The SIPTA Newsletter

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Message from the editor

In this issue of the SIPTA newsletter you will find a summary of Serafin Moral's invited talk on imprecise probabilities at ECSQARU (European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty). The ECSQARU meetings are one of the most important foruns dealing with representations for uncertainty within artificial intelligence and computer science; Serafin's participation as invited speaker certainly testifies to his leading role in the world of imprecise probabilities. Thanks to Serafin for providing a nice summary of his talk.

This issue of the newsletter also brings information on the coming 4th International Symposium on Imprecise Probabilities and their Applications (ISIPTA '05), to occur in Pittsburgh, United States. You will find here the list of accepted papers, tutorials, and invited talks.

We also have the announcement of the workshop on "Info-Gap Analysis of Engineering Systems: Robust Decisions under Severe Uncertainty," and abstracts of papers announced at the SIPTA mailing list.

Finally, in the Software Section, this issue brings information on Thomas Lukasiewicz's NMPROBLOG, a package that deals with nonmonotonic probabilistic logics and their associated probability intervals.

Also, if you know of any event or publication that should be of interest to members of SIPTA, send a message about it to fgcozman@usp.br.

Cheers!

Fabio G. Cozman

Imprecise Probability in Graphical Models: Achievements and Challenges Invited talk at ECSQARU Barcelona, July 6-8, 2005

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ECSQARU (European Conference on Symbolic and Quantitative Approaches to Reasoning with Uncertainty) is a biannual conference that was originated from ESPRIT European projects (DRUMS: Defeasible Reasoning and Uncertainty Management Systems, 1989-1996). The idea of these projects was to study symbolic and quantitative methods of representation and reasoning able to deal with knowledge that is uncertain and defeasible. The conference includes people using logic to represent knowledge, as well as people following numerical approaches. It has an open character, trying to serve as a forum to communicate ideas by researchers with different backgrounds.

When I was invited to give a plenary talk in this conference I thought that the best option was to consider the topic to which I have devoted

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most of my research effort in the last years: the use of imprecise probability in dependence graphs, called Bayesian networks when precise Bayesian probabilities are used.

First, I have discussed that imprecise probability could be useful for sensitivity analysis in Bayesian networks. But the main message I have tried to transmit is that the role of imprecise probability in graphical models can be more important, providing alternative methodologies for learning and inference.

I have pointed out that precise Bayesian procedures usually make strong assumptions which sometimes do have non vacuous consequences. In fact, in most of the cases under a precise Bayesian model if we have two options for a decision, we will have strict preference for one of them, even in the case in which the information is scarce. I have given an example of what I consider an anomalous behavior of precise models: with short samples obtained from a very simple model it is possible to learn complex models which are far from reality [1]. The main aim of the talk has been to show that with imprecise probability we can transform lack of information into indeterminacy and thus the possibilities of obtaining unsupported outputs are much lower. The following points have been considered:

1. A review of imprecise probability concepts following Walley's approach and showing the duality between sets of probabilities and sets of desirable gambles representations [2]. Most of the present work in graphical models has been expressed in terms of sets of probabilities, but desirable gambles representation is simpler in many situations [3]. Also the two most important concepts of independence have been presented [4]: epistemic irrelevance and strong independence.

2. I have presented inference in graphical models with imprecise probability, showing the different optimization problems associated with the different independence concepts and estimation procedures [5]. I have pointed out to branch and bound technique as one of the most promising approaches to obtain effective exact procedures under strong independence [6]. I have also considered as an important open problem to obtain efficient algorithms under epistemic irrelevance.

3. Given a network structure, the estimation of conditional probabilities in a Bayesian network poses important problems. Usually, Bayesian methods are used in this task, but the selection of concrete 'a priori' distributions in conjunction with the design of the network can have important consequences in the results of the probabilities we compute with the network. Then, I have introduced the imprecise Dirichlet model [7] and discussed how it can be applied to estimate interval probabilities in a dependence graph. I have considered the development of efficient algorithms under a global application of the imprecise Dirichlet model as an important research problem for the future.

4. I have asserted that the development of algorithms to learn the structure of a dependence graph is an important challenge for imprecise probability. I have explained the main ideas of the procedure introduced in [1] to decide between dependence or independence taking as basis the imprecise Dirichlet model, which can be used for the design of a genuine imprecise probability learning procedure. Bayesian scores always decide between one of the options (dependence or independence) even for very short samples. The main novelty of the imprecise probability score is that in some situations there will not be a preference for any of the options.

