DECISION ANALYSIS NEWSLETTER

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Editor' Note

Just a reminder that we are eager to publish abstracts of all papers in the area of Decision Analysis, broadly conceived. The only requirements for our publishing an abstract of your work are:

1) That the paper itself not have appeared in print yet; 2) that it is available for distribution upon request; and 3) that the abstract not exceed 200 words by much.

If there is a charge, please so indicate when you send your ***complete paper*** to the editor:

Irving H. LaValle
A. B. Freeman School of Business
Tulane University
New Orleans, LA 70118
(O) (504) 865-5484
(H) (504) 899-8110

Please phone or write in any changes in your activities or employment that could be of interest to our membership.

Please Note: (1) Inform the ORSA business office at Mount Royal and Guilford Avenues, Baltimore, MD 21202 of address change; we get our mailing labels from them! Thanks!
(2) To be included on the mailing list, you should join the Special Interest Group on Decision Analysis: send letter to ORSA office and $3 ($5) for a ORSA (non)member.

New ADA Address

Applied Decision Analysis, Inc. has moved down (or up) the street, to 2710 Sand Hill Road, Menlo Park, CA 94025. Their phone and Fax numbers remain (415) 854-7101 and 854-6233.

Inside

Nominations solicited for
Departmental Editorship

For health reasons (possibly associated with many years of heavy smoking), Irv LaValle must retire by year-end as *Management Science* Departmental Editor (DE) for the normative/methodological side of Decision Analysis. Greg Fischer will continue as DE for the behavioral/empirical side.

Nominations for a successor to Irv are sought by the Editor-in-Chief of *Management Science*:

Professor Gabriel R. Bitran
Sloan School of Management, Rm E53-355
Massachusetts Institute of Technology
30 Wadsworth Street
Cambridge, MA 02142-1347
Phone (617) 253-2652 / Fax (617) 258-7579

The deadline for nominations is **November 30, 1991.**

A DE of *Management Science* receives and may solicit submissions of manuscripts. After prescreening a submission on substantive grounds and on potential suitability for *Management Science* and the department in question, the DE arranges for its thorough, formal review, in collaboration with an Associate Editor. Once this process is complete, the DE makes the ultimate decision as to acceptance, rejection, or invitation to revise and resubmit. Thus the desirable characteristics of a good DE include broad knowledge of the subject area, good judgment, high editorial standards, and willingness to cope with a necessarily somewhat variable workload.

Announcing A Major New Journal From Wiley...

JOURNAL OF MULTI-CRITERIA DECISION ANALYSIS

General Editor

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Aims and Scope

The Journal of Multi-Criteria Decision Analysis aims to provide an international forum for the presentation and discussion of all aspects of research, application and evaluation of multi-criteria decision analysis. The Journal seeks to publish material from a variety of disciplines and all schools of thought. Case studies, applications and evaluation of techniques and methodologies will be particularly welcome.

Papers published in the Journal will encompass, but not be limited to, the following areas of MDCA.

* Mathematical and theoretical foundations
* Algorithmic aspects and human computer interfaces
* Psychological, behavioural, and organisational bases
* Case studies and implementation of MCDA procedures
* Practical evaluation of methodologies
* Teaching of MCDA to students and decision makers

Letters to the editor discussing any aspect of MCDA will be encouraged. Book and software reviews will also be published.

Call for Papers

The Journal of Multi-Criteria Decision Analysis seeks to become the international forum for MCDA and, therefore, seeks papers of the highest quality. As well as the originality and significance of the content, an important criterion for acceptance will be that a paper is well written in terms of style and accessibility to as wide an academic and professional readership as possible.

