then consult the database, navigate among the solutions and pick the one most suited for the patient awaiting treatment, and he can do so on-line! Thus the involvement of the physician in the process is increased, the time consuming trial and error process needed earlier is avoided, we get rid of the problem of the well-known extreme sensitivity of the weighted sum approach to the weight values and the chances of obtaining good treatment plans are greatly increased. The advantages of a multicriteria optimisation approach in this application are self-evident.

From my point of view, these two applications clearly illustrate the need to develop appropriate multicriteria optimisation methodology. It is simply not sufficient to have sophisticated methods of aggregating – in which way whatsoever – the multiple objectives into one overall goal, too much valuable information will be lost. In addition, the direct application of interactive methods must be discarded out of hand, because the intermediate optimisation problems are too big to be solved on-line. We should also be aware of the fact that "real" projects will always involve two groups of people: the DM's (schedulers, physicians, ...), who are experts in the application or the real world problem, and consultants (us), who are experts in Operations Research and/or multicriteria methodology. Co-operation is needed and indispensable for success of the project in the development of the underlying mathematical model as well as in the validation of results. Apart from hat, let the DM do what she does best: Judge which solution to choose by her expertise and experience. But let the consultant provide this possibility by the development of correct, efficient and easy to use systems of multicriteria optimisation (tailored to the needs of the DM, e.g. by

visualising radiation dose values by colour coded pictures). With such an approach the interaction takes place at the appropriate stage and the DM's expertise is utilised to maximum benefit. Needless to say that ample possibilities for research open up if we want to make multicriteria optimisation a successful, respected, and well established technique in OR practice.

Software

Multicriteria Decision Support for Financial Classification Problems: The FINCLAS system

by

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In the field of finance several problems are better addressed through the sorting "problematique" (classification). Such problems include credit granting, business failure prediction, country risk assessment, portfolio selection and management, etc. In the past, financial researchers addressed such problems using traditional statistical and econometric techniques. However, recently alternative non-parametric techniques have gained significant interest among researchers.

Among these alternative techniques, multiple criteria decision aid (MCDA) provides a wide set of powerful tools and methods to address financial classification decision problems in a flexible and realistic context. The preference modeling capabilities of MCDA methods enable the decision makers to develop decision models of high classification accuracy, and in addition to gain significant insight information regarding their implicit preferences.

The implementation of MCDA methods to make real time financial decisions, is realized through the development of multicriteria decision support systems (MCDSSs). MCDSSs' interactive structure and operation enables them to integrate database management with MCDA methods, to be flexible and adaptable to the changes in the decision environment as well as to the cognitive style and the preferences of different decision makers.

Based on this methodological approach the FINCLAS (FINancial CLASsification) multicriteria decision support system has been developed [3]. The FINCLAS system is the outcome of an attempt to integrate powerful methodologies from the preference disaggregation approach of MCDA with decision support systems technology, in order to provide financial/credit analysts with a user friendly but powerful tool to study financial classification decision problems efficiently in real time.

The present form of the FINCLAS system is oriented towards the analysis and assessment of corporate performance and viability, as well as the credit risk evaluation. The FINCLAS system through the combination of powerful preference disaggregation techniques with the decision support systems' technology, enables financial and credit analysts, managers of firms, as well as individual investors to study effectively a wide spectrum of significant financial classification problems, including bankruptcy risk evaluation, credit granting, assessment of corporate performance, etc. Furthermore, the system can be easily adapted to the study of other financial classification problems, including country risk assessment, portfolio selection and management, and venture capital investments, among others.

The analysis of corporate performance and viability through the FINCLAS system is based on the financial aspects of the firms as well as on a series of qualitative factors related to the operation of each firm and its relation to the market. Such qualitative factors include the quality of management, the organization, the know-how that firms possess, the market trend, the market niche/position, etc.

The system incorporates an enriched financial model base module, including several well known financial modeling techniques such as the table of sources and uses of funds, and financial forecasting methods (the linear regression and the sales percentage method).

The model base of the system incorporates a family of sorting techniques based on the preference disaggregation approach [2] and more specifically on the UTADIS method (UTilités Additives DIScriminantes; [1],[4]). The incorporation of these methods in the structure of the FINCLAS system enables the user to develop corporate assessment models that assign the firms under consideration into predefined classes according to their level of performance and viability.

