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MATHEMATICAL METHODS, COMPUTATIONAL TECHNIQUES, NON-LINEAR SYSTEMS, INTELLIGENT SYSTEMS

Proceedings of the 10th WSEAS International Conference on
MATHEMATICAL METHODS, COMPUTATIONAL TECHNIQUES and
INTELLIGENT SYSTEMS (MAMECTIS '08)
Proceedings of the 7th WSEAS International Conference on
NON-LINEAR ANALYSIS, NON-LINEAR SYSTEMS and CHAOS (NOLASC'08)
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Preface

This book contains the proceedings of the 10th WSEAS International Conference on MATHEMATICAL METHODS, COMPUTATIONAL TECHNIQUES and INTELLIGENT SYSTEMS (MAMECTIS '08), proceedings of the 7th WSEAS International Conference on NON-LINEAR ANALYSIS, NON-LINEAR SYSTEMS and CHAOS (NOLASC'08), and proceedings of the 8th WSEAS International Conference on WAVELET ANALYSIS and MULTIRATE SYSTEMS (WAMUS'08) which were held in Corfu, Greece, October 26-28, 2008. These conferences aim to disseminate the latest research and applications in Circuits, Networks, Automation, Control, Robotics, Instrumentation and Measurement, Non-Linear Systems in Science, Non-Linear Systems in Engineering, Construction of wavelets, Wavelet Transforms and other relevant topics and applications.

The friendliness and openness of the WSEAS conferences, adds to their ability to grow by constantly attracting young researchers. The WSEAS Conferences attract a large number of well-established and leading researchers in various areas of Science and Engineering as you can see from **http://www.wseas.org/reports**. Your feedback encourages the society to go ahead as you can see in **http://www.worldses.org/feedback.htm**

The contents of this Book are also published in the CD-ROM Proceedings of the Conference. Both will be sent to the WSEAS collaborating indices after the conference: **www.worldses.org/indexes**

In addition, papers of this book are permanently available to all the scientific community via the WSEAS E-Library.

Expanded and enhanced versions of papers published in this conference proceedings are also going to be considered for possible publication in one of the WSEAS journals that participate in the major International Scientific Indices (Elsevier, Scopus, EI, ACM, Compendex, INSPEC, CSA .... see: www.worldses.org/indexes) these papers must be of high-quality (break-through work) and a new round of a very strict review will follow. (No additional fee will be required for the publication of the extended version in a journal). WSEAS has also collaboration with several other international publishers and all these excellent papers of this volume could be further improved, could be extended and could be enhanced for possible additional evaluation in one of the editions of these international publishers.

Finally, we cordially thank all the people of WSEAS for their efforts to maintain the high scientific level of conferences, proceedings and journals.

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Plenary Lecture I

Geometrical Approach of Multi-Time Maximum Principle

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University Politehnica of Bucharest
Faculty of Applied Sciences
Department of Mathematics, Splaiul Independentei 313
Bucharest 060042,
ROMANIA

Email: udriste@vectron.mathem.pub.ro,

Abstract: Many science and engineering problems can be formulated as optimization problems that are governed by contact distributions (multi-time Pfaff evolution systems)

and by cost functionals expressed as multiple integrals or curvilinear integrals. Our paper discuss the contact distribution constrained optimization problems, focussing on a geometric approach of multi-time maximum principle. This extends the work of Pontryaguin in the ODEs case to include the case of normal PDEs or, more general, the distribution case.

Section 1 formulates and proves a multi-time maximum principle for the case of multiple integral functionals. Section 2 establishes a version of multi-time maximum principle for the case of curvilinear integral functionals. Though a multiple integral functional is mathematically equivalent to a curvilinear integral functional (Section 3), their meaning is totally different in real life problems. Section 4 deals with a multi-time maximum principle approach of variational calculus in the case of nonintegrability.

Brief Biography of the Speaker:

Important Career Positions: Dean, Director, Chair, Full Professor 1990-, University Politehnica of Bucharest, Department of Mathematics.

Number of PhD Students: 25 in due time and 13 Doctors in Mathematics.

Membership of Associations: AMS, 1987; Tensor Society, 1985; Balkan Society of Geometers, President, 1994;

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Publications: over 40 books; 200 papers; 200 communications.