Please send all submission (four copies in English) to:

Simon French, General Editor, School of Computer Studies, University of Leeds, Leeds, LS2 9JT

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Journal of Multi-Criteria Decision Analysis

[ ] Please send further details of the Journal of Multi-Criteria Decision Analysis

Please return to:
Sarah Stevens, Marketing Dept
John Wiley & Sons Ltd, Baffins Lane
Chichester, West Sussex, UK, PO19 1UD

Name: _____

Address: _____

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JOURNAL OF MULTI-CRITERIA DECISION ANALYSIS

GUIDE FOR AUTHORS

1. Four copies of the manuscript should be submitted to the General Editor - Simon French, School of Computer Studies, The University, Leeds LS2 9JT, UK. In all cases it would considerably help the refereeing process if the title and abstract of the paper were also submitted in ASCII format on $3^{1/2}$ or $5^{1/4}$ inch IBM disks (MS-DOS Format) or $3^{1/2}$ inch Mackintosh disk.

2. Original papers (not published nor simultaneously submitted to another journal) will be reviewed. Copyright for published papers will be vested in the publisher. Because of recent changes in copyright laws the transfer of copyright from author to publisher, previously implicit in the submission of a manuscript, must now be explicitly transferred to enable the publisher to ensure maximum dissemination of the author's work. A copy of the Publishing Agreement to be used for *Journal of Multi-Criteria Decision Analysis* is reproduced in each volume. Additional copies are available from the journal editors or from the publisher or contributors may photocopy the agreement from this journal. A copy of this agreement, signed by the author, must accompany every article submitted for publication.

3. Manuscripts must be submitted in English.

4. Editors will initially screen submissions, prior to reviewing, and inform authors quickly if the papers appear, *prima facie*, unsuitable for this journal.

5. One of the copies of the manuscript should be printed on one side of the paper only, double-spaced throughout with wide margins. The other three copies may be reproduced double-sided, but should not be reduced.

6. Tables and Figures should be numbered consecutively and placed on separate sheets, with an indication in the text as to their appropriate placement. Line drawings for accepted papers must be photoready originals in ink or high quality laser output. All line drawings should be about twice final reproduction size, which is at most 15 cm x 20.5 cm including caption. All lettering must be clear and open and sufficiently large to permit reduction of size in reproduction. The final reduced size of lettering should be no smaller than 1.5 mm high. Tables and Figures should be clearly labelled and titled.

7. No maximum length for a paper is prescribed; however, authors should write concisely. A significant element of the manuscript's review will be its length relative to its content.

8. Authors' names should be typed on the first page below the title; the affiliation, address and telephone number of the author should also be included. Email addresses should be given if available. In order to enable the publisher to do everything to ensure prompt publication, the full postal address should be given for the author who will check proofs, along with telephone, telex and telefax numbers and email addresses where possible. Correspondence will be sent to the first-named author, unless otherwise indicated. The title should be descriptive but brief.

9. The manuscript should begin with an abstract. The abstract should not contain any formulas or references. Its purpose is to summarise clearly the principal conclusions of the paper. Key words for indexing should also be included.

10. The paper should be subdivided into sections and subsections as necessary. Main headings (centred and underlined) should designate the major sections; side headings (underlined), then paragraph headings (underlined followed by colon and the text) should designate minor sections. The text should only be divided into subsections and headed paragraphs when this is a positive aid to the reader.

11. Mathematical symbols may be hand-written or type-written. Greek letters and unusual symbols should be avoided if possible. Simple notation is encouraged. Only essential mathematical formulas should be displayed in the text. Derivations should be put in an appendix, unless central to the import of the paper.

12. All table columns should have explanatory headings. Tables should not repeat data that are available elsewhere in the paper, e.g. in a line drawing.

13. References must be listed alphabetically by the surname of the first author. List author(s) (with surname first), (year), title, journal name, volume, pages for journal references; and author(s) year, title, city, and publisher for the book references. Examples for article and book respectively.

Geoffrion, A.M., Dyer, J.S. and Feinberg, A. (1972). "An interactive approach to multicriterion optimisation with an application to the operation of an academic department", Management Science, 19, 359-368.

Keeney, R.L. and Raiffa, H. (1976). Decisions with Multiple Objectives: Preference and Value Trade-offs, New York, John Wiley & Sons.

All references should be indicated in the manuscript by the author's surname followed by the year of publication: e.g. Keeney and Raiffa (1976). Where references include three or more authors the form 'Smith *et al* ' should be used.

14. In general, only published papers should be cited. If any unpublished paper is cited, instructions on how to obtain copies should be given in the references.