The Ionian Bank of Greece, the Commercial Bank of Greece, the General Bank of Greece and the Bank of Greece are currently using the FINCLAS system in their daily practice regarding the assessment and monitoring of corporate performance and viability. Furthermore, the University of Macedonia, the Athens University of Business and Economics and the Technological and Educational Institute of Crete, also use the FINCLAS system for educational purposes with regard to financial analysis and the contribution of MCDA in this field.

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Persons and Facts

Prof. Stelios Zanakis (Florida International University, USA), Dr. Michael Doumpos (Technical University of Crete, Greece) and Prof. Constantin Zopounidis (Technical University of Crete, Greece) have been awarded with the Best Interdisciplinary Paper Award during the 31st Annual National Meeting of the Decision Sciences Institute held in Orlando, Florida (November 18-21, 2000). In their paper entitled "Global Investing Risk: Assessments of Experts", the authors employed multicriteria decision aid techniques to analyze the expert's judgments in assessing investment risk in global markets.

New address: Dr. *Felix Rauschmayer*: Centre for Environmental Research (UFZ), Permoserstr. 15, 04318 Leipzig, Germany. E-mail: rauschma@alok.ufz.de

New address: Dr. *Jaroslava Halova*, Academy of Sciences of The Czech Republic, 250 68 Rez near Prague, Czech Republic. E-mail: halova@uach.iic.cas.cz



About the 53rd Meeting

by

Danae Diakoulaki

The 53rd Meeting (29-30 March 2001) took place at Athens, in the Training Centre of the National Bank of Greece located in Glyfada, a suburb 15 km from the city centre, close to the sea. The responsibility for the organisation was undertaken by the National Technical University of Athens (Lab. of Industrial and Energy Economics) and the Hellenic Operations Research Society, with D. Diakoulaki being the link of the two institutions. A financial support to the organisers was provided by the "Regulatory Authority for Energy" and the "Centre of Renewable Energy Sources", both Greek institutions of the wider energy sector. A special support was also offered by EURO for facilitating the attendance of participants from weaker currency countries.

A total of 51 papers were submitted, of which 20 have been presented orally. From these 51 papers 16 were relevant to the central topic "Economy-Energy-Environment Interactions", 12 were about different MCDA applications and the remaining 23 dealt with new concepts and methodological approaches. The programme was run successfully and fruitfull discussions animated the sessions.

Seventy (70) participants from 18 countries have attended the meeting: 18 participants were coming from Greece, 12 from Belgium, 7 from France, 6 from Italy, 6 from Spain, 5 from Canada, 2 from Germany, Israel, Lithuania, Poland, and 1 from Belarus, Bulgaria, Estonia, Netherlands, Portugal, Russia, Switzerland, UK.

The banquet took place in the Restaurant "OMILOS" in the Gulf of Vouliagmeni. Besides the nice place, the good food, the live Greek music (guitare and bouzouki), and the D.J. s choices for dancing music, it was mainly the participants' high spirit and temperament that contributed to the success of the evening!

On Saturday 31 March, most of the participants have visited, in a half-day excursion, the Temple of Posseidon in Cape Sounion (located some 70 km from Athens at the south-eastern part of Attica). In order to combine antiquities with the real progressing world we have also visited the Technological Park of Lavrion. Lavrion is a community close to Cape Sounion known from ancient times as an industrial and trade centre and characterised mainly by its port and important plomb mines. Twelve years ago the mines have closed, due to a continuous fall of prices and the gradual exhaustion of deposits, while the local population was facing the consequences of high unemployment rates. National Technical University of Athens has then undertaken the exploitation of the existing installations in order to proceed to a complete restructuring of the site through the renewal of buildings and the concentration of modern low polluting and high-tech firms. The responsible of the park Prof. Panagopoulos (former Vice-rector of NTUA) was there to welcome and guide the members of the group in the site and in the galleries of the old mine.

PROGRAMME

Thursday 29 March	**Jeudi 29 March**
12.30-13.45	Welcome – Buffet / Accueil -Buffet
13.45-14.00	Introduction to the meeting/ Introduction aux journées

SESSION -1-
METHODOLOGICAL APPROACHES
DEMARCHES METHODOLOGIQUES
Chairman/Président: Yannis SISKOS

14.00-15.00 ROUBENS Marc: "Ordinal multiattribute sorting and ordering in the presence of interacting points of view"

15.00-15.30 MEYER Patrick: "TOMASO: A Software for sorting in the presence of qualitative interacting points of view"

15.30-16.00 GUITOUNI Adel, LANG Pascal, BELANGER Micheline: "Weight stability analysis for Net-Flow based MCDA methods"

