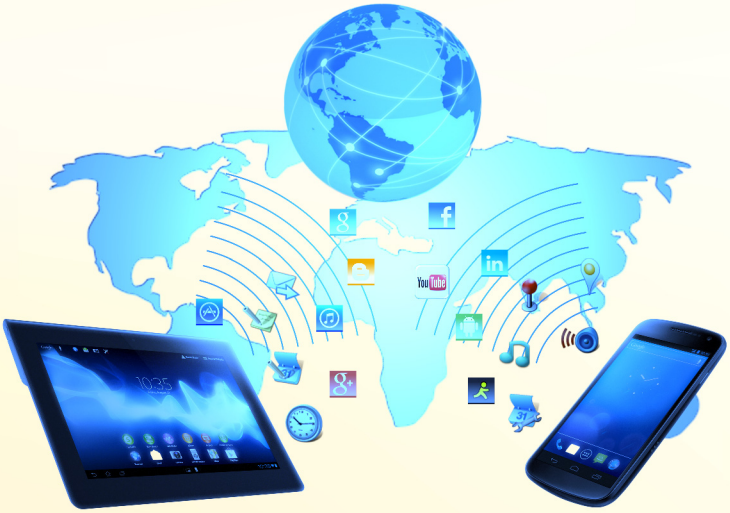
Program and Abstract Book



2014 11th International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE 2014)

September 29-October 3, 2014

Ciudad del Carmen, Campeche
México

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Introduction

Editorial

This year we are celebrating the 11th International Conference, and the seventh edition in which its organization includes the participation of three academic departments at CINVESTAV: Electrical Engineering, Computer Science and Automatic Control. The conference remains as a specialized forum where local research groups can present their recent results and proposals, interact with each other, and have the opportunity to become aware of the recent research and developments from leading institutions abroad, too. Also, the interaction with technological industry managers and government officers, keeps a special place in the activities of the conference.

This year, we received 135 submissions from 17 countries (including Mexico), from which 88 were accepted for oral presentation. We received submissions from countries such as Canada, China, Costa Rica, Cuba, France, Iran, Korea, Japan, Pakistan, Panama, Russian Federation, Tunisia, United States, and Germany among others, reflecting the international character of this conference.

As Presidents of CCE 2014, we wish to thank the Organizing Committee, the anonymous referees and the supporting personnel for their valuable time and efforts which have made possible to hold a successful 2014 11th International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE'2014). We also wish to give special thanks to the authorities of UNACAR (Universidad Autónoma del Carmen), IPN (Instituto Politécnico Nacional) as well as CINVESTAV, the IEEE Electron Devices Society and to our international program committee for all their valuable help and support.

To all our attendees, we give them a warm welcome to Ciudad del Carmen, Campeche, Mexico, wishing them a very fruitful and enriching conference, hoping that all their expectations are fulfilled.

Dr. Carlos A. Coello Coello
Dr. Alexander Poznyak Gorbatch
Dr. Mariano Gamboa Zúñiga
Dr. José Antonio Moreno Cadenas

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General Information

The 11th International Conference on Electrical Engineering, Computing Science and Automatic Control (CCE 2014) is organized by the Departments of Automatic Control, Computer Science, CGSTIC and Electrical Engineering of CINVESTAV and Autonomous University of Carmen (Universidad Autónoma del Carmen-UNACAR)

The CCE conference will take place in Ciudad del Carmen, Campeche , Mexico at the premises of the Universidad Autónoma del Carmen (Autonomous University of Carmen).

The Autonomous University of Carmen was founded in June 1967 as a response to the needs of human resource development in academia, that would promote the development of state of the region.

The C. Rector, Engineer and Lawyer Pedro Calderón Ocampo, formed the Faculty of Engineering in September 1989. In 1991 is created the Computer Engineering career,

The Universidad autónoma del Carmen (UNACAR) (Autonomous University of Carmen) is a University in Mexico. UNACAR was founded on 13 June 1967 in Ciudad del Carmen, Campeche by the governor of Campeche, José Ortíz Ávila.

The University offers 27 graduate programs and 10 postgraduate programs including Business, Administration, Education, Health, Law and Engineering.[1] UNACAR has developed its own educational system named Acalan.

Autonomous University of Carmen	
Universidad Autónoma del Carmen	
Motto	Por la grandeza de México
Motto in English	For the greatness of México
Established	13 June 1967
Type	Public university
Students	2.486 (As of 2000)
Undergraduates	2.166 (As of 2000)
Postgraduates	320 (As of 2000)
Location	Ciudad del Carmen, Mexico
Colors	Blue and Yellow
Mascot	Dolphin
Website	www.unacar.mx

Ciudad del Carmen is a city in the southwest of the Mexican state of Campeche. Ciudad del Carmen is located at 18.63°N 91.83°W on the southwest of Carmen Island, which stands in the Laguna de Términos on the coast of the Gulf of Mexico. The 2005 census population was 154,197 people. In July 2006 Ciudad del Carmen celebrated its 150th anniversary as a city.

The city is nicknamed "The Pearl of the Gulf". Ciudad del Carmen was a small city mostly de-

voted to fishing until the 1970s when oil was discovered in the region; since then it has grown and developed substantially. To this day Carmen is known as one of the best locations to find seafood in Mexico. As late as the early 1980s the city could long be reached only by ferry boats called "pangas"; this changed with the construction of a causeway bridge to the mainland in the 1980s and another one in 1994. The bridge Puente El Zacatal, constructed in 1994, is one of the longest in Latin America.

This border area at the western edge of the Yucatán Peninsula was previously part of the state of Yucatán, then of Tabasco; since 1863 it has been part of the state of Campeche. In 1840 the city had a population of about 7,000.

The city is also the seat of the state of Campeche's Carmen municipality, which includes the city and the surrounding area. The 2005 census population of the municipality of Carmen was 199,988 people, second only to the capital municipality of Campeche.

The main university in Ciudad del Carmen is the Universidad Autónoma del Carmen (UNACAR).

Founded in the pre-Hispanic era, Ciudad del Carmen was an important location which served to connect the Aztec and Mayan civilizations. Between the 16th and 18th centuries when the city of Campeche was a trade hub between Spain and New Spain (Mexico), Ciudad del Carmen was inhabited by pirates and served as a port for repairing ships and planning attacks against the Spanish.