Honors: D. Hurmuzescu Prize, Romanian Academy, 1985; Award MEI, 1988; Correspondent Member, Academia Peloritana, Messina, 1997; Titular Member, Academy of Romanian Scientists, 2007; Honorary Member, World Scientific and Engineering Academy and Society, 2008-;

Organizer: The International Conference of Differential Geometry and Dynamical Systems, University Politehnica of Bucharest, October 5-7, 2007; 7th WSEAS International Conference on Systems Theory and Scientific Computation (ISTASC'07), Vouliagmeni Beach, Athens, Greece, August 24-26 (2007); European Computing Conference, Vouliagmeni Beach, Athens, Greece, September 24-26, 2007; 12th WSEAS International Conference

on Applied Mathematics, Cairo, Egypt, Dec. 29-31, 2007; 7th WSEAS International Conference on Circuits, Systems, Electronics, Control and Signal Processing, Cairo, Egypt, Dec. 29-31, 2007; Chair-Committee: American Conference on Applied Mathematics (Math'08) and Management, Marketing and Finances (MMF'08), Cambridge, Massachusetts, USA, March 24-26, 2008; International Program Committee: The Applied Computing Conference (ACC-08), Istanbul, Turkey, May 27-30, 2008.

Fields of Interest: Differential Geometry, Optimizations on Riemannian Manifolds, Magnetic Dynamical Systems, Geometric Dynamics.

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Plenary Lecture II

Mathematical Modeling of Forest Fire Initiation

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Abstract: A mathematical model for the description of heat and mass transfer processes at forest fire initiation has been designed. This model is based on an analysis of known experimental data and using concept and methods from reactive media mechanics. Within the framework of this model, the forest and combustion products are considered as a homogeneous two temperatures, reacting, non - deformed medium. Temperatures of condensed (solid) and gaseous phases are separated out. The first includes a dry organic substance, moisture (water in the liquid-drop state), condensed pyrolysis and combustion products (coke, ash) and mineral part of forest fuels. In the gaseous phase we separate out only the components necessary to describe reactions of combustion (oxygen, combustible products of pyrolysis of forest fuels and the rest inert components). The solid phase constituting forest fuels has no intrinsic velocity, and its volumetric fractions, as compared to the gaseous phase, can be neglected in appropriate equations because a volume unit of wood. It is considered that 1) the flow has a developed turbulent nature, molecular transfer being neglected, 2) gaseous phase density doesn't depend on the pressure because of the low velocities of the flow in comparison with the velocity of the sound, 3) forest canopy is supposed to be non-deformed porous medium. The research is done by means of mathematical modeling of physical processes. It is based on numerical solution of Reynolds equations for chemical components and equations of energy conservation for gaseous and condensed (for canopy) phases. To describe the transfer of energy by radiation we use a diffusion approximation. It should be noted that the system of equations describes processes of transfer within the entire region of the forest massif, which includes the space between the underlying surface and the base of the forest canopy, the forest canopy and the space above it, while the appropriate components of the data base are used to calculate the specific properties of the various forest strata and the near-ground layer of atmosphere. This approach substantially simplifies the technology of solving problems of predicting the state of the medium in the fire zone numerically. The boundary-value problem we solve numerically using the method of splitting according to physical processes. In the first stage, the hydrodynamic pattern of flow and distribution of scalar functions was calculated. The system of ordinary differential equations of chemical kinetics obtained as a result of splitting was then integrated. A discrete analog was obtained by means of the control volume method using the SIMPLE like algorithm. The accuracy of the program was checked by the method of inserted analytical solutions. The time step was selected automatically. Fields of temperature, velocity, component mass fractions, and volume fractions of phases were obtained numerically. At the moment of ignition the gas combustible products of pyrolysis burn away, and the concentration of oxygen is rapidly reduced. The temperatures of both phases reach a maximum value at the point of ignition. The ignition processes is of a gas-phase nature—that is, initial heating of solid and gaseous phases occurs and moisture is evaporated. Then the decomposition process into condensed and volatile pyrolysis products starts, the later being ignited in the forest canopy. Note also that the transfer of energy from the fire source takes place due to radiation; the value of radiation heat flux density is small compared to that of the convective heat flux. As a result of heating of forest fuel elements, moisture evaporates, and pyrolysis occurs accompanied by the release of gaseous products, which then ignite. We can note that the isosurfaces of temperature are deformed by the action of wind. In the vicinity of the source of heat and mass release, heated air masses and products of pyrolysis and combustion float up. The wind field in the forest canopy interacts with the gas-jet obstacle that forms from the forest fire source and from the ignited forest canopy. Recirculating flow forms beyond the zone of heat and mass release,