15. Footnotes should be avoided: Parentheses should be used in their place.

16. It is the author's responsibility to obtain written permission to reproduce copyright material. Quotations should be kept to a minimum. In the rare case of a quotation exceeding 250 words, the author must obtain written permission from the publisher/author.

17. Twenty five reprints of each paper will be provided free of charge. Additional copies in multiples of one hundred may be purchased.

18. After acceptance of a paper, all correspondence should be addressed to the General Editor.

*** Call for Papers ***

8th Conference on Uncertainty in Artificial Intelligence

Stanford, California
July 17-19, 1992

The eighth annual Conference on Uncertainty in AI is devoted to the advance of artificial intelligence methods expressly accounting for uncertainty in beliefs. The conference's scope covers the full gamut of approaches to automated and interactive reasoning and decision making under uncertainty, including both qualitative and numeric methods.

We invite original contributions on all aspects of uncertainty as it pertains to artificial intelligence. Results on fundamental theoretical issues, on computational techniques for uncertain reasoning, and on novel applications of such theories and technologies to challenging problem-solving tasks are specifically solicited.

Topics of particular interest include:

- Foundations of uncertainty concepts
- Representations of uncertain knowledge and their semantics
- Automated planning and decision making under uncertainty
- Abduction and diagnosis
- Algorithms for uncertain inference
- Control of reasoning and real-time architectures
- Construction of uncertainty models from experts, data, or knowledge bases
- Pooling of uncertain evidence
- Belief updating and inconsistency handling in uncertain knowledge bases
- Explanation and summarization of uncertain information
- Engineering principles for applications of uncertain reasoning

Submitted papers will be carefully refereed for significance, originality, technical soundness, and clarity of exposition. Papers may be accepted for presentation in plenary or poster sessions. All accepted papers will be included in the published proceedings, which will be available at the conference. Outstanding student papers may be selected for special distinction.

Five copies of each paper should be sent to reach one of the Program Co-Chairs by **February 14, 1992**. The first page should include a descriptive title, the names, addresses, and student status of all authors, a brief abstract, and salient keywords or other topic indicators. Acceptance notices will be sent by April 3, 1992, and final camera-ready papers, incorporating reviewers' suggestions, will be due approximately five weeks later. There will be an eight-page limit on proceedings papers, with a few extra pages available for a fee.

Program Co-Chairs (paper submissions):

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General Co-Chairs (conference inquiries):

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Program Committee: Piero Bonissone, Peter Cheeseman, Max Henrion, Henry Kyburg, John Lemmer, Tod Levitt, Ramesh Patil, Judea Pearl, Enrique Ruspini, Ross Shachter, Glenn Shafer, Lotfi Zadeh.

Proposed ASA Section on Risk Analysis

The proposed Section on Risk Analysis of the American Statistical Association conducted its initial business meeting on Monday 19 August at the annual meeting of the American Statistical Association in Atlanta. This memorandum has been prepared to acquaint you with the proposed section, its origins and evolution, and the program for the meeting.

Risk Analysis (and the study of Comparative Risks) is a basic aspect of decision making under uncertainty. Such considerations arise in the PRA (Probabilistic Risk Assessment) of nuclear reactors, assessment of the feasibility of environmental decisions, selection of medical treatments, evaluation of foreign policy decisions by governments, and similar decision problems in virtually any area of human endeavor. At times, issues under consideration by the Section will overlap those of other ASA sections. This should not be construed as being in conflict with other sections of the ASA. Instead, it should provide a medium for cooperation and the opportunity to bring a "risk assessment" point of view to problems under consideration by other sections. This section will also endeavor to cooperate with the Society for Risk Analysis and other professional organizations in order to sponsor joint meetings and sessions at professional meetings.

In 1980, the American Statistical Association and the Nuclear Regulatory Commision entered into a cooperative agreement. Under this arrangement, the ASA provided reviews of the statistical aspects of the methodology used to evaluate existing nuclear reactors and to license new reactors. When this agreement was terminated in 1983, an ASA Committee was created to study statistical problems in the area of nuclear energy. This included not only the activities described above, but also bio-medical and environmental issues. The proposed section is a natural outgrowth of this effort, since the methodology studied by the Committee has application over a much broader range of human activity. Thus, after consultation with the ASA administration at the 1990 Annual Meeting, plans to create this section were implemented.