5. Finally I have considered the problem of supervised classification, making a survey of existing approaches [8, 9], explaining credal classification and pointing at the necessity of developing a fair comparison procedure between the outputs of precise and imprecise models, explaining some ideas in [10].

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Related events and journals

This section is reserved for announcements of events and journals that are of interest to research in imprecise probability. Send a message to the newsletter editor at fgcozman@usp.br, if you know of an event/journal/call for papers that should be in this section.

The coming ISIPTA '05 is happening during July in Pittsburgh, United States — we devote the next section entirely to it. Apart from ISIPTA '05, we note the coming Conference on Uncertainty in Artificial Intelligence (UAI) and the coming workshop "Info-Gap Analysis of Engineering Systems: Robust Decisions under Severe Uncertainty.

Conference on Uncertainty in Artificial Intelligence

The 21st UAI conference is to occur in Edinburgh, Scotland, from July 26 to July 29. Information about the UAI conference, including accepted papers, can be found at the site http://www.cs.toronto.edu/uai2005/; as you will find there, "the scope of UAI is wide, including, but not limited to, representation, automated reasoning, learning, decision making and knowledge acquisition under uncertainty." Several accepted papers are related to imprecise probabilities, as can be found at the conference web site.

For information on previous UAI conferences, go to the site of the Association for Uncertainty in Artificial Intelligence (http://www.auai.org).

Info-Gap Analysis of Engineering Systems: Robust Decisions under Severe Uncertainty

This workshop will be held on 29-30th September 2005 at the University of Newcastle-upon-Tyne. Its organizers are Prof. Jim Hall (University of Newcastle-upon-Tyne), Prof. Keith Worden (University of Sheffield), and Dr. Nick Alexander (University of Bristol).

This workshop will bring together international researchers who have been progressing info-gap applications, in most cases independently of one another, and ask them to present demonstrations of the maturing theory and reflect upon future challenges. They will be joined by selected participants working in uncertainty analysis of engineering systems that have potential for application of info-gap theory. Each member of this latter group will be invited to present a poster summarising their current work and identifying potential info-gap applications to be discussed during the workshop.

The purpose of the workshop is:
i. to share experiences of application on info-gap to a range of engineering applications, and
ii. to identify and examine future opportunities and challenges for info-gap.
This will be achieved by a combination of
presentations by leading exponents of info-gap theory followed by plenary discussion, and
a poster session to address open problems raised by other participants in the workshop and to develop potential info-gap applications.

The main speakers are (subject to confirmation):
1. Prof. Yakov Ben-Haim (Yitzhak Moda'i Chair in Technology and Economics Faculty of Me-

chanical Engineering, Technion - Israel Institute of Technology)
2. Dr. Francois Hemez (Engineering Sciences and Applications, Los Alamos National Laboratory, USA)
3. Dr. Scott Cogan (Faculte des Sciences, Laboratoire de Mecanique Appliquee, Universite de Franche-Comte, France)
4. Prof. Yoshihiro Kanno (Dept. of Urban and Environmental Engineering, Kyoto University, Japan)
5. Prof. Chris Pantelides (Department of Civil and Environmental Engineering, University of Utah, USA)
6. Dr. Miriam Zacksenhouse (Faculty of Mechanical Engineering, Technion - Israel Institute of Technology)
7. Prof. Jim Hall (Professor of Earth Systems Engineering, School of Civil Engineering and Geosciences, University of Newcastle-upon-Tyne, UK)
8. Prof. Keith Worden (Professor of dynamical systems, Department of Mechanical Engineering, University of Sheffield, UK)
9. Dr. Gareth Pierce (Research Associate, Department of Mechanical Engineering, University of Sheffield, UK)

Invitation to Participants (by Organizers)

There are places for between fifteen and twenty participants at the workshop, in addition to the main speakers. No prior experience of info-gap analysis is necessary but each participant will be expected to present a poster summarising aspects of their current work and identifying key areas of uncertainty that have potential for info-gap analysis.

We are able to pay the registration fees as well as accommodation and dinner on the night of Thursday 29 September for each participant. We cannot contribute to travel expenses.

