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Society Briefs

EUSFLAT General Assembly at IPMU 2008

The EUSFLAT Society will have a general assembly on the occasion of this year's IPMU conference in that is held June 22–27, 2008, in Málaga, Spain. The assembly is scheduled for:

Tuesday, June 24, 2008, 7:00 pm

For the final location, please check the final conference program. *We are looking forward to meeting you in Málaga and to informing you about the latest news and figures of our society!*



EUSFLAT Awards Students Grants for IPMU 2008

Moreover, we are glad to announce that EUSFLAT will award student grants for attending the IPMU 2008 Conference.



CajAstur International Prize for Soft Computing — Second Edition

CajAstur and the European Centre for Soft Computing announce the Second edition of the CAJASTUR INTERNATIONAL PRIZE FOR SOFT COMPUTING meant to distinguish a person or group of persons for the realization of a relevant scientific or industrial application, meaning an original contribution in the area of Soft Computing.

The contribution (realized by a person or group) can be related to Theory or Actual Applications of Soft Computing and should not be more than ten years old.

The Prize consists of 20,000.00 euros and an Award Certificate. The prize winner (or the representative in case of a group) will be invited to travel to Oviedo (Spain) to personally receive the Award. The prize winner commits herself/himself to attend the awarding ceremony, to deliver a specialized talk at the European Centre for Soft Computing as well as a talk open to the general public in Asturias.

The Jury of the prize will be the Scientific Committee of the Foundation for the advancement of Soft Computing.

Deadline for submitting applications for the 2008 Prize is June 21st 2008.

For additional information visit the web page of the European Centre for Soft Computing <http://www.softcomputing.es/en/home.php>

Society Briefs (cont'd)

2nd International Summer Course on Soft-Computing: Intelligent Data Analysis

The second summer course on Soft Computing: Intelligent Data Analysis will take place in Mieres, Asturias, Spain, July 7–11, 2008, and is organized by the [European Centre for Soft Computing](http://www.softcomputing.es).

Soft Computing is a discipline that deals with the design of hybrid intelligent systems which, in contrast to classical hard computing techniques, are tolerant to imprecision, uncertainty, partial truth, and approximation. Thus tractable, robust, and low cost solutions to real-world problems are achieved. The main constituents of Soft Computing are fuzzy logic, neural networks, evolutionary computation, and probabilistic reasoning. Since the term Soft Computing was coined at the beginning of the 90s, this area has experienced a rapid development of its fundamentals as well as its applications. The summer course reviews the fundamentals of this discipline, describes many real-world applications, and, in particular, treats new trends in Intelligent Data Analysis. Participants will gain insight into the potential of soft computing techniques and the state of the art in the area. To achieve this, the lecturers have been selected from the leaders of the different branches of Soft Computing.

The course will cover the following topics:

Part I: Fundamental of Soft-Computing

- Fuzzy Set Theory - Fuzzy Systems by Dr. Enric Trillas
- Neural Networks and Neuro-Fuzzy Systems by Dr. Claudio Moraga
- Evolutionary Computation and Genetic Fuzzy Systems by Dr. Oscar Cordon
- Probability and Statistics for Soft-Computing by Dr. Gil Gonzalez

Part II: New trends in Intelligent Data Analysis

- Regression and System Modeling by Dr. Luciano Sanchez
- Clustering by Dr. Michael Berthold
- Frequent item-set mining by Dr. Christian Borgelt
- Time Series by Dr. Sven Crone
- Fuzzy Classification and Ensembles by Dr. Lawrence Hall

For additional information visit the web page or contact via email:

URL: <http://www.softcomputing.es/summercourse>

e-mail: summer.course@softcomputing.es

Honor for Prof. Janusz Kacprzyk



We are glad to announce that our renowned long-time member and IFSA President, Professor Janusz Kacprzyk, was elected in December 2007 as Foreign Member of the Spanish Royal Academy of Economic and Financial Sciences (RACEF: Real Academia de Ciencias Economicas y Financieras: <http://www.racef.es>).

The EUSFLAT Society cordially congratulates!