Papers submitted for discussion/Papiers soumis à discussion

- GRECO Salvatore, MATARAZZO Benedetto, SLOWINSKI Roman**:** **"**Axiomatic basis and rule representation of non-compensatory preference structures"
- PETROVSKY Alexey: "Multiset approach to Cluster Analysis of multiattribute objects"
- MOUSSET Celine: "Représentation numérique à seuils de familles de relations"
- DOUMPOS Michael, ZOPOUNIDIS Const.: "Preference disaggregation analysis in classification problems"
- CAO-VAN Kim, DE BAETS Bernard: "Ranking trees: an ordinal tool for turning black box decision models white"

16.00-16.30 Coffee break / Pause café

SESSION -2-
ECONOMY-ENERGY-ENVIRONMENT INTERACTIONS

INTERACTIONS ENTRE ECONOMIE-ENERGIE-ENVIRONNEMENT
Chairwoman/Président: Maria Franca NORESE

16.30-17.00 VAILLANCOURT Kathleen, WAAUB Jean Philippe: "Equity in international greenhouse gas permit allocations: A multicriteria approach"

17.00-17.30 ROZAKIS Stelios, SOURIE J-C, VANDERPOOTEN D.: "Biomass supply to energy conversion systems and multicriteria decision making"

17.30-18.00 STANCIULESCU Cristina: "Energy sustainable planning using a multi-objective fuzzy mathematical programming approach"

Papers submitted for discussion/Papiers soumis à discussion

- GOLETSIS Yorgos, PSARRAS John: "Multicriteria project ranking in the Armenian energy sector"
- PAPAZOGLOU Ioannis, NIVOLIANITOU Zoe, BONANOS Gerasimos: "Expressing risk aversion and risk proneness in land use planning"
- HALOVA Jaroslava, FEGLAR Tomas: "Decision support for nuclear safety of Czech NPPs"
- ESCRIBANO RODENAS Carmen, GARCIA CENTENO Carmen: "Aide multicritère pour la prise de décisions urgentes devant les catastrophes naturelles"
- OBERTI Pascal: "Transport International d' énergie et risques de catastrophe eco-environnementale: la solution préventive d' une route maritime de compromis"

21.00 Dinner / Dîner

Friday 30 March **Vendredi 30 March**

SESSION -3-
METHODOLOGICAL APPROACHES DEMARCHES METHODOLOGIQUES
Chairman/Président: Walter HABENICHT

8.45-9.45 JURET Xavier, PERNY Patrice: "Sur la monotonie des procédures d' agrégation par choix séquentiels"

9.45-10.15 SAKALAUSKAS Leonidas: "On stochastic approach to multicriterial optimization"

10.15-10.45 GUITOUNI Adel, FRINI Anissa, MARTEL Jean-Marc: "Le processus d' aide a la décision: une représentation"

Papers submitted for discussion/Papiers soumis à discussion

- HABENICHT Walter: "Enumerative cuts in integer linear multiobjective problems"
- KALIKA Vladimir: "A methodology of accounting for uncertainty in MCDM"
- TONTCHEV Nicolay, DIMITROV Dimitar, IVELIN Ninov: "Multicriteria aid for decision making by movable limits (MADMML)"
- POKHILKO Vyacheslav, YANUS-HKEVICH O.A: "On regularization for a multicriteria problem of minimising linear forms"

- ü HINLOOPEN Edwin, NIJKAMP Peter, RIETVELD Piet: "Using the concepts of probability and paired comparison for solving the multi-criteria outranking problem concerning ordinal and cardinal information"

10.45-11.15 Coffee break / Pause café

SESSION -4-
ECONOMY-ENERGY-ENVIRONMENT INTERACTIONS

INTERACTIONS ENTRE ECONOMIE-ENERGIE-ENVIRONNEMENT
Chairman/Président: Daniel VANDERPOOTEN

11.15-12.00 WOLFLER CALVO Roberto, MAZZEO RINALDI Francesco, BAIN Donald: "Applying MCDA to real life cases studies- a critical assessment of European Experiences"

12.00-12.30 PLOTTU Eric: "Environnement et aide multicritère a la décision: Intègrer la complexité et la négotiation dans l' évaluation des projets"

12.30-13.00 GEORGOPOULOU E., SARAFIDIS J., MIRASGEDIS S., ZAIMI S., LALAS D. : "A MCDA approach in defining national priorities for greenhouse gases emissions reduction in the energy sector"