If you would like to attend, please contact Meg Buckley (Meg.Buckley@ncl.ac.uk) by 29 July 2005 with your name, full contact details, affiliation, current position and a short summary of the proposed contents of your poster. In selecting applicants we will seek a balance between industrial and university participants and between academic staff and graduate students. Participants from outside the UK are welcome. We will notify successful applicants by 8 August 2005.

Background to Info-Gap Analysis

Design and planning decisions often employ quantitative models of various phenomena. Typically, these phenomena are complex and poorly understood, so these models are accompanied by tremendous uncertainty. This uncertainty is of two sorts: aleatoric and epistemic. Aleatoric uncertainty is randomness which is usually modelled by probability distributions. Epistemic uncertainty is a knowledge gap: our understanding of the phenomena is incomplete or erroneous, so models of the phenomena are uncertain. Often the random (aleatoric) elements of the phenomena are poorly understood, so probability models are themselves subject to epistemic uncertainty as well. Info-gap theory is a method for modelling epistemic uncertainty and for evaluating and selecting between plans and designs in terms of effectiveness and robustness to both aleatoric and epistemic uncertainties.

Information-gap decision theory was initiated and developed by Prof Yakov Ben-Haim and has its origins in the early 1980s in convex modelling of materials, mechanical and dynamical problems. A system model is parameterised so that system response to loading is represented by nested sets containing excursions of system behaviour. Of particular interest is the level at which system behaviour exceeds some failure criterion. In work with Isaac Elishakoff, Ben-Haim demonstrated how diligently applied probabilistic methods can result in disturbingly inaccurate estimates of the probability of failure of safety-critical systems, whilst convex analysis identified more reliable bounds on system behaviour (Ben-Haim and Elishakoff, 1990). This work was cultivated into a theory of non-probabilistic robust reliability (Ben-Haim, 1996) and subsequently into a complete theory of decision-making under severe uncertainty (Ben-Haim, 2001, 2005).

An info-gap analysis has three components: a system model, an info-gap uncertainty model and performance requirements. The system model describes the structure and behaviour of the system in question, using as much information as is reasonably available. The system model may, for example, be in the form of a set of partial differential equations, a network model, or indeed a probabilistic model such as a Poisson process. The uncertainty in the system model is parameterised with an uncertainty parameter α (a positive real number), which defines a family of nested sets that bound re-

gions or clusters of system behaviour. When $\alpha = 0$ the prediction from the system model converges to a point, which is the anticipated system behaviour, given current available information. However, it is recognised that the system model is incomplete so there will be a range of variation around the nominal behaviour. Uncertainty, as defined by the parameter α, is therefore a range of variation of the actual around the nominal. No further commitment is made to the structure of uncertainty. α is not normalised and has no betting interpretation, so is clearly distinct from a probability.

Next, two contrasting consequences of uncertainty are introduced: 'catastrophic failure' and 'windfall success'. Two immunity functions, a robustness function and an opportunity function, describe the variation of α with the magnitude of the unfavourable and favourable consequences. Info gap theory therefore seeks to gain from favourable excursions in uncertain system behaviour as well as developing robust strategies that guard against the effects of unfavourable excursions. Excessive emphasis on failure can result in a loss of opportunity, but the two are not always mutually exclusive.

Analysis of robustness and development of strategies for robust-decision-making under severe uncertainty are now amongst the most pressing problems in the management of engineering systems. Recent events, from terrorist attacks to the Asian tsunamis illustrate the importance of designing systems that are robust to unexpected loadings. This is a concept that is straightforward at an intuitive level, but formalising a theory that can deal with truly unexpected loads and states of near total ignorance (situations where probabilistic approaches falter or fail completely) is certainly non-trivial. Info-gap theory shows great promise yet needs to be tested and applied in order to prove its fitness for purpose. The proposed workshop aims to contribute to the evaluation of info-gap theory in practice and the definition of problems that have to be overcome if info-gap is to gain widespread acceptance in engineering practice.

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Ben-Haim, Y. Info-gap Decision Theory For Engineering Design. Or: Why 'Good' is Preferable to 'Best', appearing as chapter 11 in Engineering Design Reliability Handbook, Edited by Efstratios Nikolaidis, Dan M.Ghiocel and Surendra Singhal, CRC Press, Boca Raton, 2005.