PhD Dissertations

Àngel García-Cerdaña

Logics based on triangular norms: a contribution to the study of their substructural aspects

Abstract: The multi-valued semantics associated to the fuzzy logic includes some operations defined on the real interval $[0,1]$ that generalize Boolean truth functions. A triangular norm (t-norm, for short) is a binary operation defined on the real interval $[0,1]$ which is increasing in both arguments, associative, commutative and has 1 as identity element. Fuzzy logic systems use left continuous t-norms and their residua as truth functions for the conjunction and the implication, respectively. A logic is *fuzzy* and *t-norm based* if it is sound and complete with respect to the algebras over $[0,1]$ given by a family of left continuous t-norms (see [5] for an overview).

On the other hand, a logic is *substructural* if it admits a sequent presentation obtained by deleting or restricting some of the so-called *structural rules* from the common sequent presentation of intuitionistic logic or classical logic.

The development of these two research fields is closely related to two books: *Substructural Logics* [3] is the first monograph about this family of logics, and *Metamathematics of Fuzzy Logic* [9], by Petr Hájek, is the first book devoted to the systematic treatment of the formal systems associated with fuzzy logic.

The doctoral dissertation [8] is a contribution to the study of the relationships between fuzzy logics based on t-norms and substructural logics. The connections between both research fields are based on the fact that the most general fuzzy logic based on t-norms, the logic MTL of Esteva

and Godo (see [4]), is an axiomatic extension of the basic intuitionistic substructural logic without *contraction* (but with *exchange* and *weakening*) studied by the logician Hiroakira Ono (see [11]) and that we denote eFL_{ew} (the external deductive system associated with the sequents calculus FL_{ew}). The main tools we use in our study are abstract algebraic logic (see [6]) and the theory of Gentzen systems (see [2, Section 2] and the references there quoted).

The dissertation, written in Catalan, is self contained (one section is devoted to introduce all notions later considered), contains the full five articles published by the author [10, 5, 7, 2, 1], and contains a part devoted to generalize to wider substructural frameworks some of the results obtained in the published papers. The main contributions are the following ones:

1. A full landscape of logics considering both the hierarchy of FL_{ew} -logics studied by Ono and the hierarchy of fuzzy logics based on t-norms is shown (results published in [5]).
2. Analysis of some definability conditions of the additive connectives of conjunction and disjunction in extensions of eFL_{ew} and MTL (results published in [7]).
3. Study of certain fragments, without the connective of implication, of the Gentzen system FL_{ew} and of its associated external system eFL_{ew} (results published in [2, 1]).
4. Generalization of some results about the fragments without implication to a more general substructural framework (without contraction but also without weakening or without exchange). This results will be published soon (in English) in the collection of monographs of the Institute of Research in Artificial Intelligence (IIIA) of the Spanish National Research Council (CSIC).

We consider the *fragment* of a logic in a sublanguage L as the restriction of their consequence relation (not only theorems) to the sublanguage L . The study of the fragments is important in order to characterize the contribution of each connective to the general properties of the particular logic. Besides their inherent interest, the study of the fragments without implication of eFL_{ew} is proposed as a strategy towards obtaining characterizations of all fragments without implication of the fuzzy logics based on t-norms. In this approach, one of the results—surprising from our point of view—we get is that the connectives of additive and multiplicative conjunction (i.e., the reticular conjunction and the fusion) are indistinguishable in the corresponding fragments without implication and negation of eFL_{ew} . This fact has as a corollary that these two kinds of conjunction are also indistinguishable in the same fragments of all t-norm based fuzzy logics.