The city got its current name on July 16, 1717, in honor of the Virgin of Carmen, believed to be the protector of the island, when the Spanish forces, commanded by Alonso Felipe de Andrade evicted the pirates from the island and took control the city after a long period of occupation. Since then, every year at the end of July, Ciudad del Carmen turns into the very center of the regional social, cultural and religious festivities, on the fair that celebrates the island's protector virgin.

On the other hand, the Centro de Investigación y de Estudios Avanzados del IPN (CINVESTAV-IPN) was created in 1961 by presidential decree as a public agency with legal personality and its own assets. It is considered one of the best scientific and technological research centers in Mexico and Latin America. The CINVESTAV has twenty-eight research departments that are distributed by the nine campuses throughout Mexico (Guadalajara, Irapuato, Monterrey, Mérida, Querétaro, Saltillo, Tamaulipas, as well as the South campus and Zacatenco campus both located in Mexico City).

The research work at CINVESTAV is carried out in different areas of science and technology: Natural Sciences, Life and Health Sciences, Technology and Engineering Sciences, and Social Sciences and Humanities.

The Departments of Automatic Control, Computer Science, CGSTIC and Electrical Engineering at CINVESTAV offer masters and Ph.D. degrees in their specialties and are focused in basic

and applied research in diverse areas such as those indicated below.

Automatic Control Department

- Mathematic Theory of Automatic Control
- Artificial Vision
- Robotics
- Biomathematics
- Advanced Topics of Modern Mathematics
- Identification and State Estimation of Dynamic Systems
- Control of Technological Processes

Information

http://www.ctrl.cinvestav.mx/

Phone: (+52 55) 5747 3795

Computer Science Department

- Computer graphics and visualization
- Cryptography and computer security
- Soft computing
- Computer architecture
- Software engineering
- Cooperative work
- Distributed and parallel systems
- Operating systems
- Theoretical computer science
- Artificial intelligence

Information

http://www.cs.cinvestav.mx

Phone: (+52 55) 5747 3800 ext: 3758 and 3756,

CGSTIC

The CGSTIC is in charge of the backbone of the CINVESTAV communications network and offers

services such as:

- Supercomputing at the CINVESTAV cluster
- Web development and maintanance
- Intranet and Internet operation
- PBX administration

Information

http://cgstic.cinvestav.mx

Phone: (+52 55) 5747-3800 ext. 3712

Electrical Engineering Department

- Biomedical engineering
- Communications systems
- Mechatronics
- Solid-state materials, electron devices and integrated circuits
- Nanotechnology

Information

http://www.ie.cinvestav.mx

Phone: (+52 55) 5747-3800 ext. 6505

Schedule

Monday September 29, 2014			
TUTORIAL COURSES TUT1: Vehículos aéreos autónomos, Dr. Hugo Rodríguez Cortés TUT2: eGovFrame, Lic. Jano López Rodríguez UNACAR-Edificio del Centro de Vinculación Universitaria			
Hour (TUT1)	Main Auditorium (TUT1)	Hour (TUT2)	Main Auditorium (TUT2)
8:00-9:00	Registration	8:00-9:00 or 14:30-15:30	Registration
9:00-11:00	TUT1	15:30-17:30	TUT2
11:00-11:30	Coffee	17:30-18:00	Coffee
11:30-13:30	TUT1	18:00-20:00	TUT2
13:30-15:30	Lunch		Lunch

Tuesday September 30, 2014			
TUTORIAL COURSES TUT3: Robots Humanoides, Dr. Juan Manuel Ibarra Zannatha TUT4: Introducción a GNU/Linux y Python, Dr. Luis Gerardo de la Fraga UNACAR-Edificio del Centro de Vinculación Universitaria			
Hour (TUT3)	Main Auditorium (TUT3)	Hour (TUT4)	Main Auditorium (TUT4)
8:00-9:00	Registration	8:00-9:00 or 15:00-15:30	Registration
9:00-11:00	TUT3	15:30-17:30	TUT4
11:00-11:30	Coffee	17:30-18:00	Coffee
11:30-13:30	TUT3	18:00-20:00	TUT4
13:30-15:30	Lunch		Lunch

Schedule CCE CONFERENCE

Wednesday October 1st, 2014					
UNACAR-Edificio del Centro de Vinculación Universitaria					
Hour	Room 1	Room 2	Room 3	Room 4	Main Auditorium
8:00-9:00	Registration				
9:00-10:00	AC1	AC4	MEC1	SSM1	SESSION
10:00-11:00					Opening Ceremony and Plenary Prof. Nejat Olgac (PLE1 -AC)
11:00-11:30	Coffee break				
11:30-12:30					Plenary Prof. Vadim I. Utkin (PLE2-AC)
12:30-13:50	AC2	AC5	MEC2	SSM2	
13:50-15:30	Lunch				
15:30-16:30	AC3	AC6		SSM3	
16:30-17:30					Plenary Prof. Ali Boukabache (PLE3-CGSTIC)
17:30-18:00	Coffee break				
18:00-20:00	Welcome event				

Thursday October 2nd, 2014					
UNACAR-Edificio del Centro de Vinculación Universitaria					
Hour	Room 1	Room 2	Room 3	Room 4	Main Auditorium
8:00-9:00	Registration				
9:00-10:00	BIO1	COM1	CS1	SSM4	SESSION
10:00-11:00					Plenary Prof. Matthias Pätzold (PLE4-COM)
11:00-11:30	Coffee break				
11:30-12:30	BIO2	COM2	CS2	SSM5	
12:30-13:30					Plenary Prof. Christian Patrice Marchal (PLE5-BIO)
13:30-15:00	Lunch				
15:00-17:00	BIO3-BIO4		CS3		

Friday October 3rd, 2014					
UNACAR- Edificio del Centro de Vinculación Universitaria					
Hour	Room 1	Room 2	Room 3	Room 4	Main Auditorium
8:00-9:00	Registration				
9:00-10:00	NANO1	CS4	CS6		SESSION
10:00-11:00					Plenary Prof. Jian-Qiao Sun (PLE6-CS)
11:00-11:30	Coffee break				
11:30-12:50	NANO2/ SSM6	CS5	CS7-CS8		
13:00-14:00	Closing ceremony, closing cocktail				