At this initial meeting, the following speakers provided perspectives on "Risk Analysis": Dr. Robert F. Bordley, Director Decision Risk Program, National Science Foundation; Dr. Harry F. Martz, Los Alamos National Laboratory; and Professor Howard E. Rockette, Department of Biostatistics, University of Pittsburgh, School of Public Health.

Further information will appear in a subsequent issue of this *Newsletter*.

Committee on Human Factors

Four new individuals have been appointed to three-year terms on the Committee on Human Factors of the National Research Council: Paul S. Goodman [GSIA, Carnegie-Mellon University, Pittsburgh, PA 15213]; Robert Helmreich [Dept. of Psychology, University of Texas, Austin, TX 78712]; Roberta L. Klatzky [Dept. of Psychology, University of California, Santa Barbara, CA 93106]; and Joyce L. Shields [President, HAY Systems, Inc., 2000 M. Street, N.W., #650, Washington, DC 20036].

The Committee on Human Factors is chaired by Douglas H. Harris and sponsored by nine federal agencies. It conducts studies on the relationships of individuals, organizations and technology that are deemed by the committee and its sponsors to be of national importance. The goals of these studies are to identify critical problems related to human and organizational performance and training and complex technologies and work environments; disclose gaps in the current knowledge base relevant to these problems; and recommend the research and policies needed to arrive at the basis for problem solutions. For a Committee brochure or further information about the Committee on Human Factors, its projects and publications, contact Dr. Harold P. Van Cott, Study Director, Committee on Human Factors, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

PAPERS RECEIVED

Please request copies directly from the author, not the Newsletter Editor

From **F. Hutton Barron**, Dept. of Management Science and Statistics, University of Alabama, Box 870226, Tuscaloosa, AL 35487-0226:

Selecting a Best Multiattribute Alternative With Partial Information about Attribute Weights

Use of approximate weights would greatly simplify decision analysis under certainty since detailed weight elicitation could be avoided. This paper examines the degree to which partial information about weights can be used to identify a best alternative, or failing uniqueness, prescribes an easily implemented rule for selecting a "best" alternative. The prescribed rule uses as weights the centroid of the feasible region defined by the partial information. In conjunction with the rule, the value of the partial information can be determined using an "expected gain from weight precision" (EGWP) measure, analogous to "expected value of perfect information" in decision analysis under uncertainty.

From **P. George Benson, Shawn P. Curley,** and **Gerald F. Smith**, Carlson School of Management, University of Minnesota, 271 19th Ave. South, Minneapolis, MN 55455 [address requests to Professor Benson]:

A Cognitive Analysis of Probability Assessment

A cognitive analysis of subjective probability is applied to the evaluation of techniques used by decision analysts for eliciting probabilities from experts. An assessment interview involves the construction of beliefs and responses, requiring both reasoning and judgmental cognitive processes. The belief assessment procedures have been particularly underdeveloped. Current procedures used by analysts to aid belief assessment are identified and evaluated. Although such procedures offer important guidance for probability assessment, additional prescriptive development is possible. A belief processing model is used as a framework for expanding the potential for aiding probability assessment. It is argued that significant improvements in assessment practice can be realized by providing better support for the reasoning employed by experts in belief assessment.

From **Robert T. Clemen**, College of Business Admin., University of Oregon, Eugene, OR 97403-1208, and **Kevin F. McCardle**, Fuqua School of Business, Duke University, Durham, NC 27706:

Dependent Information Sources and the Adoption of New Technology

In deciding whether or not to adopt an innovative technology, a firm (decision maker) may solicit, at a cost, the opinions of various experts regarding the economic value of the innovation. We examine the effect of dependencies among the experts' opinions on the firm's optimal decision rule in a sequential sampling model.