Papers submitted for discussion/Papiers soumis à discussion

- ü HALDI Pierre-Andre, PICTET Jacques: "Preliminary experience with the integration of a MCDA approach in a large international project"
- ü GOLETSIS Yorgos, PSARRAS John: "Group DSS for energy projects evaluation"
- ü GARCIA CENTENO Carmen, ESCRI-BANO RODENAS Carmen: "Intérpretation de' l analyse de sensibilité dans un procès de décision multicritère appliqué au domaine de l´environnement"
- ü ROZAKIS Stelios, KAZAKCI Akin Osman., VANDERPOOTEN Daniel: "Minmax criterion for interval programming application to agricultural LP models"
- ü CAO-VAN Kim, OMANN Ines, DE BAETS Bernard: "Application of decision trees to sustainable transport"

13.00-14.00 Lunch / Déjeuner

SESSION -5-
METHODOLOGICAL APPROACHES
DEMARCHES METHODOLOGIQUES
Chairman/Président: Philippe VINCKE

14.00-14.30 Working Group matters and next meetings/ La vie du groupe et prochaines réunions

14.30-15.30 VANSNICK Jean-Claude, BANA e COSTA Carlos, DE CORTE Jean-Marie: "Réduction progressive d' incomparabilité dans le cadre d' un modèle d' agrégation additif"

15.30-16.00 OGRYCZAK Wlod., SLIWINSKI Tomasz: "On solving linear programs with the ordered weighted averaging objective"

16.00-16.30 NGO THE An, BOUYSSOU Denis, TSOUKIAS Alexis: "From preference to attitude of decision maker"

Papers submitted for discussion/Papiers soumis à discussion

- ü LOUKAS Dimos, MATSATSINIS Nicos, PAPADIMITIOU Ioannis: "Decisions' ranking using factorial axes"
- ü VAARMAN Out: "On solving nonlinear least squares problems"
- ü MONTANO GUZMAN Linett: "Mesures floues 2-additives et son application dans les problèmes de classification"
- ü DESPOTIS Dimitris, SMIRLIS Y.G.: "Data Envelopment Analysis with imprecise data"

16.30-17.00 Coffee break / Pause café

SESSION -6-
APPLICATION STUDIES and METHODOLOGICAL APPROACHES
CAS CONCRETS et DEMARCHES METHODOLOGIQUES
Chairman/Président: Dominique BOLLINGER

17.00-17.30 MARCHANT Thierry: "Aide multicritère à la décision et choix social"

17.30-18.00 DRECHSLER Martin, RAUSCHMAYER Felix: "Decisions between species"

18.00-18.30 GRIGORIADOU Maria, SPYRIDAKOS Thanassis, YANNACOPOULOS Dionysis, BAKOYANNIS Spyros: "Evaluating the evaluators: a multicriteria approach"

18.30-19.00 BANA e COSTA Carlos, THOMAZ Joao: "Locating centres of information and recruitment of volunteers for the Portuguese Armed Forces: a decision analysis case-study"

Papers submitted for discussion/Papiers soumis à discussion

- THIEL Tomasz: "Solution of multicriterial decision problems, related to assessment of selected alternatives of motorway surface construction in Poland, with sensitivity and stability analysis"
- MATSATSINIS Nicos, SISKOS Yannis: "An intelligent multicriteria DSS for new product development"
- MAGDISYUK Ilona: "Cargo flow forecasting using cascade correlation neural network"
- GUPTA Jyoti, CHEVALIER Alain, DUTTA Shantanu: "Multicriteria approach to establish framework for risk assessment in Venture Capital investments"
- FERNANDEZ BARBERIS Gabriela Monica: "The investment decisions and the Multiple Criteria Decision Aid"
- USTINOVICHIUS Leonas: "Multicriteria optimisation or the efficiency of construction investments"
- GRIGOROUDIS Vagelis, KRASSADAKI E., MATSATSINIS Nikos, SISKOS Yannis: "A multicriteria accreditation system for information technology skills and qualifications"
- BOLLINGER Dominique, PICTET Jacques: "Pratique de l' AMCD dans un petit bureau d' étude"



Forthcoming Meetings

(This section is prepared by Luís Dias)

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

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

EUROFUSE 2001 – Workshop on Preference Modelling and Applications, April 25-27, 2001, Granada, Spain. Contact: E. Herrera-Viedma: viedma@decsai.ugr.es or herrera@decsai.ugr.es.