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while on the windward side the movement of the air flowing past the ignition region accelerates. Under the influence of the wind the tilt angle of the flame is increased. As a result this part of the forest canopy, which is shifted in the direction of the wind from the center of the surface forest fire source, is subjected to a more intensive warming up. Mathematical model and the results of the calculation give an opportunity to evaluate critical condition of the forest fire initiation, which allows applying the given model for estimation of preventing forest fires conditions.

Brief Biography of the Speaker:
Surname or Family Name: Perminov
First name: Valeriy
Birth date: October, 22 1958

Degrees:
1995 - Candidate of Science in Fluid mechanics Tomsk State University (this degree is equivalent to a doctorate degree - Ph.D in Fluid Mechanics).
1981 - Diploma as mathematics, Kemerovo State University.

Positions held:
1997 - up to now - Deputy Director and Lecture (Assistant professor), Belovo Branch of Kemerovo State University.
1995-1996 - Assistant Professor of physical mechanics department at the faculty of mechanics and mathematics of the Tomsk State University.
1988-1995 - Senior research worker of physical mechanics department of Tomsk State University.
1984-1987 - A post-graduate student of physical mechanic department of Tomsk State University
1982-1983 - A probability student of physical mechanics department of Tomsk State University.
1981 - An assistant of the department of High mathematics, Kemerovo Technological Institution.
Courses

Tomsk State University:
1. Programming (FORTRAN, PASCAL) - 1994-1996.
2. Numerical methods of mechanics of continuous media - 1995-1996.
3. Mechanics of reacting media and ecology - 1995 – 1996.
4. Forest Fire Physics - 1996.

Belovo Branch of Kemerovo State University:
1. High mathematics – 1996 – up to now.
2. Differential Equations - 1997- 1999
3. Mechanics of continuous media - 1997- 2006.
4. Numerical methods - 1997- up to now
5. Mathematical modeling - 2000-up to now

My scientific interests are connected with the application of the methods of mechanics of reacting medium to the forest fires and ecological problems of environmental pollution. Mainly, it is a problem of creation of mathematical models for description of forest fires. Besides, I apply numerical methods for solution of partial differential equation systems, which are used in these models for description of forest fires. I've compiled some computer programs (I prepared my programs with the FORTRAN language. I have published over 80 papers in different editions. I took part in Russian and international grants. I took part in different all Russian and international conferences devoted to the problems of transfer processes, forest fires and ecology.

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Plenary Lecture III

Nature Inspired Algorithms in Intelligent Systems Modeling

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Abstract: Metaheuristics inspired from nature have gained increasing attention in recent years. They represent a powerful approach to solve NP-difficult problems. There are many examples of adaptive behaviour in natural multi-agent systems. The most known examples are ant colony behaviour and wasp colony behaviour The bio-inspired Ant Colony Optimization model simulates real ant behaviour to find the minimum length path between the ant nest and the food source. The wasp inspires algorithms are based on the model for the selforganization that takes place within a colony of wasps In a colony of wasps, interactions between members of the colony and the local environment result in dynamic distribution of tasks such as foraging and brood care. In addition, a hierarchical social order among the wasps of the colony is formed . .Self-organization, interactions between members of the colony and the local environment, direct and indirect interactions between individuals are very useful in artificial multiagent systems. Computational analogies of natural systems have served as inspiration for multi-agent optimization and control algorithms. Systems composed of several interacting autonomous agents have a big potential to be used in complex problems solving.

The aim of this lecture is to make a survey of ant and wasp based algorithms and models for solving complex optimization problems. Examples of applications of nature inspired algorithms for modeling multiagent systems in various fields are presented and analysed.