CODE	SESSIONS
PLE	Plenary
AC	**AUTOMATIC CONTROL**
AC1	Time-delay Systems
AC2	Robotic Systems
AC3	State Estimation
AC4	Identification and Modelling
AC5	Intelligent Systems
AC6	Automatic Control
BIO	**BIOMEDICAL ENGINEERING**
BIO1	Biomedical Engineering
BIO2	Biomedical Engineering
BIO3	Biomedical Engineering
BIO4	Biomedical Engineering
COM	**COMMUNICATIONS SYSTEMS**
COM1	Communications Systems
COM2	Communications Systems
CS	**COMPUTER SCIENCE AND COMPUTER ENGINEERING**
CS1	Computer Science and Computer Engineering
CS2	Computer Science and Computer Engineering
CS3	Computer Science and Computer Engineering
CS4	Computer Science and Computer Engineering
CS5	Computer Science and Computer Engineering
CS6	Computer Science and Computer Engineering
CS7	Computer Science and Computer Engineering
CS8	Computer Science and Computer Engineering
SSM	**SOLID-STATE MATERIALS, ELECTRON DEVICES AND INTEGRATED CIRCUITS**
SSM1	Solid-state materials, Electron Devices and Integrated Circuits
SSM2	Solid-state materials, Electron Devices and Integrated Circuits
SSM3	Solid-state materials, Electron Devices and Integrated Circuits
SSM4	Solid-state materials, Electron Devices and Integrated Circuits
SSM5	Solid-state materials, Electron Devices and Integrated Circuits
SSM6	Solid-state materials, Electron Devices and Integrated Circuits
MEC	**MECHATRONICS**
MEC1	Mechatronics
MEC2	Mechatronics
NANO	**NANOTECHNOLOGY**
NANO1	Nanotechnology
NANO2	Nanotechnology

Plenaries

PLE1-AC: Prof. Nejat Olgac
Plenary Talk: **Novel Perspectives on Stability of Time-Delayed Systems (TDS) and Practical Implications**
University of Connecticut
Mechanical Engineering Department
United States of America (USA)
October 1st, 2014
10:00 hrs

PLE2-AC: Prof. Vadim I. Utkin
Plenary Talk: **Impact of mathematical theory of discontinuous systems by A.F.Filippov on sliding mode control methodology**
Ohio State University
United State of America (USA)
October 1st, 2014
11:30 hrs

PLE3-CGSTIC: Prof. Ali Boukabache
Plenary Talk: **Microfluidic-based MEMS: from concept to biochips. A review of emerging technologies and some applications**
CNRS, LAAS
Univ. de Toulouse, Toulouse
France
October 1st, 2014
16:30 hrs

PLE4-COM: Prof. Matthias Pätzold
Plenary Talk: **Advanced Techniques for Modelling and Simulation of Mobile-to-Mobile MIMO Channels**
University of Agder
Faculty of Engineering and Science
Mobile Communications group
Kingdom of Norway
October 2nd , 2014
10:00 hrs

PLE5-BIO: Prof. Christian Patrice Marchal
Plenary Talk: **Technological challenges for inducing hyperthermia to treat cancers**
Responsable du service de radiothérapie dU CHUD SUD réunion à saint pierre
France
October 2nd , 2014
12:30 hrs

PLE6-CS: Prof. Jian-Qiao Sun
Plenary Talk: **A Genetic Algorithm and Cell Mapping Hybrid Method for Multi-objective Optimization Problems**
Editor-in-Chief, IJDC
Director UCMERI
Professor School of Engineering
University of California, Merced
California, USA.
October 3rd , 2014
10:00 hrs

Program

Keynote Speakers

Prof. Nejat Olgac

University of Connecticut
Mechanical Engineering Department
United States of America (USA)
ALARM: Advanced Laboratory for Automation, Robotics and Manufacturing

Plenary Talk: Novel Perspectives on Stability of Time-Delayed Systems (TDS) and Practical Implications

Date: October 1st, 2014
10:00 hrs.

Abstract

TDS are infinite dimensional systems. As such, they offer mathematically very challenging stability and control problems, which kept many system specialists occupied in the past 6+ decades. This talk covers an umbrella paradigm called the 'Cluster Treatment of Characteristic Roots (CTCR)'. It is, in fact, equivalent to Routh-Hurwitz criterion with a crucial exception that it is for infinite-dimensional structures. CTCR starts with some earlier-unrecognized features of the LTI-Time Delay Systems, and proposes a unique resolution to the stability assessment of TDS via a substantially different perspective than the competing methodologies. It results in a paradoxical finding that states the stability of systems may be improved by artificially increasing the existing delays. Most importantly this new paradigm declares these stability pockets non-conservatively and exhaustively.This capability leads to a new stabilizing control concept which the speaker named "the Delay Scheduling". There is another non-trivial extension of this paradigm which is called the "Sign Inverting Control". It provides some interesting robustness properties of feedback control systems against delay variations.

End product of this treatment has broad practical implications:

- Delayed Resonator© actively-tuned vibration absorber (see the CNN strip at the above URL).
- Real time control using Delay Scheduling concept,
- Optimized metal machining free from regenerative chatter,
- Design and control of combustors without Thermo-acoustic Instability (TAI)

Biography

Nejat Olgac, Dr. Eng. Sci. Columbia Univ. 1976, M.Sc. Technical Univ. of Istanbul, Turkey 1972 (summa-cum-laude), both in Mechanical Engineering. He is a professor with the Mechanical Engineering Department of the University of Connecticut since 1981. His research interests are in robust nonlinear controls, active vibration absorption, time-delayed systems, micromanipulation in bio-engineering. Dr. Olgac holds three patents on the Delayed Resonator active vibration suppression technique (1995-1996-1999) and a fourth one on anti-chatter concepts in simultaneous machining (2011). He is the director of Advanced Laboratory for Robotics,

Automation and Manufacturing (ALARM) at UConn. Dr. Olgac was Visiting Professor at INRIA (Sophia Antipolis, France) 1988-89, SEW Eurodrive Fellow - Guest Professor at Technical Univ. of Munich, Germany in 1995-96 and Visiting Professor at Harvard University 2002-03). He was on the editorial board of the ASME Trans. of Dynamic Systems, Measurement and Control (1996-2004), and the guest editor of the Special Issue of JDSMC on Time Delayed Systems (June, 2003), is presently on the Editorial Boards of J. Vibration and Control, Int. J. of Mechatronics and Manufacturing Systems. He was a member and the Chairman of the Executive Committee of the ASME Dynamic Systems and Control Division (2001-6). He is the General Chair of IFAC Time Delay Systems Workshop (TDS) 2012, and General Chairman of ASME Dynamic Systems and Controls Conference, DSCC2013. He is a member of the ASME Systems and Design Group Operating Board, he also sits on the A2C2 (American Automatic Control Council) Operating Board. Prof. Olgac is a member of the Connecticut Academy of Science and Engineering (CASE), Fellow of ASME and Senior Member of IEEE.