From May 1-6, 2001 the "1. World Conference for Systemic Management" will take place in Vienna, Austria (Europe). Website at: http://www.isct.net. Contact: Dirk Dose Conference Manager ISCT Conference Office Lange Gasse 65 1080 Vienna AUSTRIA Tel.: +43-1-409-55-66-66 Fax: +43-1-409-55-66-67 e-mail: worldconference@isct.net.

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.

The 6th Annual Meeting of the Asia Pacific Region of the Decision Sciences Institute. It will be held at the Orchard Hotel Singapore, Singapore during July 18-21, 2001. The submission deadline is MAY 15, 2001. Submission may be sent electronically in MS Word97 format to dscbox1@nus.edu.sg. APDSI's permanent website for more details of Call for Papers at: http://misnt.calpoly.edu/apdsi/.

First International Conference on Decision Support for Telecommunications and Information Society DSTIS-2001, July 11-14, 2001, Warsaw, Poland http://www.itl.waw.pl/dstis.

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

CSM'2001 - 15th JISR-IIASA Workshop on Methodologies and Tools for Complex System Modeling and Integrated Policy Assessment will be held at IIASA (Laxenburg, Austria) on August 27-29 2001. Web site: http://www.iiasa.ac.at/~marek.

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.

EURO Summer Institute (ESI) XIX. Toulouse, France, 9-22 September 200, Subject: Decision Analysis and Artificial Intelligence. Contact: http://www-poleia.lip6.fr/~perny/ESI2001.

ORP3 – EURO Peripatetic Post-graduate Programme, September 26-29, 2001, Paris, France. Contact: Denis Bouyssou: bouyssou@essec.edu.fr. Web site: http://mapage.noos.fr/orp3.

54th Meeting of the EWG "Multicriteria Aid for Decisions", Durbuy, Belgium, 4-5, October 2001, organized by Marc Roubens (M.Roubens@ulg.ac.be) and Philippe Vincke (PVincke@smg.ulb.ac.be). Thème : "Aide multicritère à la décision et systèmes distribués".

INFORMS Fall 2001 Meeting, Miami Beach, FL, November 3-7, 2001, Fontainebleau Hotel. Web site: http://128.227.36.67/Informs2001/index2.html.

55th Meeting of the EWG "Multicriteria Aid for Decisions", Leipzig, Gemany, From 14th to 16th of march 2002 in Leipzig. Organiser: M. Drechsler (martind@pinus.oesa.ufz.de) and F. Rauschmayer (rauschma@alok.ufz.de)

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)

Kluwer's Handbook of Multi-Criteria Decision Making

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Aim and scope. In the last few decades we have seen the development of a large number of methods and techniques for decision analysis and support, often using the advanced tools of information and communication technology. The underlying assumptions about human behaviour were so diverse, and the research efforts were so intense, that the rich variety of approaches may be confusing for the decision makers. The aim of the handbook is to present a broad overview of the methodologies — with cross-references, comparative studies, and case studies — so that managers, administrators, consultants, facilitators, as well as specialists in decision analysis and support discover their effectiveness for the solution of decision problems. Given the progress that has recently been made in adjacent sciences such as psychology, psychophysics, and brain research, the handbook may also sketch, perhaps in a speculative manner, the possible impact of the results. How would the new insights affect our views on the fabric of the decision maker and on the concepts of multi-criteria decision making?

Covering a decision process. In essence, the handbook should cover the whole trajectory of a decision process, from the initial problem identification and the discovery of human and organizational constraints, via the formulation of objectives and criteria and the screening of the possible alternatives, to the evaluation of the feasible alternatives and the final implementation of the preferred solution. Hence, although the handbook will concentrate on the mathematical and computational tools for decision analysis and support (the *raison d'être* of the research area), much attention will be given to the position of those tools within the framework of an actual decision process.

Mathematical and computational prerequisites. Obviously, the handbook is intended for readers with widely varying levels of education, experience, and expertise. The common basis is supposed to be the mathematical and computational knowledge roughly covered by a bachelor's degree in science, engineering, the behavioural sciences, economics, econometrics, or business administration. Thus, the readers are supposed to be familiar with the contents of solid introductory courses in calculus, linear algebra, probability, statistics, and operations research, and they regularly use computers for private and/or business applications.