Brief Biography of the Speaker: Dana Simian received the diploma. in engineering from the University of Sibiu, Romania, the diploma. in Mathematics - Informatics from the University Babes-Bolyai of Cluj-Napoca, Romania and the Ph.D. in Mathematics from Babes-Bolyai University of Cluj- Napoca, She is Assoc. Prof. to the Department of Computer Science, Faculty of Sciences, University Lucian Blaga of Sibiu, Romania. She has a great experience in algorithms and numerical methods for modelling and optimization. She organized many special sessions within WSEAS conferences and many international workshop on topics related to modeling, approximation and optimization. She was a member of many scientific committees of international conferences. She has published more than 50 papers on a wide variety of subjects relating to multivariate interpolation, optimization, modeling, multiagent systems. She is co-editor of 6 WSEAS book series. She is author of 10 scientific books. She has been included in “Who is Who in the World” in 2006. She participated in many research grants.

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Plenary Lecture IV

Global Optimization Strategies for Improved Bandwidth Management in Wireless Communications

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Chalkis Institute of Technology,
Chalkis,
GREECE

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Abstract: Bandwidth management is one of the fundamental issues in wireless communications. The corresponding allocation schemes can not be static due to the dynamically changing traffic conditions and network performance. Thus, more sophisticated strategies adapted to current network conditions must be investigated and applied. Recently, various approaches have been proposed for channel allocation based on intelligent techniques such as multi-agent technology and genetic algorithms. These approaches constitute heuristic solutions to resource management problem. The goal of this plenary speech is two fold. First, is to present global optimization strategies for bandwidth management, based on computational intelligence techniques. Second, is to illustrate the development and application of a novel global optimization scheme, based on the ant colony optimization approach. Such an approach has not been proposed so far for solving the channel allocation problem in wireless communication systems. A comprehensive heuristic methodology based on global optimization and intelligent techniques like ant colony optimization and multi-agents is herein proposed. Simulation results show network performance improvement of the proposed global optimization strategy based on computational intelligence.

Brief Biography of the Speaker: Dimitrios A. Karras, PhD received his Diploma and M.Sc. Degree in Electrical and Electronic Engineering from the National Technical University of Athens, Greece in 1985 and the Ph. Degree in Electrical Engineering, from the National Technical University of Athens, Greece in 1995, with honours. From 1989-1995 he was with the National Centre of Scientific Research as a collaborating researcher. From 1995-2000 he served as a visiting professor in the University of Ioannina, Dept. Informatics and in the University of Piraeus, Dept. Business Administration. From 2000-2003 he was with the Hellenic Aerospace Industry as technical Manager in Telecommunications projects as well as with the Hellenic Open University, Dept. Informatics as a visiting professor. In addition he was collaborating with the University of Hertfordshire as an external professor. Since 2004, he has been with the Chalkis Institute of Technology, Automation Dept., Greece as full professor in Digital Systems as well as with the Hellenic Open University, Dept. Informatics as a visiting professor. He has published more than 40 research Journal papers in various areas of pattern recognition, image/signal processing and neural networks and more than 120 research papers in International Scientific Conferences. His research interests span the fields of pattern recognition, neural networks and computational/ artificial intelligence, multidimensional digital signal processing, image processing and analysis, communications and security, biomedical engineering as well as parallel and fast algorithms.

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Dr. Karras is Editor in Chief of the journal "International Journal of Signal and Imaging Systems Engineering (IJSISE)", InderScience Publishers, http://www.inderscience.com/browse/ index.php?journalCODE=ijsise He has served as General Chair in the Conference on Artificial Intelligence and Pattern Recognition, AIPR-07, Orlando, Florida, USA, July 9-12, 2007, in the International Conference on Software Engineering Theory and Practice, SETP-07, Orlando, Florida, USA, July 9-12 2007 as well as in the International conference on Automation,

Robotics and Control Systems, ARCS-08, Orlando, Florida, USA, July 7-10 2008. He was Programme Chair in the international conference IWSSIP 2005, September 2005, Chalkis, Greece.

Dr. Karras research efforts have been supported by a research grant in DKFZ- Germany in 1995, he is listed in a number of International Who's Who, he has served as session chair/ international program committee member in many International Scientific Conferences and as a referee in many research journals/conferences. Dr. Karras is a member of IEEE, a member of ACM as well as a member of the Technical Chamber of Greece.