From **Richard de Neufville**, Technology and Policy Program, Rm E40-251, Massachusetts Institute of Technology, Cambridge, MA 02139, and **Daniel King**, Civil Engineer Corps, US Navy, NAS Barbers Point, HI 96862 [address requests to Professor de Neufville]:

Risk and Need-for-Work Premiums in Contractor Bidding

Contractors add significant premiums to their bids when they have a low need-for-work or projects have high risk. An empirical study of the effect of need-for-work and project risk on contractor bid markups was conducted by assessing and analyzing utility functions obtained from construction contractors in a bid simulation exercise. Thirty contractors participated in the study. The statistical analysis of utility data indicates, with a high level of confidence, that need-for-work and risk significantly affect contractor bid markups. A revised model of bidding is presented. The paper also discusses the implications of these need-for-work and risk premiums for owners, contractors, and the insurance industry.

From **Peter C. Fishburn**, Rm 2C-354, AT&T Beil Laboratories, 600 Mountain Ave., Murray Hill, NJ 07974:

A General Axiomatization of Additive Measurement with Applications

Necessary and sufficient conditions are specified for a general theory of additive measurement that presumes very little set-theoretic structure. The theory is illustrated for numerical representations in extensive, conjoint, difference, threshold, expected utility, probability, ambiguity, and subset measurement.

From **Charles M. Harvey**, College of Business Administration, University of Houston, Houston, TX 77204- 6282:

A Slow-Discounting Model for Social Costs and Benefits

Public benefits in the distant future receive very little importance when a policy analysis uses present value discounting to weigh future benefits against present costs. This paper defines conditions on social preferences that imply a non-constant discounting model--a model that accords considerable importance to the distant future and that is as tractable to apply as the present value discounting model. We compare this alternative model with the present value discounting model from a normative viewpoint and conclude that the alternative model can be appropriate for the prescriptive modeling of a policy choice that involves long-range social effects.

From **Gordon B. Hazen, Wallace J. Hopp**, and **James M. Pellisier**, Dept. of Industrial Engineering and Management Sciences, Northwestern University, Evanston, IL 60208 [address requests to Professor Hazen]:

Continuous-Risk Utility Assessment in Medical Decision-Making

We argue that for risky medical treatment decisions, conventional utility assessment techniques are inadequate due to their emphasis on unrealistic risk magnitudes and sure consequences, leading to assessment questions that are unfamiliar to most patients, have little educational value, and do not reliably extend to the application at hand. As an alternative, we contend that medical utility assessments should be performed in a continuous-risk domain with risk levels matching those of the

actual decision problem. In support of this position, we describe an empirical study that compares the responses of subjects under a conventional assessment protocol with those under a continuous-risk utility assessment protocol. Preliminary results show that conventional assessment protocols result in significantly lower estimates of the degree of risk aversion compared to a more realistic continuous-risk protocol.

From **Donald L. Keefer**, Department of Decision and Information Systems, Arizona State University, Tempe, AZ 85287-4206:

Certainty Equivalents for Three-Point Discrete-Distribution Approximations

Three-point discrete-distribution approximations are often used in decision and risk analyses to represent probability distributions of continuous random variables -- e.g., as probability nodes in decision or probability trees. Although the accuracy of such approximations in representing moments has been studied, very little research has directly addressed their accuracy in representing expected utilities or certainty equivalents of the underlying distributions. This paper draws upon recent research to demonstrate that substantial errors in certainty equivalents can occur when using discrete-distribution approximations constructed to match the first several moments of the underlying distribution exactly. Then it examines how accurately six general-purpose three-point approximations represent certainty equivalents for continuous random variables as the level of risk aversion is varied. In the process it compares the best two approximations for estimating means and variances identified in an earlier study with promising approximations proposed more recently. Several of theses approximations perform quite well, provided that the level of risk aversion and the characteristics of the test distributions are within reasonable bounds, which is significant for decision analysis practice.