The volume. The handbook may contain some 20 contributions of 25 – 75 pages each so that it may eventually count some 1000 pages. Given the presumed level of mathematical and computational knowledge of the readers, the authors should not hesitate to prove the theorems so that their contributions are more or less self-contained. This also enables them to highlight the role of the underlying behavioural assumptions. It is not necessary for the contributions to be pure research papers. The contributions should rather have the character of tutorials, broad survey papers, or lecture notes for graduate courses.

Referees. Contributors will possibly be asked to referee the manuscripts submitted by other contributors in order to improve the quality and the coherence of the handbook. If necessary, other specialists may be asked to referee the manuscripts.

Call for proposals. Scientists who are familiar with one or more subjects in the below tentative outline, or with additional subjects which they recommend for the handbook, are strongly encouraged to submit a plan, not more than one page, with the list of topics and sections which they have in mind. Most welcome will also be a copy of the material from which they plan to start (survey papers, tutorials, lecture notes, already published elsewhere or in an advanced stage).

Time schedule. Camera-ready manuscripts, produced according to Kluwer’s guidelines, are expected to arrive at the editor’s address before the end of 2001. There will be a short period of three or four months for refereeing and for the revision of the manuscripts. The final versions will be sent to the publisher in May or June 2002, so that the handbook may appear in the fall of 2002.

Tentative outline. What follows is a rough sketch of the subjects to be covered in the handbook. If two or more authors touch the same subject, they are expected to insert cross-references in their contributions and to discuss, if possible, the diverging views on the issues in question. Overlaps may occur in the handbook, they may even be desirable.

Part I. Problem identification and structuring

Policy Analysis, a systematic approach to decision support. Decision processes in an organization, the accountability issue. The fabric of the decision maker, the impact of brain research. Cultural diversity in decision making. Linguistic information, the language of power. History of MCDM.

Part II. Methods for MCDM

Uncertainty in MCDM. Imprecision in MCDM. The descriptive approach. The normative approach. The prescriptive approach. Constructivism and outranking methods. Direct rating and pairwise comparisons. The Analytic Hierarchy Process. Comparative studies of MCDM systems.

Part III. Methods for Multi-Objective Optimization

Multi-objective linear programming. Efficient solutions, ideal and anti-ideal vectors. Weighing the objectives. Goal Programming. Multi-objective non-linear programming.

Part IV. Applications of MCDM

Group decision making. Decentralized and distributed decision making. Performance evaluation. Resource allocation and project selection. Conflict analysis and negotiations. Fair distributions of power and influence. Medical decision analysis. Environmental impact analysis.

Part V. The position of MCDM

Effectiveness, efficiency, and legitimacy of decision support. Consensus, compromise, and the power game in groups. Commitment, the emotional drive to carry out the decision. Validation of MCDM support. MCDM embedded in legislation. Ethical considerations and role expectations.

*** *** ***

Intelligent Strategies for Meta Multiple Criteria Decision Making

by

Thomas Hanne
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Multiple criteria decision-making research has developed rapidly and has become a main area of research for dealing with complex decision problems which require the consideration of multiple objectives or criteria. Over the past twenty years, numerous multiple criterion decision methods have been developed which are able to solve such problems. However, the selection of an appropriate method to solve a particular decision problem is today's problem for a decision support researcher and decision-maker.

Intelligent Strategies for Meta Multiple Criteria Decision-Making deals centrally with the problem of the numerous MCDM methods that can be applied to a decision problem. The book refers to this as a `meta decision problem', and it is this problem that the book analyzes. The author provides two strategies to help the decision-makers select and design an appropriate approach to a complex decision problem. Either of these strategies can be designed into a decision support system itself. One strategy is to use machine learning to design an MCDM method. This is accomplished by applying intelligent techniques, namely neural networks as a structure for approximating functions and evolutionary algorithms as universal learning methods. The other strategy is based on solving the meta decision problem interactively by selecting or designing a method suitable to the specific problem, for example, the constructing of a method from building blocks. This strategy leads to a concept of MCDM networks. Examples of this approach for a decision support system explain the possibilities of applying the elaborated techniques and their mutual interplay. The techniques outlined in the book can be used by researchers, students, and industry practitioners to better model and select appropriate methods for solving complex, multi-objective decision problems.

Contents: List of Figures. List of Tables. Preface. Foreword. 1. Introduction. 2. The meta decision problem in MCDM. 3. Neural networks and evolutionary learning for MCDM. 4. On the combination of MCDM methods. 5. LOOPS - an object oriented DSS for solving meta decision problems. 6. Examples of the application of

LOOPS. 7. Critical resume and outlook. Appendices. Index.