ISIPTA '05

The 4th International Symposium on Imprecise Probabilities and Their Applications (ISIPTA '05) will be held at Carnegie Mellon University, Pittsburgh, United States. The symposium sessions will be held from July 21 to July 23; they will be preceded by tutorials on July 20, and there will be a workshop on Financial Risk Assessment in the morning of July 24 (organized by Teddy Seidenfeld). Detailed information about the conference, including program, venue and maps, can be found at http://www.sipta.org/isipta05/.

The ISIPTA symposia are characterized by the emphasis placed on discussion. This is in part due to the awareness that "imprecise probability" is a generic term for many different models. ISIPTA '05 will favour discussion primarily through the special format of the symposium: there will be no parallel sessions, and each paper will be presented both in plenary and in poster form. Plenary sessions are intended to introduce the main ideas of the papers in intuitive, non-technical way, and to stimulate general discussion. Poster sessions move the discussion to the technical level by giving the possibility to deepen the details of a paper in an informal way.

The conference banquet will be held on Thursday (July 21) evening at the Andy Warhol Museum (one of the four Carnegie Museums in Pittsburgh). On Friday (July 22) evening, there will be a cruise on the riverboat "Keystone Belle" hosted by Gateway Clipper. No conference activities are planned on Saturday evening, but some events that are going on in Pittsburgh that evening include a symphony performance, a Pirates baseball game, and an outdoor jazz concert in Riverview Park. There are also many interesting restaurants in the vinicity of the symposium and within walking distance of the hotels.

Tutorials

1. **Introduction to Imprecise Probabilities**, by Gert de Cooman, Ghent University, Belgium

   The tutorial will introduce basic notions and

ideas in the theory of imprecise probabilities. It will highlight the behavioural interpretation of several types of imprecise probability models, such as lower previsions, sets of probability measures and sets of desirable gambles; as well as their mutual relationships. Rationality criteria for these models, based on their interpretation, will be discussed, such as avoiding sure loss and coherence. We also touch upon the issues of conditioning, and decision making using such models.

2. **Imprecise Probabilities and Financial Risk Assessment**, by Paolo Vicig, Universita di Trieste, Italy
   Although financial risk measurement is a largely investigated research area, its relationship with imprecise probabilities has been mostly overlooked. However risk measures can be viewed as instances of upper (or lower) previsions, thus letting us apply the theory of imprecise previsions to them. Therefore, after a presentation of some well known risk measures (including Value-at-Risk or VaR, coherent and convex risk measures), we show how their definitions can be generalized and discuss their consistency properties. Thus, for instance, VaR may or may not avoid sure loss, and conditions for this can be derived. This analysis also makes us consider a very large class of imprecise previsions, which we termed convex previsions, generalizing convex risk measures and other uncertainty models. Measures for conditional risks can further be introduced by extending this class to conditional convex previsions. Finally, we discuss the role of some important notions in the theory of imprecise probabilities, like that of natural extension, when applied to risk measurement.

3. **The Logical Concept of Probability and Statistical Inference**, by Kurt Weichselberger (with Anton Wallner), Ludwig-Maximilians-University Munich, Germany
   This tutorial will review Prof. Weichselberger's theory of interval probability. A consistent concept of logical probability affords the employment of interval probability. Such a concept which attributes probability to arguments consisting of premise and conclusion, can be used to generate a system of axioms for statistical inference — for the contents of this tutorial, check the paper with the same title at the conference web site.

Invited Talks

1. **Banquet talk: Convexity and E-Admissibility in Rational Choice**, by Isaac Levi, Columbia University:
   After a brief summary of leading ideas I have advocated since the early 1970's concerning the representation of probability judgment by sets of probabilities, I consider the most contentious of the assumptions I impose on sets of permissible probabilities. That is the requirement that sets of permissible probabilities satisfy a convexity condition. Several objections are reviewed. An objection recently raised in conversation by T.Seidenfeld is singled out for special attention. My response to his worry and to another objection raised by Seidenfeld, Kadane and Schervish derives the convexity of credal probability sets from the idea that all potential resolutions of conflict in the evaluation of options should be considered permissible together with the assumption that any evaluation of options that preserves evaluations that are common to already recognized permissible evaluations ought to qualify as a potential resolution. On this basis, the "value structure" representing the evaluation of options is shown to be convex. This in turn argues for the convexity of the set of permissible probabilities.