From **Donald L. Keefer** and **William A. Verdini**, [at above address for Professor Keefer]:

Major Improvements in PERT via Better Three-Point Approximations

This paper builds upon earlier work from the decision/risk analysis area in presenting approximations for the mean and variance of PERT activity times that perform much better than those currently being taught and used. The approximation proposed here are simple and easy to use and offer significant advantages over the original PERT formulas and recently proposed modifications. For instance, they are several orders of magnitude more accurate than their PERT counterparts in estimating means and variances of beta distributions if the data required for all methods are obtained accurately. Moreover, they utilize probability data that can be assessed more reliably than those required by the PERT formulas, while still requiring just three points from the activity-time probability distribution. We demonstrate that using the proposed approximations can significantly improve the accuracy of probability statements about project completion time. Their use complements efforts to improve PERT analyses of networks involving multiple critical paths.

From **Irving H. LaValle**, A. B. Freeman School of Business, Tulane University, New Orleans, LA 70118, and **Peter C. Fishburn**, Rm 2C-354, AT&T Bell Laboratories, 600 Mountain Ave., Murray Hill, NJ 07974:

State-Independent Subjective Expected Lexicographic Utility

By enriching the set of acts deemed available at least as objects of assessment, we obtain a significant tightening of the linear lexicographic representation described in LaValle and Fishburn (1991a). Under the state-independent assumption that every outcome is available in every state, each state must be either completely null or completely essential (rather than lexicographically essential), and the matrices characterizing subjective probabilities of the states must be square and lower triangular with positive diagonal entries. It follows that there are straightforward generalizations of real-valued-probability relationships such as Bayes' theorem. Even in the tighter case, the matrix probabilities cannot be reduced to scalar matrices or even fully diagonal matrices. Nevertheless, they are easy to work with and permit fully consequentialist decision analysis of problems in which preferences are nonarchimedean.

From **Yutaka Nakamura**, Institute of Socio-Economic Planning, University of Tsukuba, 1-1-1 Tennoudai, Tsukuba, Ibaraki 305, Japan:

Subjective Utility with Upper and Lower Probabilities on Finite States

This paper is concerned with thresholds of discrimination of preference judgements under uncertainty. We establish an axiomatic characterization for a threshold representation, where thresholds are represented by inexact measurement of subjective probabilities, i.e., upper and lower probabilities. Since upper and lower probabilities need not be additive, the representational form adopts the Choquet integration.

Rank Dependent Utility for Arbitrary Consequence Spaces

Quiggin's anticipated utility, sometimes called rank dependent utility, generalizes von Neumann-Morgenstern expected utility to accommodate Allais type violations of preference judgments. His theory and the subsequent axiomatic refinements presume that the underlying consequences spaces are rich, so that certainty equivalents of every gambles exist. This paper developed an axiomatic characterization of rank dependent utility for arbitrary consequence spaces, so that certainty equivalents of gambles do not necessarily exist.

From **Prakash P. Shenoy**, School of Business, University of Kansas, Lawrence, KS 66045-2003:

Valuation Networks, Decision Trees, and Influence Diagrams: A Comparison

Recently, we proposed a new method for representing and solving Bayesian decision problems based on the framework of valuation-based systems. The new representation is called a valuation network, and the new solution method is called a fusion algorithm. In this paper, we compare valuation networks to decision trees and influence diagrams. For symmetric decision problems, the valuation network representation method is more expressive than both decision trees and influence diagrams. We also compare the fusion algorithm to the backward recursion method of decision trees and to the arc-reversal method of influence diagrams. For symmetric decision problems, the fusion algorithm is more efficient than the backward recursion method of decision trees and more efficient and simpler than the arc-reversal method of influence diagrams.

From **Gary R. Smith**, Logical Decisions, 164 E. Scenic Ave., Point Richmond, CA 94801:

A Canonical Form for "Decision Tree" Problems

Traditional approaches for evaluating sequential decision problems have difficulties with their representations, solution methods or both. In addition, most methods provide an incomplete description of the problem, creating difficulties when attempting to describe applications. These difficulties motivate the development of a standardized "canonical form" for sequential decision problems. The canonical form elements from decision trees, influence diagrams and algebraic methods and combines them into a four part standardized representation. This representation has an efficient associated solution algorithm based on evaluation of a state vector by an overall value function.