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Plenary Lecture V

Intelligent Systems

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Abstract: Many definitions of intelligence exist, but for our purposes we use the following: intelligence is the ability to reach ones objectives. A system is more intelligent if it reaches its objectives faster and easier. This includes the ability to learn to do this. The intelligence of a system is a property of its mind. The mind is the functioning of its brain. Intelligent System (IS) is a system that learns during its existence. (In other words, it learns, for each situation, which response permits it to reach its objectives.) It continually acts, mentally and externally, and by acting reaches its objectives more often than pure chance would indicate.

This paper approaches the subject of paradigms for the categories of intelligent systems. First we can look at the term paradigm in its scientific meaning and then we make acquaintance with the main categories of intelligent systems (expert systems, intelligent systems based on genetic algorithms, artificial neuronal systems, fuzzy systems, hybrid intelligent systems). We will see that every system has one or more paradigms, but hybrid intelligent systems combine paradigms because they are made of different technologies.

Brief Biography of the Speaker:

Academic Positions:

- Assistant Professor, Department of Mathematics, Informatics and Socio-Human Sciences, Faculty of Economic Sciences, Head of the Information Technology & Communication Department at "George Baritiu" University of Brasov, Romania, where, since 2006, he has held several academic positions.
- He has experience in Information Technology & Communication, Informatics & ECDL, Office Automation, Databases, Radiolocation, and Education.

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Scientific activity:

- He has published a total of 5 books (2 books abroad), has participated in 3 national research projects, has published 41 various papers in conference proceedings or refereed journals (14 papers have been published abroad), has participated with 4 papers at the WSEAS Conferences, has published 2 articles in WSEAS Transactions, and he is a reviewer of WSEAS.

Studies:

- Ph.D. in Automatic Control, "Transilvania" University of Brasov (2006);
- Licensed Officer in Radiolocation, Electrical Engineering, Electro-Mechanics, Electrical Machines and Apparatus, Ministry of Defence (1995); Licensed in Military Sciences, Aviation, Anti-Aircraft Defence and

Naval Faculty, Academy for Higher Military Studies of Bucharest (1993); Radiolocation Officer, Anti-Aircraft Artillery, Missiles and Radiolocation Military School for Active Officers of Brasov (1973);
- Licensed in Electrical Machines and Apparatus, Faculty of Mechanics, "Transilvania" University of Brasov (1981);

Experience:

- Assistant of the Department of Mathematics, Informatics and Socio-Human Sciences, Faculty of Economic Sciences, Director of the Education Planning and Organisation Department, "George Baritiu" University of Brasov (2002 – 2006);
- Commandant, Deputy Commandant for Education, Chief of Education Department, Chief Bureau, Chief of the Combat Training Bureau, Chief lecturer of the Combat Tactics and Applications Department, Lecturer of the Electronics and Radiolocation Department of the Air Force Non-commissioned and Technical Non-commissioned Officer School, "Avram Iancu" Radiolocation Military Institute; Anti-Aircraft Artillery and Missiles and Radiolocation Military School for Active Officers of Brasov; Technical Quality Control Service team leader, National General Inspectorate for Product Quality Control, Bucharest (1975 – 2001);
- Radar station team leader, Air Space Surveillance System of the Romanian Air Force (1973 – 1975).

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Plenary Lecture VI

Outliers in Bilinear Time Series Model

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Coordinator for the Unit Fundamental Engineering Studies
Faculty of Engineering and Built Environment,
Universiti Kebangsaan Malaysia,
43600 UKM, Bangi, Selangor
MALAYSIA

Email: azami@vlsi.eng.ukm.my, azaminelli@gmail.com

Abstract: Ruberti et al. [1972] and Mohler [1973] initiated the idea of bilinear models with applications on control theory. A real in-depth statistical study was started by Granger and Anderson [1978a]. They presented various types of bilinear models and discussed the invertibility and stationarity properties of the models. They also showed that bilinear model performs well compared to linear model when applied to the Wőlfer sunspot data and the IBM daily common stock closing prices as available in Box and Jenkins [1976]. Another interesting feature of bilinear model is the fact that it is merely an extension of the linear ARMA model as well as being a simplified case of nonlinear Volterra series expansions (Weiner [1958]). Most discussion on detection of outliers is for the linear case. As for bilinear model, only Chen [1996] and Zaharim [1996] had explored the area. Chen used the Gibbs sampling method for general bilinear model but only considered one type of outlier only, the additive outlier. On the other hand, Zaharim used the least squares method for simple bilinear model to detect four type of outliers, the additive outlier (AO), innovational outlier (IO), temporary change (TC) and level change (LC). In this article, work by Zaharim [1996] is extended for BL(1,1,1,1). It is shown that the detection procedure performs well in detecting each type of outlier.