References:

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- [2] F. Bou, À. García-Cerdaña, and V. Verdú. On two fragments with negation and without implication of the logic of residuated lattices. *Mathematics Preprint Series 369*, IMUB (University of Barcelona), February 2005.
- [3] K. Dösen and P. Schroeder-Heister, editors. *Substructural Logics*, volume 2 of *Studies in Logic and Computation*. Oxford University Press, 1993.
- [4] F. Esteva and L. Godo. Monoidal t-norm based logic: towards a logic for left-continuous t-norms. *Fuzzy Sets and Systems*, 124:271–288, 2001.
- [5] F. Esteva, L. Godo, and À. García-Cerdaña. On the hierarchy of t-norm based residuated fuzzy logics. In M. Fitting and E. Orłowska, editors, *Beyond two: theory and applications of multiple-valued logic*, volume 114 of *Studies in Fuzziness and Soft Computing*, pages 251–272. Physica, Heidelberg, 2003.
- [6] J. M. Font, R. Jansana, and D. Pigozzi. A survey on abstract algebraic logic. *Studia Logica*, Special Issue on Abstract Algebraic Logic, Part II, 74(1–2):13–97, 2003.
- [7] À. García-Cerdaña, C. Noguera, and F. Esteva. On the scope of some formulas defining additive connectives in fuzzy logics. *Fuzzy Sets and Systems*, 154(1):56–75, 2005.
- [8] À. García-Cerdaña. *Lògiques basades en normes triangulars: una contribució a l'estudi dels seus aspectes subestructurals*. PhD thesis, University of Barcelona, 2007. Available on line at <http://www.iiia.csic.es/~angel/PhDthesis-A-Garcia-C.pdf>
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- [10] S. Gottwald, À. García-Cerdaña, and F. Bou. Axiomatizing monoidal logic. A correction to: “A treatise on many-valued logics”. *Journal of Multiple-Valued Logic and Soft Computing*, 9(4):427–433, 2003.
- [11] H. Ono. Substructural logics and residuated lattices - an introduction. In V. F. Hendricks and J. Malinowski, editors, *50 Years of Studia Logica*, volume 21 of *Trends in Logic—Studia Logica Library*, pages 193–228. Dordrecht, 2003.

Keywords: t-norm based fuzzy logics, substructural logics, algebraic logic, Gentzen systems, fragments.

Advisors: Francesc Esteva, IIIA-CSIC; Ventura Verdú, University of Barcelona.

About the author: Àngel García-Cerdaña was born in Barcelona, Spain in 1952. He obtained the graduation in mathematics in 1976. Has been teacher of mathematics of secondary education and in the recent times has been teacher of logic in the department of Philosophy of the Autonomous University of Barcelona (2004-2007). He combines the scientific career with the artistic activities (theater and music) and the theatrical pedagogy. He was awarded his PhD degree in November 2007 (University of Barcelona). At present he has a temporary contract in the IIIA (CSIC). E-Mail: angel@iiia.csic.es, agcerdanya@gmail.com.

Bibliographic Information: The thesis is available at: <http://www.iiia.csic.es/~angel/PhDthesis-A-Garcia-C.pdf>

Book announcements and reviews

Brief announcements

- G. Beliakov, A. Pradera, T. Calvo, *Aggregation Functions: A Guide for Practitioners*, Springer, 2007. 360 pages, ISBN 978-3-540-73720-9. <http://www.springer.com/978-3-540-73720-9>
- H. B. Mitchell, *Multi-Sensor Data Fusion. An Introduction*, Springer, 2007. 282 pages, ISBN 978-3-540-71463-7. <http://www.springer.com/west/home/generic/search/results?SGWID=4-40109-22-173737011-0>
- J. Lu, G. Zhang, D. Ruan, F. Wu, *Multi-Objective Group Decision Making: Methods, Software and Applications with Fuzzy Set Techniques*, World Scientific Press, 2007. 408 pages, ISBN-13 978-1-86094-793-3, ISBN-10 1-86094-793-X <http://www.worldscibooks.com/business/p505.html>
- H. Bustince, F. Herrera, J. Montero, *Fuzzy Sets and Their Extensions: Representation, Aggregation and Models*, Springer, 2007. 680 pages, ISBN-978-3-540-73722-3 <http://www.springer.com/west/home/generic/search/results?SGWID=4-40109-22-173750209-0>
- N. T. Nguyen, *Advanced Methods for Inconsistent Knowledge Management*, Springer, 2008. 356 pages. ISBN-978-1-84628-888-3. <http://www.springer.com/west/home/computer/artificial?SGWID=4-147-22-173734631-0>
- S. Miyamoto, H. Ichihashi, K. Honda, *Methods in c-Means Clustering with Applications*, Springer, 2008. 248 pages. ISBN-978-3-540-78736-5. <http://www.springer.com/engineering/book/978-3-540-78736-5>
- M. Nikraves, J. Kacprzyk, L.A. Zadeh, (Eds.), *Forging New Frontiers: Fuzzy Pioneers I*, Springer, 2007. 460 pages. ISBN-978-3-540-73181-8. <http://www.springer.com/engineering/book/978-3-540-73181-8>
- B. Apolloni, W. Pedrycz, S. Bassis, D. Malchiodi, *The Puzzle of Granular Computing*, Springer, 2008. 460 pages. ISBN-978-3-540-79863-7. <http://www.springer.com/engineering/book/978-3-540-79863-7>