Kluwer Academic Publishers, Hardbound, INTERNATIONAL SERIES IN OPERATIONS RESEARCH AND MANAGEMENT SCIENCE Volume: 33 ISBN 0-7923-7251-4, November 2000, 216 pp.

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Models, Methods, Concepts & Applications of the Analytic Hierarchy Process

by

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Luis G. Vargas
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Models, Methods, Concepts and Applications of the Analytic Hierarchy Process is a volume dedicated to selected applications of the Analytic Hierarchy Process (AHP) focused on three themes: economics, the social sciences, and the linking of measurement with human values. (1) The AHP offers economists a substantially different approach to dealing with economic problems through ratio scales. The main mathematical models on which economics has based its quantitative thinking up to now are utility theory, which uses interval scales, and linear programming. We hope that the variety of examples included here can perhaps stimulate researchers in economics to try applying this new approach. (2) The second theme is concerned with the social sciences. The AHP offers psychologists and political scientists the methodology to quantify and derive measurements for intangibles. We hope that the examples included in this book will encourage them to examine the methods of AHP in terms of the problems they seek to solve. (3) The third theme is concerned with providing people in the physical and engineering sciences with a quantitative method to link hard measurement to human values. In such a process one needs to interpret what the measurements mean. A number is useless until someone understands what it means. It can have different meanings in different problems. Ten dollars are plenty to satisfy one's hunger but are useless by themselves in buying a new car. Such measurements are only indicators of the state of a system, but do not relate to the values of the human observers of that system. AHP methods can help resolve the conflicts between hard measurement data and human values.

Contents: 1. How to Make a Decision. 2. The Seven Pillars of the AHP. 3. Architectural Design. 4. Designing a Mousetrap. 5. Designing the Best Catamaran. 6. The Selection of a Bridge. 7. Measuring Dependence Between Activities: Input Output Application to the Sudan. 8. Technological Choice in Less Developed Countries. 9. Market Attractiveness of Developing Countries. 10. An AHP Based Approach to the Design and Evaluation of a Marketing Driven Business and Corporate Strategy. 11. New Product Pricing Strategy. 12. Incorporating Expert Judgment in Economic Forecasts - the Case of the U.S. Economy in 1992. 13. A New Macroeconomic Forecasting and Policy Evaluation Method. 14. Forecasting the Future of the Soviet Union. 15. Abortion and the States: How Will the Supreme Court Rule on the Upcoming Pennsylvania Abortion Issue. 16. The Benefits and Costs of Authorizing Riverboat Gambling. 17. The Case of the Spotted Owl vs. the Logging Industry. 18. Selection of Recycling Goal Most Likely to Succeed. 19. To Drill or Not to Drill: A Synthesis of Expert Judgments. 20. Modeling the Graduate Business School Admissions Process. 21. Infertility Decision Making. 22. The Decision by the US Congress on China's Trade Status: A Multicriteria Analysis. 23. Deciding Between Angioplasty and Coronary Artery Bypass Surgery. Index.

Kluwer Academic Publishers, INTERNATIONAL SERIES IN OPERATIONS RESEARCH AND MANAGEMENT SCIENCE Volume: 34, Hardbound, ISBN 0-7923-7267-0, November 2000, 352 pp.

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(PROCHAINEMENT)

L'Ordonnancement Multicritère

par

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L'Ordonnancement est un domaine largement étudié dans la littérature depuis de nombreuses années. Lors des quinze dernières années, de plus en plus de travaux se sont intéressés à la prise en compte de critères conflictuels dans les problèmes d'ordonnancement. L'objectif du livre est de présenter une synthèse des travaux dans ce domaine en faisant un parallèle avec les résultats et méthodes de l'optimisation multicritère. Il s'agit d'un ouvrage pédagogique, qui présente les concepts, résultats et algorithmes de base. Le livre se compose de quatre parties.

La première partie est introductive et rappelle en deux chapitres les éléments de base de l'ordonnancement et de la complexité des problèmes et des algorithmes.

La seconde partie est consacrée à l'aide à la décision et à l'optimisation multicritère. L'objectif de cette partie est de présenter, en deux chapitres, l'ensemble des éléments fondamentaux de l'optimisation multicritère : définitions d'optima de Pareto, classes d'algorithmes, méthodes de

calcul d'optima de Pareto, algorithmes classiques de la Recherche Opérationnelle, « goal programming », etc. Le troisième chapitre de cette partie présente une approche pour la résolution des problèmes d'ordonnancement multicritères, une extension de la notation usuelle des problèmes d'ordonnancement, ainsi que de nouveaux résultats de complexité.