2. **Probability and the Problem of Ignorance**, by Arthur Dempster, Harvard University:
   I will address in this talk several issues related to the Dempster-Shafer extension of the calculus of probability. To fix a locus for the theory, it is helpful to recognize that mathematics relates to science in two fundamentally different ways, one concerned with explicit formal representation of objective phenomena, and the second with explicit formal representation of subjective reasoning about uncertain aspects of the objective world. DS calculus is in essence a mathematical representation of the latter sort, providing a rigorous foundation for characterizing uncertainties of a specific type, namely uncertainties about objectively defined unknowns. For every binary margin of a defined system, traditional Bayesian reasoning requires specification of two probabilities summing to unity, surely an impossibly strong assumption for most contemporary real applications, whereas DS allows a third probability of "don't know" which can range from zero in the Bayesian case to unity for

the representation of complete ignorance. The extended calculus promises a large extension of the class of potentially useful models, beyond the subclass currently developing within the Bayesian special case. Models are constructed in the DS mode using a mathematical definition of the fundamental concept of independence, misleadingly called the Dempster rule of combination, together with graphical structures that permit practical modeling of the uncertainty of high-dimensional complex systems. To the extent that the Bayesian special case succeeds in practice, as it often does, it trades on the acceptability of a strong implicit assumption that knowledge of unrepresented phenomena is independent of the explicitly represented model, and therefore is irrelevant. An intriguing feature of the DS calculus is that it casts new light on the problem of how inference is possible about complex systems despite the futility of attempting to assign evidence-based Bayesian probabilities to the vast arrays of variables that modern technologies are capable of representing and measuring.

Workshop on Financial Risk Assesment

1. **Dynamic monetary risk measures for processes**, by Patrick Cheridito
   We study time-consistency properties of processes of monetary risk measures that depend on bounded discrete-time processes describing the evolution of financial values. The time horizon can be finite or infinite. We call a process of monetary risk measures time-consistent if it assigns to a process of financial values the same risk irrespective of whether it is calculated directly or in two steps backwards in time, and we show how this property manifests itself in the corresponding process of acceptance sets. For processes of coherent and convex monetary risk measures admitting a robust representation with sigma-additive linear functionals, we give necessary and sufficient conditions for time-consistency in terms of the representing functionals.

2. **Time Consistent and Currency Invariant Convex Risk Measures** by Stephen D'Silva
   In order to study time-consistent monetary concave risk adjusted valuations in a continuous time, finite horizon setting, there arises a need to define risk adjusted valuations at all dates in the time continuum. One approach of tackling this issue is to define risk adjusted valuations at all dates and call this sequence of risk valuations as the risk valuation process. However, monetary risk adjusted valuations enjoy the translation invariance property which enables us to define monetary risk adjusted valuations at intermediate stopping times in terms of the date-0 risk adjusted valuation.
   We characterize these intermediate risk adjusted valuations in terms of the date-0 risk adjusted valuation for strongly relevant time-consistent monetary risk measures. We develop a representation for strongly relevant monetary risk measures which are time consistent at certain specified dates.
   We seek to characterize convex risk measures which are both time consistent and currency invariant. We define currency invariance for monetary concave risk adjusted valuations. We show that only trivial monetary concave risk adjusted valuations satisfy both time consistency and currency invariance for all positive exchange rate processes.

3. **Generalized Deviation in Risk Analysis**, by R. Tyrrell Rockafellar, Stan Uryasev, Michael Zabarankin
   General deviation measures are introduced and studied systematically for their potential applications to risk management in areas like portfolio optimization and engineering. Such measures include standard deviation as a special case but need not be symmetric with respect to ups and downs. Their properties are explored with a mind to generating a large assortment of examples and assessing which may exhibit superior behavior. Connections are shown with coherent risk measures in the sense of Artzner, Delbaen, Eber and Heath, when those are applied to the difference between a random variable and its expectation, instead of to the random variable itself. However, the correspondence is only one-to-one when both classes are restricted by properties called lower range dominance, on the one hand, and strict expectation boundedness on the other. Dual characterizations in terms of sets called risk envelopes are fully provided.

4. **Fundamental Theorems of Previsions and Asset Pricing Theories**, by Mark Schervish, Teddy Seidenfeld, Jay Kadane
   We explore the connections between the concepts of arbitrage and Dutch Book. These concepts are related to the fundamental theorem of previsions and the fundamental theorem of asset pricing. In loose terms, fair prices for gam-

bles (previsions) are coherent and asset prices are arbitrage free if they are expected values under probability measures. How generally this loose result holds and how closely the two concepts correspond are the main focus of this study.