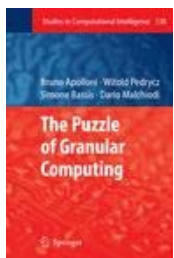
Book descriptions



S. Miyamoto, H. Ichihashi, K. Honda
Methods in c-Means Clustering with Applications.
Springer, 2008. 248 pages. ISBN-978-3-540-78736-5.
Link: <http://www.springer.com/engineering/book/978-3-540-78736-5>

Description: The main subject of this book is the fuzzy c-means proposed by Dunn and Bezdek and their variations including recent studies. A main reason why we concentrate on fuzzy c-means is that most methodology and application studies in fuzzy clustering use fuzzy c-means, and hence fuzzy c-means should be considered to be a major technique of clustering in general, regardless whether one is interested in fuzzy methods or not. Unlike most studies in fuzzy c-means, what we emphasize in this book is a family of algorithms using entropy or entropy-regularized methods which are less known, but we consider the entropy-based method to be another useful method of fuzzy c-means. Throughout this book one of our intentions is to uncover theoretical and methodological differences between the Dunn and Bezdek traditional method and the entropy-based method. We do not claim that the entropy-based method is better than the traditional method, but we believe that the methods of fuzzy c-means become complete by adding the entropy-based method to the method by Dunn and Bezdek, since we can observe natures of the both methods more deeply by contrasting these two.

Table of contents: Basic Methods for c-Means Clustering.- Variations and Generalizations – I.- Variations and Generalizations – II.- Miscellanea.- Application to Classifier Design.- Fuzzy Clustering and Probabilistic PCA Model.- Local Multivariate Analysis Based on Fuzzy Clustering.- Extended Algorithms for Local Multivariate Analysis.



B. Apolloni, W. Pedrycz, S. Bassis, D. Malchiodi
The Puzzle of Granular Computing.
Springer, 2008. 460 pages. ISBN-978-3-540-79863-7.
Link: <http://www.springer.com/engineering/book/978-3-540-79863-7>

Description: The ultimate goal of this book is to bring the fundamental issues of information granularity, inference tools and problem solving procedures into a coherent, unified, and fully operational framework. The objective is to offer the reader a comprehensive, self-contained, and uniform exposure to the subject. The strategy is to isolate some fundamental bricks of Computational Intelligence in terms of key problems and methods, and discuss their implementation and underlying rationale within a well structured and rigorous conceptual framework as well as carefully related to various application facets. The main assumption is that a deep understanding of the key problems will allow the reader to compose into a meaningful mosaic the puzzle pieces represented by the immense variety of approaches present in the literature and in the computational practice. All in all, the main approach advocated in the monograph consists of a sequence of steps offering solid conceptual fundamentals, presenting a carefully selected collection of design methodologies, discussing a wealth of development guidelines, and exemplifying them with a pertinent, accurately selected illustrative material.