Prof. Vadim I. Utkin

Ohio State University
United State of America (USA)

Plenary Talk: Impact of mathematical theory of discontinuous systems by A.F.Filippov on sliding mode control methodology

Date: October 1st, 2014
11:30 hrs

Abstract

Sliding mode control implies designing control components as discontinuous state functions. As a result state trajectories can belong to one or intersections of several discontinuity surfaces in the state space. These motions are referred to as sliding mode. The fundamental question arising at the stages of analysis and synthesis of control systems is what are differential equations governing sliding mode. Ambiguity of right-hand sides of the motion equations in discontinuity surfaces gave birth to different ways of solution continuation and rather hot discussions on which one is correct. The method developed by Professor Filippov explained the reasons of such kind of uncertainty and let control engineers demonstrate a set of advantageous properties of the systems with sliding modes. The above issues, events and people constitute the scope of the presentation.

Biography

Prof V. Utkin graduated from Moscow Power Institute (Dipl. Eng.) and received a Ph.D. from the Institute of Control Sciences (Moscow, Russia). He was with the Institute of Control Sciences since 1960, and was Head of the Discontinuous Control Systems Laboratory from 1973 to 1994. He was Ford Chair of Electromechanical Systems from 1994 to 2002 at the Ohio State University.

Prof. Utkin is one of the originators of the concepts of Variable Structure Systems and Sliding Mode Control. He is an author of five books and more than 300 technical papers. In 1975-1978 he was in charge of an international project between his Institute and "Energoinvest", Sarajevo, on the sliding mode control of induction motors. He has worked on the control of D.C., induction, and synchronous drives using sliding mode techniques in metal-cutting machine tools, process control and electric cars. His current research interests are the control of infinite-dimensional plants (including flexible manipulators), sliding modes in discrete time systems, microprocessor implementation of sliding mode control, control of electric drives, alternators and power converters, robotics and motion control.

He is an Honorary Doctor of the University of Sarajevo (Yugoslavia, 1978) and University Rovira i Virgili (Spain, 2011), IEEE Fellow. In 1972 he was awarded the Lenin Prize (the highest scientific award in the former USSR), Oldenburger medal of ASME (2003), Humboldt Award (Germany, 2005), elected as aForeign member of Science and Art Academy of Bosnia and Herzegovina (2008).

Prof. Utkin was IPC chairman of 1990 IFAC Congress in Tallinn; now he is Associate Editor of "International Journal of Control".

Currently Prof. Utkin teaches courses on control principles for undergraduates (Principles of Automatic Control), and courses in Optimal control, State Methods for Dynamic Systems Analysis and Control and Sliding mode control in electromechanical systems at the graduate level.

Prof. Utkin has held visiting positions at universities in the USA, UK, Japan, Italy, Spain and Germany. He holds appointments in the Control Research Laboratory of the Department of Electrical Engineering and in the Department of Mechanical Engineering, where he teaches in the System Dynamics, Measurements and Controls program.

Prof. Ali Boukabache

CNRS, LAAS
Univ. de Toulouse, Toulouse
France
Web: http://www.laas.fr/1-31281-Annuaire-du-LAAS.php?id=102

Plenary Talk: Microfluidic-based MEMS : from concept to biochips. A review of emerging technologies and some applications

Date: October 1st, 2014
16:30 hrs

Abstract

The bio-microsystems, and particularly biochips, constitute a very large field of Research/Development and represent a major key non only to explore the basic mechanisms of life sciences, but also by some specific applications; they cover a very large panel of micro-nano- devices for biology/biochemistry/environment et can serve to analysis, diagnostics, therapy , drug development, health monitoring, water treatment,…at very reduced scales. When their development is compatible with microelectronics techniques, it insures advantages in terms of parallelism/ treatment of (electrical) signals, speed, accuracy, reliability, etc …, and at last but not least, low cost , low invasiveness, availability of the micro device.

Microfluidics, since 1990, plays the first role in this evolution; we shall present a large overview of its principal characteristics/principles/interest, but also methods and materials allowing obtaining biochips.

The second part of the presentation will be focused on one hand on fluids analysis, particularly water, and on other hand, the detection of foodstuffs toxicity. For one as for the other, we will develop the concept / design of the bioMEMS and also the technological approach used to their fabrication and finally their characterizations and practical tests.

Additionally other areas, who are not directly concerned by biological applications, will be presented in order to give an idea of the potentialities of the association of microfluidics and some classical domains of electrical engineering.

Biography

Prof. Ali Boukabache is engineer graduated from ENP (Algiers), DEA (Toulouse) and finally received a PhD diploma from University of Toulouse (1983). He has been teacher/researcher successively at University of Constantine (Algerie) until 2001 and, after a short passage in industry, he has integrated, since 2004 at Toulouse (France), the Electrical Engineering Department of Paul-Sabatier University for teaching activities, and LAAS-CNRS to conduct researches in the field of MEMS.

Currently, A.Boukabache teaches , for undergraduates, microelectronic and electrical courses; he has introduced, for some years, at post-graduate levels, different courses on MEMS, and , more specifically the microfluidic specialty.

For research activities, since 2005, he has focused on microfluidic technology and its applica-

tions both in telecommunications systems and biology/environment. By the past, he has conducted researches respectively on MOS transistors and their use as radiation sensors, pressure sensors and also in the telecommunication components. Presently, A.Boukabache drives a national project dedicated to the analysis of rejected water, particularly towards the organic pollutants and their toxicity. The microsystem developed constitute the basis for different microfluidic applications.

Prof. Matthias Uwe Pätzold

University of Agder
Faculty of Engineering and Science
Mobile Communications group
Kingdom of Norway

Plenary Talk: "Advanced Techniques for Modelling and Simulation of Mobile-to-Mobile MIMO Channels"

Date: October 2nd, 2014
10:00 hrs

Abstract

The modelling of realistic mobile radio channels has been of interest from the earliest beginnings of mobile communications up to the present time. This interest is driven by the fact that channel models are indispensable for the performance evaluation, parameter optimisation, and test of mobile communication systems. From digital modulation techniques over channel coding to network aspects, nearly all relevant components of a mobile radio system are determined by the propagation characteristics of the channel. A profound knowledge of channel modelling and simulation techniques is therefore of great importance for researchers and telecommunication engineers who are involved in the development of mobile communication systems.