Accepted Papers

- A New Score for Independence Based on the Imprecise Dirichlet Model, Joaqun Abellán, Serafin Moral.
- Fast Algorithms for Robust Classification with Bayesian Nets, Alessandro Antonucci, Marco Zaffalon.
- Comparative Ignorance and the Ellsberg Phenomenon, Horacio Arlo-Costa, Jeffrey Helzner.
- Comparing Methods for Joint Objective and Subjective Uncertainty Propagation with an Example in Risk Assessment, Cédric Baudrit, Didier Dubois.
- Possibilistic Networks with Locally Weighted Knowledge Bases, Salem Benferhat, Salma Smaoui.
- Electric Company Portfolio Optimization Under Interval Stochastic Dominance Constraints, Dan Berleant, Mathieu Dancre, Jean-Philippe Argaud, Gerald Sheble.
- Some Theoretical Properties of Interval-Valued Conditional Probability Assessments, Veronica Biazzo, Angelo Gilio.
- On Eventwise Aggregation of Coherent Lower Probabilities, Andrew Bronevich.
- Computing Lower and Upper Expectations under Epistemic Independence, Cassio Campos, Fabio Cozman.
- Application of a Hill-Climbing Algorithm to Exact and Approximate Inference in Credal Networks, Andrés Cano, Manuel Gómez, Serafin Moral.
- Configurations of Locally Strong Coherence in the Presence of Conditional Exchangeability (the case of cardinality $k \leq 3$), Andrea Capotorti.
- Likelihood-Based Statistical Decisions, Marco Cattaneo.
- Answers to Two Questions of Fishburn on Subset Comparisons in Comparative Probability Orderings, Robin Christian, Arkadii Slinko.
- Learning from Multinomial Data: a Nonparametric Predictive Alternative to the Imprecise Dirichlet Model, Frank Coolen, Thomas Augustin.
- Evidential Modeling for Pose Estimation, Fabio Cuzzolin, Ruggero Frezza.
- n-Monotone Lower Previsions and Lower Integrals, Gert De Cooman, Matthias Troffaes, Enrique Miranda.
- S-Independence and S-Conditional Independence with Respect to Upper and Lower Conditional Probabilities Assigned by Hausdorff Outer and Inner Measures, Serena Doria.
- Computing the Join Range of a Set of Expectations, Charles Geyer, Radu Lazar, Glen Meeden.
- Basing Probabilistic Logic on Gambles, Peter Gillett, Richard Scherl, Glenn Shafer.
- Objective Imprecise Probabilistic Information, Second Order Beliefs and Ambiguity Aversion: an Axiomatization, Raphael Giraud.
- Towards a Unifying Theory of Logical and Probabilistic Reasoning, Rolf Haenni.
- Dynamically Consistent Updating of MaxMin EU and MaxMax EU Preferences, Eran Hanany, Peter Klibanoff.
- Approximate Inference in Credal Networks by Variational Mean Field Methods, Jaime Ide, Fabio Cozman.
- A Granular Semantics for Fuzzy Measures and its Application to Climate Change Scenarios, Jonathan Lawry, Jim Hall, Guangtao Fu.
- Decision Making with Imprecise and Fuzzy Probabilities – a Comparison, Sven-Hendrik Lossin.
- Nonmonotonic Probabilistic Logics under Variable-Strength Inheritance with Overriding: Algorithms and Implementation in nmproblog, Thomas Lukasiewicz.
- On Coherent Variability Measures and Conditioning, Sebastian Maass.
- On the Existence of Extremal Cones and Comparative Probability Orderings, Simon Marshall.
- Bayesianism Without Priors, Acts Without Consequences, Robert Nau.
- Envelope Theorems and Dilation with Convex Conditional Previsions, Renato Pelessoni, Paolo Vicig.
- Limits of Learning from Imperfect Observations under Prior Ignorance: the Case of the Imprecise Dirichlet Model, Alberto Piatti, Marco Zaffalon, Fabio Trojani.
- Imprecise Probability Models for Inference in Exponential Families, Erik Quaeghebeur, Gert De Cooman.
- Estimation of Chaotic Probabilities, Leandro Rego, Terrence Fine.
- No Double Counting Semantics for Conditional Independence, Prakash P. Shenoy.