Brief Biography of the Speaker: Azami Zaharim worked first 13 years as a lecturer in the Universiti Teknologi MARA (University of MARA Technology - UiTM) before joining the Universiti Kebangsaan Malaysia (National University of Malaysia - UKM) in the year 2003. He is Associate Professor at the Faculty of Engineering and Built Environment UKM, and is currently Coordinator for the Unit Fundamental Engineering Studies. He obtained his BSc(Statistics and Computing) with Honours from North London University, UK in 1988 and PhD (Statistics) in 1996 from University of Newcastle Upon Tyne, UK. He specialize in statistics, public opinion, engineering education and renewable energy resources.

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He has until now published over 80 research papers in Journals and conferences, conducted more than 15 public opinion consultancies and delivered 3 keynotes/invited speeches at national and international meetings. He is currently the head of Renewable Energy Resources and Social Impact Research Group under the Solar Energy Research Institute (SERI). In the year 2007, he headed the Engineering Mathematics Research Group. At the same time, he is currently active involve in outcome based education (OBE) approach at the national level and the chairman of the Engineering Education Research Group since 2005. He is also involved actively in the research for the future of engineering education in Malaysia 2006 under the Ministry of Higher Education of Malaysia.

Special Session I

Advanced Multimedia Annotation Tools and Methods

Aims and Scope

Several billions of multimedia files exist in loosely structured repositories (e.g. the Web) and their number grows rapidly every day. Currently less than 10 % of this information is professionally annotated, while the rest is either incompletely annotated or not annotated at all. As a result in most cases multimedia search engines achieve low precision and recall, while users are not satisfied by the retrieved content. To overcome these problem advanced multimedia annotation tools and methods should be implemented.

The purpose of this session is to bring together researchers and practitioners working in the area of multimedia annotation from various disciplines. It aims at providing an integrated platform to present original methods, tools, and applications of Multimedia Annotation, emphasizing on semantics Therefore, the session serves as a forum enabling experience exchange between academia and industry, as well as between researchers working in different research branches.

Topics
Topics of interest include, but are not limited to the following:

- Multimedia annotation tools
- Hierarchical Video Annotation
- Image Annotation through Machine Learning
- Automatic annotation of broadcast news
- Integrated annotation systems
- Annotation of cultural content
- Automatic annotation through content authentication
- Automatic annotation by event authentication
- Annotation by user interaction
- Annotation by content matching
- Annotation by keyword matching
- Ontologies and Multimedia Annotation

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Brief Biographies of the Organizers:

Dr. Nicolas Tsapatsoulis graduated from the Department of Electrical and Computer Engineering, the National Technical University of Athens in 1994 and received his Ph.D degree in 2000 from the same University. He has worked at the School of Electrical and Computer Eng. of the National Technical University of Athens (2000-2002) as a Research Assistant, being responsible for the project "ORESTEIA" IST-2000-26091, and at the Institute of Communications and Computer Systems, Athens, Greece, being a Class C' Researcher (2002-2003). During the academic period 2003-2004 he was with the Computer Science Dept. of the University of Cyprus being a Visiting Lecturer. The academic period 2004 - 2005 he served as a Visiting Assistant Professor at the same department. Since September 2005 he works as a Technical Manager for the CRPF project OPTOPOIHSH: Development of knowledge-based Visual Attention models for Perceptual Video Coding.

He is a member of the Technical Chambers of Greece and Cyprus and a member of IEEE Signal Processing and Computer societies. He has published fourteen papers in international journals, eight papers in books and more than 52 in proceedings of international conferences. His research has been recognized by the international research community through more than 320 citations.

He served as Technical Program Co-Chair for the VLBV'01 workshop and he is a reviewer of several scientific journals (IEEE Transactions on Multimedia, IEEE Transactions on Neural Networks, IEEE Transactions on Circuits and Systems for Video Technology, IEEE Transactions on Information Technology in Biomedicine, etc). His current research interests lie in the areas of visual-attention based video coding, advanced human computer interaction, machine vision, and image and video processing.