This presentation on the modelling and simulation of mobile radio channels is divided in two parts —a basic and an advanced part— to accommodate different experience levels. The objective of the first part is to familiarize the audience with the background and basic principles of mobile radio channel modelling. Another objective is to provide an overview on commonly used design methodologies enabling the development of channel models for present and future mobile communication systems. All presented channel models are based on a superposition of a finite number of complex sinusoids (plane waves). However, the design methodologies differ in the way of computing the model parameters determining the statistical behaviour of the channel model. It will be illustrated that the proposed channel models are widely flexible, which enables an excellent fitting of their principal statistical properties against measurement data of real-world channels or against the statistics of specified reference channel models.

The second part moves gradually to more advanced modelling and simulation techniques. Special interest will be devoted to an overview of cutting-edge research in the area of mobile-to-mobile MIMO channels, vehicle-to-vehicle MIMO channels, and mobile channels for relay-based cooperative networks. In addition, techniques will be presented enabling the design of measurement-based mobile-to-mobile radio channel models. The main statistical properties of the presented channel models will be discussed. Emphasis will be placed on the distribution of the received envelope and the correlation properties of the channels in all three dimensions — space, time, and frequency. The obtained results show that the statistical properties of the channel models required for future mobile-to-mobile communication systems are quite different from the statistical properties of the channel models used in present mobile communication systems. The presentation closes with an overview of open research questions in the area.

Biography

Matthias Pätzold was born in Engelsbach, Germany, in 1958. He received the Dipl.-Ing. and Dr.-Ing. degrees from Ruhr-University Bochum, Bochum, Germany, in 1985 and 1989, respectively, all in Electrical Engineering. In 1998, he received the habil. degree in Communications Engineering from the Technical University of Hamburg-Harburg, Hamburg, Germany. From 1990 to 1992, he was with ANT Nachrichtentechnik GmbH, Backnang, Germany, where he was engaged in digital satellite communications. From 1992 to 2001, he was with the Department of Digital Networks at the Technical University Hamburg-Harburg. In 2001, he joined the University of Agder, Grimstad, Norway, where he is a full professor for Mobile Communications and the Head of the Mobile Communications Group.

He authored and co-authored more than 260 technical journal and conference papers. His publications received eleven best paper awards. He is author of the books "Mobile Radio Channels - Modelling, Analysis, and Simulation" (in German) (Wiesbaden, Germany: Vieweg, 1999), "Mobile Fading Channels" (Chichester, U.K.: Wiley & Sons, 2002), and "Mobile Radio Channels" (Chichester, U.K.: Wiley & Sons, 2011).

Prof. Pätzold has been the TPC Chair of ISWCS'07, ATC'12, ATC'11, ATC'10, ICCE'10, and the PHY Track Co-Chair of PIMRC'13. He has been actively participating in numerous reputed international conferences serving as TPC member, keynote speaker, tutorial lecturer, and session chair.

He is an Associate Editor of the IEEE Vehicular Technology Magazine. He edited several special issues, including the special issue on the "Wireless Future" (Springer, 2009), the special issue on "Trends in Mobile Radio Channels: Modeling, Analysis, and Simulation" (IEEE Vehicular Technology Magazine, 2011), and the special issue on "Modeling and Simulation of Mobile Radio Channels" (Hindawi Publishing Corporation). He is a Senior Member of the IEEE. His current research interests include mobile radio communications, especially multipath fading channel modelling, multiple-input multiple-output (MIMO) systems, vehicular-to-vehicular communications, mobile-to-mobile communications, cooperative communication systems, and underwater acoustic communications.

Dr. Christian Patrice Marchal, MD, PhD

Head of the radiation department.
University hospital of Saint Pierre of La Réunion
France

Plenary Talk: Technological challenges for inducing hyperthermia to treat cancers

Date: October 2nd, 2014
12:30 hrs

Abstract

Moderate Hyperthermia between 42 to 45°Celsius is now recognized as a tool for treating cancer in combination with radiation or chemotherapeutics agents. Inducing heat in every part of the human body and controlling temperature in the same time are still the challenges of this century. Many technological inventions developed in the last century are now used for ablathermia. These treatments do not need temperature control and the aim is only burns selected metastatic tumors which are small and well localized for limited clinical indications. The target of moderate hyperthermia is quite different because especially developed for treating every kind of primary tumors like sarcomas, cervix carcinomas, rectal tumors… Even though some recent technologies concentrating electromagnetic fields by multiple dipoles placed around the patients are clinically used, their clinical potential is limited by the electric properties of the treated tissues and by the blood flow. Continuous 3D measuring controlling temperature in vivo remains a great challenge. Therefore like for radiation therapy, realistic treatment planning systems have been developed but still remains tools for research.

The aims of this talk is to open new reflections for the future of moderate hyperthermia by using the technological, clinical and biological experience acquired during the last decades.

Biography

Born in Nancy (France) in 1952 , he began his medical studies in 1971 and engineering studies at the University of Nancy. From 1977 he started his researches in the department of Nuclear medicine of the University hospital, working on ultrasound induced hyperthermia. He contributes to the development of several prototypes for focusing ultrasound and measuring temperature using variations of ultrasound velocity with temperature in phantoms and in animal tissues. He was one of the clinical pioneers in France who applied hyperthermia in clinics for cancer treatment and he published his first clinical experience in 1981 (Bull of cancer). He was a graduate MD in 1979 and engineer in electronics of the Nancy University in 1983. Continuing his works on hyperthermia and radiobiology, he studied oncologic radiotherapy and showed that hyperthermia can potentiate the effects of radiation.

He became graduate medical radiation Oncologist in 1982. He took the head of the hyperthermia and radiobiology unit of the comprehensive cancer center Alexis Vautrin until 2005. He contributed to the development of several prototypes: like HPRL 434 apparatus for superficial heating, HELIOS 27 in collaboration with ODAM-BRUKER company which was a new techno-

logy for interstitial heating with radiation monopoles operating at 27 Mhz.

He developed a deep heating system named HPHRL 27 using one and then 2 large wave guides operating at 27 MHz with SAIREM Company of Lyon, with a project partially funded by an INSERM. With this work he graduated with a PhD in Biophysics in 1989 from the university of Marseille (France).

He became a researcher associated at the National research center for science (CNRS) from 1995 to 2005 , and took the head of the department of radiotherapy from 1994 to 2004 . He was co-manager of the European project of on hyperthermia and cancer in the nineties. He writes nearly 150 publications and several chapters in different books.