Table of contents: The general framework.- Granule formation around data.- Part I Algorithmic Inference.- Modeling samples.- Inferring from samples.- Part II The development of Fuzzy Sets.- Construction of information granules.- Estimating Fuzzy Sets.- Part III Expanding granula into boolean functions.- The clustering problem.- Suitably representing data.- Part IV Directing populations.- The main paradigms of social computation.- If also ants are able.- Part V Granular constructs.- Granular Constructs.- Identifying fuzzy rules.- A conceptual synthesis.



M. Nikraves, J. Kacprzyk, L. A. Zadeh, (Eds.)
Forging New Frontiers: Fuzzy Pioneers I.
Springer, 2007. 460 pages. ISBN-978-3-540-73181-8.
Link: <http://www.springer.com/engineering/book/978-3-540-73181-8>

Description: The 2005 BISC International Special Event-BISCSE'05 "FORGING THE FRONTIERS" was held in the University of California, Berkeley, "WHERE FUZZY LOGIC BEGAN, from November 3 – 6, 2005. The successful applications of fuzzy logic and its rapid growth suggest that the impact of fuzzy logic will be felt increasingly in coming years. Fuzzy logic is likely to play an especially important role in science and engineering, but eventually its influence may extend much farther. In many ways, fuzzy logic represents a significant paradigm shift in the aims of computing - a shift which reflects the fact that the human mind, unlike present day computers, possesses a remarkable ability to store and process information which is pervasively imprecise, uncertain and lacking in categoricity.

The chapters of the book are evolved from presentations made by selected participants at the meeting and organized in two books. The papers include reports from the different front of soft computing in various industries and address the problems of different fields of research in fuzzy logic, fuzzy set and soft computing. The book provides a collection of forty four (44) articles in two volumes.

Conferences and Calls for Papers

Conference reports

29th Linz Seminar on Fuzzy Set Theory (<http://www.fill.jku.at/research/linz2008/index.html>)

The 29th edition of the Linz Seminar on Fuzzy Set Theory was devoted to "Foundations of Lattice-Valued Mathematics with Applications to Algebra and Topology" and was held in the Bildungszentrum St. Magdalena, Linz, Austria, February 12–16, 2008. The conference was organized by the Johannes Kepler University Linz (Department of Knowledge-Based Mathematical Systems) jointly with the Software Competence Center Hagenberg, Austria, and with the support of EUSFLAT.

The last decade has witnessed a significant development of the categorical, logical, and order-theoretic foundations of lattice-valued mathematics and their impact on algebra and topology. These developments have created or significantly strengthened bridges between lattice-valued mathematics, logic, sheaves, algebraic theories, quantales and order-theoretic structures, various subdisciplines of topology, and theoretical computer science. The purpose of the 29th Seminar was to discuss the synergies between these fields as well as identify important open questions.

The Program Committee was chaired by Stephen E. Rodabaugh (Youngstown, OH) and Lawrence N. Stout (Bloomington, IL), and there were 43 participants from 19 countries, presenting a total of 31 papers. Invited talks were given by Mai Gehrke (Nijmegen), Remigijus Petras Gylis (Vilnius), Steven J. Vickers (Birmingham) and Dexue Zhang (Chengdu).

The 30th edition of the Linz Seminar on Fuzzy Set Theory is scheduled for February 3–7, 2009, again in the Bildungszentrum St. Magdalena, Linz, Austria.

Erich Peter Klement, LINZ 2008 Organizing Committee chair.

9th FSTA Conference (<http://www.math.sk/FSTA>)

The 9th FSTA (Fuzzy Sets: Theory and Applications) conference was held in Liptovský Ján, Slovakia, February 4-8, 2008. This traditional biannual meeting was organized under the auspices of the Faculty of Civil Engineering of the Slovak University of Technology in Bratislava, the Academy of the Armed Forces of General Milan Rastislav Štefánik in Liptovský Mikuláš, the Mathematical Institute of the Slovak Academy of Sciences, and Working Group for Fuzzy Set Theory and Applications by Slovak Mathematical and Physical Association, in co-operation with EUSFLAT. FSTA is a forum for presentation and discussion the latest results, developments and trends in the various areas of fuzzy set theory, but also in several branches of soft computing, in quantum structures, general measures and integrals. The 9th FSTA has welcomed 95 active participants. Symbolically, there were 9 plenary lectures. Up to regular sessions contributions, the special session on copulas (organized by F.Durante, JKU Linz) and the special session on fuzzy connectives (organized by M.Baczynski, University Katowice) have attracted many researchers in the domain. The traditional cultural spirit of the conference was presented by a valuable concert of FSTA participants organized by B.Riečan, UMB Banská Bystrica. For more details on the conference, including the program and files of presented abstracts, see <http://www.math.sk/FSTA>.