La troisième partie de l'ouvrage est dédiée aux problèmes d'ordonnancement multicritères seuls, i.e. lorsqu'il n'y a pas de problème d'affectation aux ressources. Le premier chapitre de cette partie est entièrement consacré aux problèmes à une machine de type « Juste-à-Temps ». Une approche nouvelle y est présentée ainsi que l'ensemble des problèmes de base. Le second chapitre est dédié aux problèmes à une machine et le troisième chapitre aux problèmes d'atelier (« flowshop », « jobshop » et « openshop »).

La quatrième partie concerne les problèmes d'ordonnancement et d'affectation multicritères. Elle est composée de deux chapitres. Le premier traite les problèmes à machines parallèles et le second est consacré aux problèmes de type « flowshop hybride ».

Pour une grande partie des problèmes considérés dans cet ouvrage, les algorithmes de résolution sont présentés en détail, à l'aide d'une description en langage algorithmique et d'exemples numériques simples.

NB : cet ouvrage est tiré en exemplaires limités, et diffusé gracieusement de façon restreinte, dans l'attente d'une parution chez un éditeur. Pour plus d’informations contacter les auteurs : {tkindt,billaut}@univ-tours.fr

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Multi-Criteria Decision Making Methods: A Comparative Study

by

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Multi-Criteria Decision Making (MCDM) has been one of the fastest growing problem areas in many disciplines. The central problem is how to evaluate a set of alternatives in terms of a number of criteria. Although this problem is very relevant in practice, there are few methods available and their quality is hard to determine. Thus, the question `Which is the best method for a given problem?' has become one of the most important and challenging ones. This is exactly what this book has as its focus and why it is important. The author extensively compares, both theoretically and empirically, real-life MCDM issues and makes the reader aware of quite a number of surprising `abnormalities' with some of these methods. What makes this book so valuable and different is that even though the analyses are rigorous, the results can be understood even by the non-specialist.

Audience: Researchers, practitioners, and students; it can be used as a textbook for senior undergraduate or graduate courses in business and engineering.

Contents: List of Figures. List of Tables. Foreword. Preface. Acknowledgments. 1. Introduction to Multi-Criteria Decision Making. 2. Multi-Criteria Decision Making Methods. 3. Quantification of Qualitative Data for MCDM Problems. 4. Deriving Relative Weights from Ratio Comparisons. 5. Deriving Relative Weights from Difference Comparisons. 6. A Decomposition Approach for Evaluating Relative Weights Derived from Comparisons. 7. Reduction of Pairwise Comparisons Via a Duality Approach. 8. A Sensitivity Analysis Approach for MCDM Methods. 9 Evaluation of Methods for Processing a Decision Matrix and Some Cases of Ranking Abnormalities. 10. A Computational Evaluation of the Original and the Revised AHP. 11. More Cases of Ranking Abnormalities When Some MCDM Methods Are Used. 12. Fuzzy Sets and Their Operations. 13. Fuzzy Multi-Criteria Decision Making. 14. Conclusions and Discussion for Future Research. References. Subject Index. Author Index. About the Author.

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Decision Making: Recent Developments and Worldwide Applications

edited by

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This book presents many recent developments in the field of decision-making, which address managerial decision problems in public and private organizations. It covers a

wide range of important academic and practical decision-making approaches in fields such as finance, marketing, production/operations management, international business, education, environmental science, health care, transportation logistics, information technology, and telecommunications.

Audience: Decision analysts, management scientists, operations researchers, financial managers, economists, accountants, computer scientists, information technologists, risk analysts, health care planners, environmental managers, tourism officials, government analysts, statisticians.

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

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"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)

27 mars 2001 Conférence de Marc PIRLOT (Faculté Polytechnique de Mons, Belgique) :
Une nouvelle formalisation des modèles de concordance.

22 mai 2001 Discussion des travaux de Amine AÏT YOUNES (LAMSADE) :
Problèmes liés à la construction d'un pseudo-critère à partir d'un rangement des actions.

12 juin 2001 Conférence de Bruno FAIVRE D'ARCIER (Laboratoire d'Economie des transports à Lyon) :
Quel rôle pour l'analyse coût-avantage dans un processus de concertation ? Le cas des investissements de transport.

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