He is now the head of the radiation department of the university hospital of Saint Pierre of La Réunion.

Prof. Jian-Qiao Sun

Editor-in-Chief, IJDC, Director UCMERI
Professor, School of Engineering, University of California, Merced, California, USA.
Web: http://faculty.ucmerced.edu/jqsun

Plenary Talk: A Genetic Algorithm and Cell Mapping Hybrid Method for Multi-objective Optimization Problems

Date: October 3rd, 2014
10:00 hrs

Abstract

In this paper, a hybrid multi-objective optimization (MOP) algorithm based on the genetic algorithm (GA) and the simple cell mapping (SCM) is proposed. The GA converges quickly toward a solution neighborhood but it takes a considerable amount of time to find the global solution. The SCM can find the global solution because it sweeps the whole space of interest, but the computational effort grows exponentially with the dimension. In this work, GA is used to initially find a rough solution for the MOP. Then, SCM takes over to find the nondominated solutions in each region returned by GA. It should be indicated that one point is enough for SCM to recover the rest of the solution in each zone. For comparison purpose, the hybrid algorithm, GA and SCM methods are utilized to solve some of benchmarking problems. With the Hausdorff distance as a performance metric, the results show that the hybrid approach outperforms other methods, although it does not guarantee finding the global solution.

Biography

- Ph.D. and M.S. in Mechanical Engineering, University of California at Berkeley. Fields of Study: Solid Mechanics, Dynamics and Applied Mathematics.
- B.S. in Solid Mechanics. Huazhong University of Science and Technology (Wuhan, China)
- Director, UC Merced Energy Research Institute, University of California, Merced, California.
- Professor, School of Engineering, University of California, Merced, California.
- Founder and President, Advanced Mechanical Systems Technology, LLC, Newark, Delaware. Precision instrument for chemical and biological defense, industrial automation.
- Professor, Department of Mechanical Engineering, University of Delaware, Newark, Delaware.
- Registered Professional Engineer, State of Delaware.
- Senior Engineering Specialist, Controllable Materials Systems, Thomas Lord Research Center, Lord Corporation, Cary, North Carolina.
- Editor-in-Chief, International Journal of Dynamics and Control, Springer, Berlin, Germany.
- Member, Board of Series Editors, Book series on "Springer Tracts in Mechanical Engineering", Springer, Berlin, Germany.
- Editorial Board Member, Book series on "Advances in Materials and Mechanics", Higher Education Press of China.

- Editorial Board Member, Journal of Sound and Vibration, Elsevier Science, Ltd., Oxford, U.K.
- Editorial Board Member, Journal of Vibration and Control, SAGE Publications Ltd, London, U.K.
- Research Interests: Stochastic systems, nonlinear dynamics, controls, cell mapping methods and multi-objective optimization.

Tutorials

Tutorial 1: Vehículos aéreos autónomos

Date: Monday, September 29, 2014

Tutorial speaker: Dr. Hugo Rodríguez Cortés
Doctor of Science (2002) from the University of Paris XI, France
Professor and researcher of CINVESTAV-IPN
Electrical Engineering Department, Mechatronics Section
Mexico

Objetivo

Proporcionar las herramientas fundamentales para el modelado de vehículos que se desplazan como resultado de fuerzas de origen aerodinámico. Proporcionar las herramientas de control lineal para el control de esta clase de vehículos.

1. Cinemática y dinámica de un cuerpo rígido
1.1. Cinemática de un cuerpo rígido
1.2. Representación de la orientación de un cuerpo rígido
1.2.1. Ángulos de Euler
1.2.2. Cuaternos
1.2.3. Matriz de rotación
1.2.4. Fenómeno de desenrollo
1.3. Dinámica de un cuerpo rígido
1.4. Navegación terrestre y geodésica

2. Modelado de un vehículo aéreo
2.1. Aerodinámica básica
2.2. Fuerzas y momentos que actúan sobre los vehículos aéreos
2.3. Análisis estático
2.4. Modelo no lineal de diferentes vehículos aéreos
2.4.1. Aeronave de ala fija
2.4.2. Helicóptero
2.4.3. Helicópteros multi rotor
2.5. Puntos de equilibrio
2.6. Modelos lineales y las derivadas de estabilidad

3. Dinámica de un vehículo aéreo y control clásico
3.1. Modos de un vehículo aéreo como cuerpo rígido
3.2. Cualidades de vuelo
3.3. Conceptos básicos de control clásico
3.3.1. Estabilidad
3.3.2. Controlabilidad y estabilizabilidad
3.3.3. Observabilidad y el principio de separación
3.3.4. Control multi variable
3.4. Esquemas básicos de control
3.4.1. Aumento de estabilidad

3.4.2. Pilotos automáticos
3.4.3. Programación de ganancias

Bibliografía

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Tutorial 2: eGovFrame a complete platform

Date: Monday, September 29, 2014

Tutorial speaker: Lic. Jano López Rodríguez

Introduction

eGovFrame facilitates the development of applications based on open standards, resulting in improved software quality, more efficient development and greater reuse of software modules. In order to have better systems and not to depend on IT vendor's frameworks, there is a robust alternative solution, based in open source software. In this tutorial we will show the most important aspects of the eGovFrame, in order that the assistants may understand why it's a very useful tool to make eGovernment Systems. Also in the tutorial we can work in an example of how the eGovermente applications can be made.

The main benefits of the eGovFrame are:

For the Goverment:

- They get administration and full control over new developments
- Promotes the standardization
- Improve the interoperability between systems
- Increases the quality
- Reduces the cost and the time for development

For the Smal and Medium Size Enterprises (SME's):

- Remove vendor dependence

- Enhance competitiveness
- Reuse common functionalities
- UP-to-date ITC trends

Program

Session 1: (4 hr)

- Introduction to eGovFrame
- Technical aspects of eGovFrame (the 4 enviroments)
- Cases of Use

Session 2: (4 hr)

- Introduction to mobile eGovFrame (the 4 enviroments)
- Cases of Use

Tutorial 3: Modelado y Control de Robots Humanoides

Date: Tuesday, September 30, 2014

Tutorial speaker: Dr. Juan Manuel Ibarra Zannatha
Doctor of Engineering (1982); Institute de Recherche en Informatique et Systèmes Aléatoires, France
Professor and researcher of CINVESTAV-IPN
Automatic Control Department
Mexico

Introducción

Desde su aparición, hace ya más de medio siglo, los brazos robóticos han venido dominando una gama de operaciones industriales cada vez más grande. Además, la Robótica ha experimentado una expansión muy rápida en todos los entornos de nuestras vidas y ya no sólo en el sector industrial. Es así que los robots de servicio ya están asistiendo al ser humano en un cada vez mayor número de tareas y explorando juntos entornos hostiles. Así, este tipo de robots, en particular los robots humanoides ya están ayudándonos y conviviendo con nosotros desde algunos años y pronto se convertirán en parte esencial de nuestras vidas.