- A Protocol for the Elicitation of Imprecise Probabilities, Alane Alves Silva, Fernando Campello de Souza.
- Generalized Conditioning in Neighbourhood Models, Damjan Skulj.
- Ordinal Subjective Foundations for Finite-domain Probability Agreement, Paul Snow.
- Variable Selection in Classification Trees Based on Imprecise Probabilities, Carolin Strobl.
- Powerful Algorithms for Decision Making under Partial Prior Information and General Ambiguity Attitudes, Lev Utkin, Thomas Augustin.
- Decision Making under Incomplete Data using the Imprecise Dirichlet Model, Lev Utkin, Thomas Augustin.
- The Role of Coherence for the Integration of Different Sources, Barbara Vantaggi.
- On an Interval-Valued Solution of the Marginal Problem, Jirina Vejnarova, Radim Jirousek, Vladislav Bna.
- Maximal Number of Vertices of Polytopes Defined by F-Probabilities, Anton Wallner.
- The Logical Concept of Probability and Statistical Inference, Kurt Weichselberger.
- Conservative Rules for Predictive Inference with Incomplete Data, Marco Zaffalon.
- Arithmetic on Random Variables: Squeezing the Envelopes with New Joint Distribution Constraints, Jianzhong Zhang, Dan Berleant.

Publications announced at the SIPTA mailing list

In this new section, we list publications (and abstracts) announced at the SIPTA mailing list. Hopefully this is a valid incentive for people to announce their papers in the mailing list! Please start announcing your papers, and let me know about any relevant papers you find, by sending a message to fgcozman@usp.br!

Fabio Cozman

B. R. Cobb, P. P. Shenoy. On the Plausibility Transformation for Transforming Belief Function Models to Probability Models.
(At http://lark.cc.ku.edu/~pshenoy/Papers/WP308.pdf.)
Abstract:
In this paper, we propose the plausibility transformation method for translating Dempster-Shafer (D-S) belief function models to probability models, and describe some of its properties. There are many other transformation methods used in the literature for translating belief function models to probability models. We argue that the plausibility transformation method produces probability models that are consistent with D-S semantics of belief function models, and that, in some examples, the pignistic transformation method produces results that are inconsistent with Dempster's rule of combination.

E. Lehrer. A New Integral for Capacities.
(At http://www.math.tau.ac.il/~lehrer/Papers/Integral-capacity6.pdf.)
Abstract:
A new integral for capacities, different from the Choquet integral, is introduced and characterized. The main feature of the new integral is concavity, which might be interpreted as uncertainty aversion. The integral is then extended to fuzzy capacities, which assign subjective expected values to random variables (e.g. portfolios) and may assign subjective probability only to a partial set of events. An equivalence between minimum over sets of additive capacities (not necessarily probability distributions) and the integral w.r.t fuzzy capacities is demonstrated. The extension to fuzzy capacities enables one to calculate the integral also when there is information only about a few events and not about all of them.

Software section: NMPROBLOG: Nonmonotonic Probabilistic and Default Reasoning

by Thomas Lukasiewicz
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The system NMPROBLOG is geared towards nonmonotonic probabilistic and default reasoning — topics that have received intense attention within the artificial intelligence community. The package is freely available at the address http://www.kr.tuwien.ac.at/staff/lukasiew/nmproblog.html.

NMPROBLOG solves the following problems in nonmonotonic probabilistic and default reasoning:

- deciding consistency and computing tight entailed intervals in weak/strong/variable-strength nonmonotonic probabilistic logics

(probabilistic System P, probabilistic System Z, and probabilistic lexicographic entailment);

- deciding satisfiability and computing tight entailed intervals in ordinary/variable-strength model-theoretic probabilistic logic;
- deciding consistency and computing tight entailed intervals in probabilistic logic under g-coherence; deciding consistency and entailment in default reasoning (System P, System Z, and lexicographic entailment).

The package is written in C and uses the package `lp_solve` , version 5.1, for deciding the solvability of systems of linear constraints and for computing the optimal values of linear programs. The graphical user interface of NMPROBLOG has been built using the package `glade 2.6` . The executable for linux and some examples are available at the web site, together with screen shots.

The system and the inference problems it solves are presented in more detail in a paper at ISIPTA '05 (available at http://www.sipta.org/isipta05/).

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