Dr. Anastasis Kounoudes received his Meng in Computer Engineering and Informatics from the University of Patras, Greece, in 1997 and his PhD in Digital Signal Processing from Imperial College in 2000. During the period 2000-2002 he worked as a postdoctoral research associate at the Communications and Digital Signal Processing Group of Imperial College. He also worked with DERA (UK Ministry of Defence) and Qinetiq as researcher and technical consultant. In February 2002 he joined Domain Dynamics Ltd in London as a senior researcher and application engineer. Since January 2004, Dr Kounoudes holds the position of Assistant Professor in the Department of Computer Science & Information Systems at the Philips College. His research interests include speaker verification, speech recognition, image processing for medical applications, underwater and wireless communications and ad-hoc networks. He recently received two grants from the Research Promotion Foundation for research in the area of speech biometric security systems. Dr Kounoudes serves as a reviewer of IEEE signal processing letters and a full member of the IEEE, the IEEE Communication Society and Cyprus Computer Society, and associate member of the City & Guilds, Imperial College (ACGI).

Dr. Klimis Ntalianis is a Senior Researcher at the National Technical University of Athens. He received the B.Sc. and the Ph.D. both from National Technical University of Athens. He is the author of more than 60 scientific papers. He has received scholarships and awards from the Institute of Computer and Communication Systems, the National Scholarships Foundation, the National Technical University of Athens and other Foundations. His research interests lie in the areas of encryption systems, data/information hiding algorithms, advanced human authentication technologies and multimedia analysis.

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Special Session II

Advanced Techniques and Simulations for Defense Applications

Aims and Scope

The purpose of this session is to bring together researchers and practitioners from various disciplines, working in the areas of Defence and Defence applications. It aims to provide an integrated platform to present original methods, tools, techniques and innovative applications on IS&T for Defence and Intelligence. Therefore, the session serves as a forum enabling experience exchange between academia and industry, as well as between researchers working in different research branches.

Topics
Topics of interest include, but are not limited to the following:

- Information Security
- Privacy and Security
- Cryptography
- Cryptanalysis
- Hacking and Cracking
- Risk Analysis
- Threat Assessment/Modeling
- IW and Information Infrastructure Protection
- Biometric in the military applications
- Artificial Intelligence in the military applications
- Database Management
- Data Mining and Data Warehousing
- Knowledge Management
- Military Decision Making
- Military Systems Interoperability
- Digitized Battlefield and C4ISR
- Terrorism and Bioterrorism
- Advanced signal processing for military applications
- Early Warning Systems
- GIS Systems
- Crisis Management Systems
- Pattern Recognition Systems
- Applied information technology for military training

Session Organizers

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Nikolaos G. Bardis received the diploma of Computer Engineering and the PhD degree from National Technical University of Ukraine (Polytechnic Institute of Kiev) in 1995 and 1999 respectively. In 2000 the degrees was recognized as similar of the Hellenic Patra's Polytechnic Institute on Department of Computer Science. He is an Adjunct Professor High Military Educational Institution, Hellenic Army Academy, Hellenic Naval Academy, Hellenic Air force Academy and research scientist at High Military Educational Institution (Hellenic Army Academy, Hellenic Naval Academy, Hellenic Air force Academy), at the National Centre for Scientific Research "Demokritos"- Greece on Applied Technologies Department & Net Media Lab and adjunct an Assistant Professor in the Automation Department at the Technological Education Institute (T.E.I) of Chalkida (Greece). His research interests include cryptography and data security, information theory, artificial intelligence, databases, software engineering and applications in Defence and in the Military Applications. He is a member of the Technical Chamber of Greece, TPC COMSOC - IEEE, WSEAS, and RGCDS.

Nikolaos V. Karadimas was born in Athens, Greece and he received a Bachelor's degree with Honours in Electronic Engineering and a Masters degree in Computer Science from Glasgow Caledonian University, Scotland in 1997 and 1998, respectively. He also holds a Masters degree in Distributed and Multimedia Information Systems (1999) from Heriot-Watt University, Scotland. In 2007 he received a PhD degree from the National Technical University of Athens. Since 2007, he is a post-doctoral researcher at the Multimedia Technology Laboratory within National Technical University of Athens and a lecturer (407/80) at the High Military Educational Institution, Hellenic Army Academy. He is teaching in Technical NCO Academy and in Technological Educational Institute of Piraeus, as well. He is a Chartered Engineer and a member of the Greek Technical Chamber, of the IEEE, of WSEAS and of IET. His research interests are in the fields of Databases, Optimization Techniques, Geographical Information Systems, and Decision Support Systems with emphasis in the Military Applications.