The 10th FSTA is planned for the end of January 2010, again in Liptovský Ján.

E.P.Klement, R.Mesiar, O.Nánásiová and S.Saminger-Platz, chairpersons of 9th FSTA.

Upcoming EUSFLAT-Endorsed Events

- **12th International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems (IPMU 2008)**, Málaga, Spain, June 22-27, 2008.
<http://www.gimac.uma.es/ipmu08/>
- **4th International Conference on Soft Methods in Probability and Statistics (SMPS 2008)**, Toulouse, France, September 8-10, 2008.
<http://www.irit.fr/smps08/>
- **8th International Conference on Hybrid Intelligent Systems (HIS 2008)**, Barcelona, Spain, September 10-12, 2008. Deadline: May 31, 2008.
<http://his2008.lsi.upc.edu/index.html>
- **14th Spanish Conference on Fuzzy Logic and Technologies (ESTYLF 2008)**, Mieres, Asturias, September 17-19, 2008.
<http://www.softcomputing.es/estyf08/es/portada.php>
- **First Summer School on Copulas**, Linz, Austria, September 17-19, 2008.
<http://www.fill.jku.at/ssc>
- **8th International FLINS Conference on Computational Intelligence in Decision and Control (FLINS 2008)**, Madrid, Spain, September 21-24, 2008.
<http://www.mat.ucm.es/congresos/flins2008/>
- **3rd International Symposium Advances in Artificial Intelligence and Applications (AAIA'08)**, Wilsa, Poland, October 20-22, 2008. Deadline: June 15, 2008.
<http://www.imcsit.org/?cont=91&type=page&page=72>
- **5th IEEE International Conference on Soft Computing as Transdisciplinary Science and Technology (CSTST 2008)**, Paris, France, October 26-30, 2008. Deadline: June 15, 2008.
<http://sigappfr.acm.org/cstst08/>
- **5th International Conference on Modeling Decisions for Artificial Intelligence (MDAI 2008)**, Sabadell, Catalonia, Spain, October 30-31, 2008.
<http://www.mdai.cat/mdai2008/>

Other Events

- **2008 International Conference on Human System Interaction (HSI 2008)**, Krakow, Poland, May 25-27, 2008.
<http://hsi.wsiz.rzeszow.pl>
- **IEEE World Congress on Computational Intelligence (WCCI 2008)**, Hong Kong, June 1-6, 2008.
<http://www.wcci2008.org/>
- **9th International Conference Artificial Intelligence and Soft Computing (ICAISC 2008)**, Zakopane, Poland, June 22-26, 2008.
<http://icaisc.pcz.pl/>
- **6th International Workshop on Adaptive Multimedia Retrieval (AMR 2008)**, Berlin, Germany, June 26-27, 2008.
<http://www.hhi.fraunhofer.de/amr2008>
- **4th International Conference on Natural Computation (ICNC'08)**, 5th International Conference on Fuzzy Systems and Knowledge Discovery (FSKD'08), Jinan, China, August 25-27, 2008.
<http://www.icnc-fskd2008.sdu.edu.cn>
- **2008 IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT'08)**, Sydney, Australia, December 9-12, 2008. Deadline: July 10, 2008.
<http://datamining.it.uts.edu.au/wi08/html/iat/?index=about>
- **8th IEEE International Conference on Data Mining (ICDM'08)**, Pisa, Italy, December 15-19, 2008. Deadline: July 7, 2008.
<http://icdm08.isti.cnr.it/>

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