En 1973 aparece el primer robot humanoide el WABOT-1, desarrollado por Ichiro Kato de la U. de Waseda, Japón, y en la Expo de Ciencias de Tsukuba, Japón en 1985 aparece su segundo prototipo, el WABOT-2, que ya era capaz de tocar el piano. Pero se considera que la era de los robots humanoides se inicia en 1996 con la aparición del humanoide ASIMO de Honda, primer humanoide capaz de caminar con estabilidad de manera autónoma, es decir sin necesidad de potencia de cómputo ni de energía provenientes del exterior. ASIMO es el primer humanoide diseñado y construido de manera profesional utilizando toda la tecnología disponible sin limitaciones presupuestales de modo que cuenta con una estructura mecánica rígida, sin juego en sus articulaciones, con transmisiones de movimiento con un alto grado de reducción y sin juego, con motores de gran eficiencia y poco peso, un sistema de percepción con sensores propioceptivos (posición y velocidad en todas sus articulaciones) y, sobre todo, sensores exterocep-

tivos de visión, de tipo inercial (acelerómetros y giróscopos) así como de fuerza para evaluar la interacción de sus pies con el suelo mediante sensores de seis ejes (las tres componentes del vector fuerza y los tres pares alrededor de los ejes cartesianos). Su sistema de control basado en la teoría del ZMP (Zero Moment Point) le permitió ser el primer humanoide en caminar de manera estable y ahora prácticamente todos los robots humanoides siguen este principio. Los resultados son realmente espectaculares a los ojos de cualquiera incluyendo los de los especialistas, pero… ¿cómo hace ASIMO para desenvolverse con tanta agilidad para caminar, correr y aún saltar en un pie o en ambos?

Objetivo

Este curso tiene como objetivo contestar de la manera más amplia posible esta pregunta, por lo que introduce las tecnologías y las teorías involucradas en el control de los humanoides como el ASIMO, es decir, de todos aquellos robots cuya arquitectura electromecánica y su hardware computacional han sido desarrollados con los más altos estándares de diseño y construcción de esta clase de prototipos, tales como la serie HRP, ASIMO o QRIO, entre otros. Se utilizan como ejemplos los robots AH1N1, Ah1N2 y Johnnie desarrollados en el Laboratorio de Robótica y Visión Artificial del DCA-Cinvestav.

Tutorial 4: Introducción a GNU/Linux y Python

Date: Tuesday, September 30, 2014

Tutorial speaker: Dr. Luis Gerardo de la Fraga
PhD in Computer Engineering, Autonomous University of Madrid, Spain, 1998. (Universidad Autónoma de Madrid, España)
Professor and researcher of CINVESTAV-IPN
Computer Science Department
Mexico

Abstract

Python (www.python.org) es un lenguaje de muy alto nivel, como también lo son perl, php, ruby y lua. No hay tipos y son lenguajes interpretados. Hoy es el ambiente de programación para sistemas de desarrollo como Raspberry PI (www.raspberrypi.org). En este tutorial se aprenderá cómo crear programas básicos en python dentro del ambiente de GNU/Linux. Saber un lenguaje de muy alto nivel reduce muchísimo los tiempos de programación, se pueden crear prototipos muy rápidamente, por lo que es muy conveniente aprender el uso de algunos de ellos.

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Arellano Cárdenas, Oliverio	Photovoltaic panel emulator in FPGA technology using ANFIS approach
Arzel, Ludovic	Oxidation of In2Se3 Precursor Films and its Effects on Preparation of CuInSe2 based Thin Film Solar Cells
Aslam, Muhammad	Agent Based Mobile Recommender System
	Cloud Service Recommender System using Clustering
Aztati-Aguilar, Octavio Gamaliel	SDNN Index of Heart Rate Variability as an Indicator of Change in Rats Exposed to Fine Particles: Study of the Impact of Air Pollution in Mexico City
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Balakina, Ekaterina	Metro train operation control algorithms with regulation restrictions adaptive to system state changes
Baranov, Leonid	Metro train operation control algorithms with regulation restrictions adaptive to system state changes
Barreau, Nicolas	Oxidation of In2Se3 Precursor Films and its Effects on Preparation of CuInSe2 based Thin Film Solar Cells
Barrera, Guillermo	Middleware Architecture for Control an Heterogeneous Expert System

Bazán, Ivonne	Ultrasonic Estimation of Separation Change between Membranes in a Human Thorax Phantom Oriented to Pleural Effusion Detection
	Proposal of a Mechanism for an Electrical Elbow Prosthesis
Becerril-Juárez, Ignacio G	Effect of milling time on mechanically alloyed Cu(In,Ga)Se2 nanoparticles
Begovich-Mendoza, Ofelia	Modeling of a Greenhouse Prototype Using PSO Algorithm Based on a LabView Application
Bello, Rafael	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
Biswal, Rajesh Roshan	Optoelectronic Properties of ZnO:In Thin Films by Ultrasonic Spray Pyrolysis
Bozrov, Victor	Parametric Optimization of a Volumetric Pneumatic Actuator
Bravo, Maricela	Representing Web Service Operations as N-ary Trees and RDF Serializations to Allow Service Comparison and Automatic Documentation
	Similarity of Sentences through Comparison of Syntactic Trees with Pairs of Similar Words
Budagovskii, Andrey	Biostimulation of the Growth of Wheat Seeds produced by modulated pulsed Diode Lasers radiation
C	
Cabello, Uriel	Fault Tolerance In Heterogeneous Multi-Cluster Systems Through A Task Migration Mechanism
Cabrera-Arenas, Victor	Polyfluorene-based ligh-emitting diodes using TiOx as an electron injection layer
	Influence of the recombination mechanism via band tails on the electric performance of a bulk heterojunction solar cell
Cabrera-González, Jesús	Towards an Automatic Counter of Lunar Craters
Calvillo Tellez, Andres	Heart Shaped Monopole Antenna with Defected Ground Plane for UWB Applications