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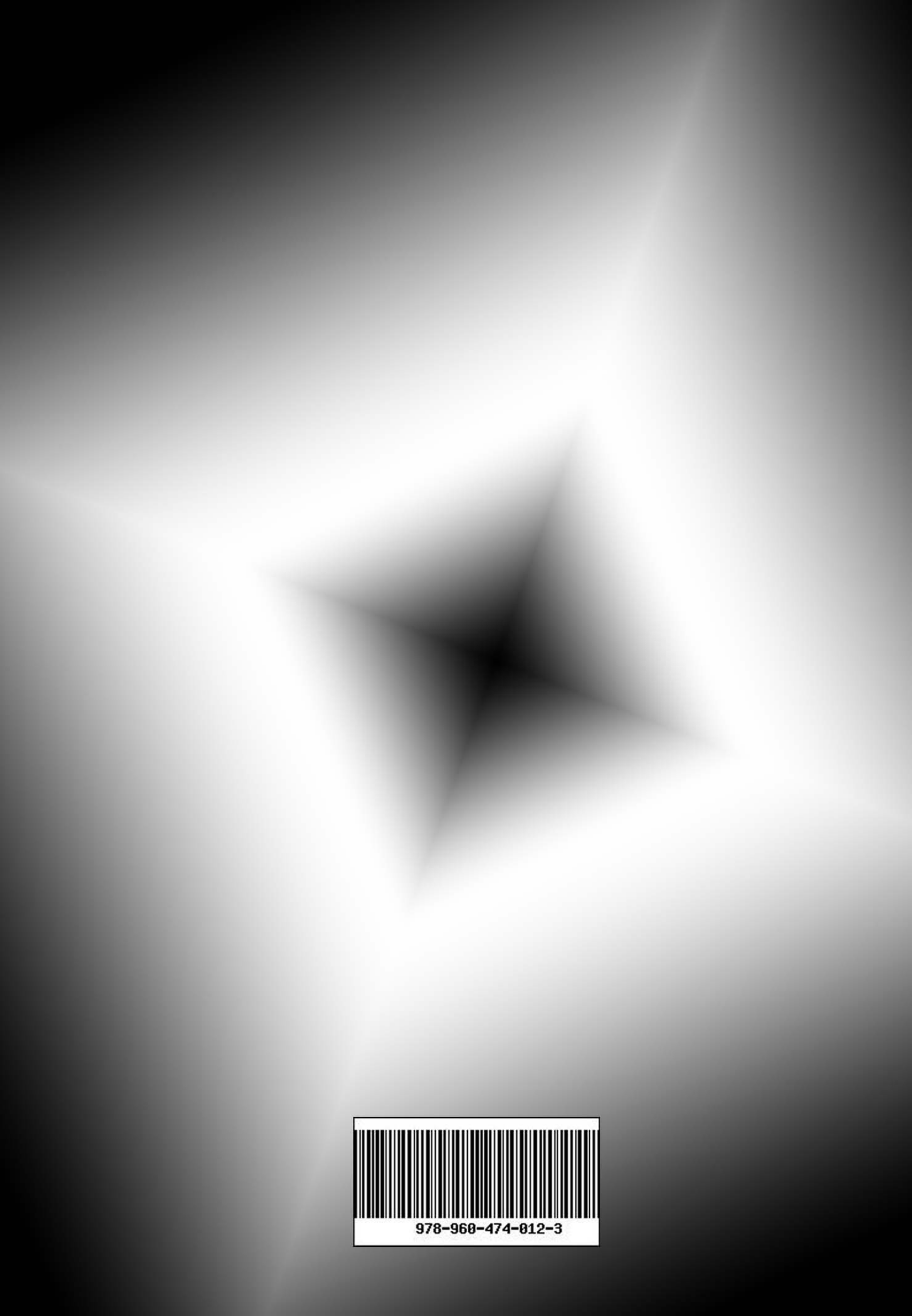

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