From **James E. Smith**, Fuqua School of Business, Duke University, Durham, NC 27706:

Moment Methods for Decision Analysis

Decision models involving continuous probability distributions almost always require some form of approximation. The usual approach to evaluating these kinds of models is to construct a discrete approximation for each continuous distribution and compute value lotteries and certain equivalents using these discrete approximations. Although decision analysts are quite comfortable with this approach, there has been relatively little consideration of how these discrete approximations affect the results of the analysis. In the first section of this paper, we review three common methods of constructing discrete approximations and compare their performance in a simple example.

The results of the example suggest a different approach that offers potential improvements in accuracy and efficiency over the usual approach. The basic idea is that given discrete approximations that accurately represent the moments of assessed "input" distributions, we may easily and accurately compute the moments of the "output" distribution or value lotteries. These moments then summarize what we know about the value lottery and certain equivalent, and provide the basis for computing approximate value lotteries and certain equivalents. In this paper, we discuss the methods supporting this moment approach and evaluate their performance in the context of the example.

From **James E. Smith** [address above], **Samuel Holtzman**, and **James E. Matheson**, Strategic Decisions Group, 2440 Sand Hill Rd., Menlo Park, CA 94025:

Structuring Conditional Relationships in Influence Diagrams

Influence diagrams provide a graphical language for describing the structure of decision problems. An influence diagram is at once both a formal description of a decision problem that can be treated by computers and a representation that is easily understood by decision-makers who may be unskilled in the art of complex probabilistic modeling. The power of an influence diagram, both as an analysis tool and a communication tool, lies in its ability to concisely and precisely describe the structure of a decision problem. To date, influence diagrams have been used primarily to represent the key variables in a decision problem and to indicate the existence of conditional relationships among these variables. This paper extends the definition of an influence diagram to describe the detailed structure of these conditional relationships. It also shows how the structural properties of these conditional relationships can be propagated and exploited during computation.

NEWS RELEASE

Announcing Volumes III & IV of the Analytic Hierarchy Process Series

The Logic of Priorities and *Analytical Planning*, two books on the Analytic Hierarchy Process for multiple criteria decision making, come together in a single paperback book. The cost is $30.

The Logic of Priorities by Thomas L. Saaty and Luis G. Vargas, 299 pp., 1991. Introduction to prioritization using the Analytic Hierarchy Process in applications to transport projects, technology transfer, and resource allocation under certainty. It also covers forward and backward planning; risk, and uncertainty in portfolio selection; and conflict resolution.

Analytical Planning by Thomas L. Saaty and Kevin P. Kearns, 208 pp., 1991. Presents the Analytic Hierarchy Process as a methodological approach to planning. Covers complexity in systems, systems characteristics and how the Analytic Hierarchy Process can be applied in a systems framework. Includes strategic planning, benefit-cost analysis, and resource allocation with the Analytic Hierarchy Process.

For more information about these, and other books on multiple criteria decision making, contact Expert Choice, Inc., 4922 Ellsworth Avenue, Pittsburgh, PA 15213. You may Phone/FAX us at (412) 682-3844.

NEWS RELEASE

Marketing Decisions Using Expert Choice

Expert Choice, Inc., the Decision Support Software Company, announces their new book for marketing software: *Marketing Decisions Using Expert Choice* ($49.95). It includes a 4-level version of the software. We also offer the workbook without the software for $25.00. The book contains applications and case studies in marketing using decision support the Expert Choice software, which is based on the Analytic Hierarchy Process (AHP), a multicriteria decision making process. This book describes how to provide decision support to executives making marketing decisions. It discusses situatio analysis in the Expert Choice framework: market research, competition, forecasting, and market strategy planning, and includes case studies for each chapter showing how to use the Expert Choice software. Exercises are given for the reader to work out. The chapters include "Marketing Decisions and Executive Decision Support", "Situation Analysis", "Market Strategy Planning", and "Evaluation and Control". By R.F. Dyer, E.A. Forman, E.H. Forman, and G. Jouflas, paperback, 210 pp. Available from Expert Choice, Inc. Call (412) 682-3844.