Calzada-Lara, Gabriel	High performance Direct Torque Control for Induction Motors using an Adaptive Sliding Mode Observer
Camacho-Solorio, Leobardo	I-LQG Control of DC-DC Boost Converters
Cardenas-Juarez, Marco	Performance of MADM Algorithms with Real Spectrum Measurements for Spectrum Decision in Cognitive Radio Networks
Casillas Z., Antonio	Characterization Technique to Implement Self-Timed Cells for VLSI Design Blocks
Castillo, Bernardino	Fault Detection and Isolation Problem: Sliding Mode Fuzzy Observers and Neural Networks
Castro, Marco	Supporting Face to Face Collaboration through Dynamic Arrays of Mobile Devices
Cazarez-Castro, Nohe R	Design and hardware implementation of a closed-loop stable fuzzy controller
Cerdeira, Antonio	Harmonic distortion analysis implementation for the determination of distortion in analog circuits.
Chacon-Murguia, Mario I.	Rao-Blackwellized Particle Filter for Multiple Object Tracking in Video Analysis
Chavez Perez, Ricardo Arturo	Heart Shaped Monopole Antenna with Defected Ground Plane for UWB Applications
Chávez Lomelí, Laura Elena	Approximation Algorithms for the Street Sweeping Problem
Chávez Rivera, Lucia Berenice	Determination of Temperature in Neonates Based in a Face IR Thermography Image Segmentation Algorithm
Coello, Lenniet	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
Contreras, Diana	Proposal of a Mechanism for an Electrical Elbow Prosthesis
Contreras, Esteban	Harmonic distortion analysis implementation for the determination of distortion in analog circuits.
Cruz-Prieto, Josafat	Ultrasonic Estimation of Separation Change between Membranes in a Human Thorax Phantom Oriented to Pleural Effusion Detection

Cuvas, Carlos	Predictive Control and Truncated Predictor: A Comparative Study on Numerical Benchmark Problems
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Davila Saldivar, Claudia	Extracting the Floating Gate Voltage on the Multiple-Input FGMOS Transistor
De Ford, Peter	Maximum Likelihood Thresholding Algorithm Based on Four-Parameter Gamma Distributions
De La Fraga, Luis Gerardo	Automatic Extraction of Geometric Models from 3D Point Cloud Datasets
De Vizcaya-Ruiz, Andrea	SDNN Index of Heart Rate Variability as an Indicator of Change in Rats Exposed to Fine Particles: Study of the Impact of Air Pollution in Mexico City
Decouchant, Dominique	Fault Tolerance In Heterogeneous Multi-Cluster Systems Through A Task Migration Mechanism
	A User Restrictions-Based Semantic Matchmaking Service for Resource Discovery
	Support for resource aggregation in collaborative P2P systems
Domínguez Chávez, Jose Alfonso	Biostimulation of the Growth of Wheat Seeds produced by modulated pulsed Diode Lasers radiation
Domínguez, Sergio	A Prototype Design for an Accelerometer Using a Multiple Floating-Gate MOSFET as a Transducer.
Domínguez-Ramírez, Omar A.	Robust Higher Order Sliding Mode Based Impedance Control for Dual-User Teleoperation under Unknown Constant Time Delay.
Duran, Karla	Similarity of Sentences through Comparison of Syntactic Trees with Pairs of Similar Words
Díaz Sánchez, Alejandro	Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy
E	

Espinosa, Elisa	Fault Detection and Isolation Problem: Sliding Mode Fuzzy Observers and Neural Networks
Estrada, Magali	Polyfluorene-based ligh-emitting diodes using TiOx as an electron injection layer
F	
Falcon, Rafael	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
Fernandez, Yumilka	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
Fernández-Valladares, Miguel Iván	Glove-Based Sign Language Recognition Solution to Assist Communication for Deaf Users
Figueroa Torres, Cruz Ángel	Heart Shaped Monopole Antenna with Defected Ground Plane for UWB Applications
Filiberto, Yaima	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
Flores Nava, Luis Martín	Multilayer perceptron network with integrated training algorithm in FPGA
	Photovoltaic panel emulator in FPGA technology using ANFIS approach
G	
Gallegos, Francisco	Proposal of a Mechanism for an Electrical Elbow Prosthesis
Garcia, Octavio	Mini airplane: Design, Aerodynamic Modeling and Stability
Garcia, Oscar	Harmonic distortion analysis implementation for the determination of distortion in analog circuits.
García, Kimberly	A User Restrictions-Based Semantic Matchmaking Service for Resource Discovery
García-Valdovinos, Luis G.	Robust Higher Order Sliding Mode Based Impedance Control for Dual-User Teleoperation under Unknown Constant Time Delay.
García-Zetina, Oscar	Portable device for heart rate monitoring based on impedance pletysmography
Golikov, Victor	Detection of the Subpixel Floating Objects on an Agitated Sea Surface Using an Image Sequence

Gómez-Castañeda, Felipe	Formation of Square Patterns using a model alike Swift-Hohenberg
	Multilayer perceptron network with integrated training algorithm in FPGA
	Photovoltaic panel emulator in FPGA technology using ANFIS approach
Gomez, Marco A.	Necessary Exponential Stability Conditions for Scalar Periodic Time-Delay Systems
Gómez, Ricardo	Broadband PIFA Antenna for Mobile Communications Terminals
Gonzalez-Duarte, Sergio	Rao-Blackwellized Particle Filter for Multiple Object Tracking in Video Analysis
Gordillo, Luis A.	An Adaptive Geometrically-Complemented Approach for ECG Signal Denoising
Gracios-Marin, Carlos	Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy
Granados-Cruz, Moises	Triangulation-Based Indoor Robot Localization Using Extended FIR/Kalman Filtering
	A Generalized Algorithm for Nonlinear State Estimation Using Extended UFIR Filtering
Guerrero Tavares, Jesus N.	Observer and parameter estimation for IWP: comparison of a super-twisting algorithm and an adaptive method
Guerrero, Fernando	Mini airplane: Design, Aerodynamic Modeling and Stability
Guevara, Cristina	Electrical characterization of textile electrodes for an ECG acquisition system
Gurevich, Yuri G.	Influence of Nonequilibrium Temperature and Charge Carriers on the Ohm's Law in a Bipolar Semiconductor
Gurrola Navarro, Marco	Extracting the Floating Gate Voltage on the Multiple-Input FGMOS Transistor
Gutierrez Salgado, Juan Manuel	Analysis of P300 containing EEG through three non-linear methods
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Heredia, Aurelio	Electrical characterization of textile electrodes for an ECG acquisition system
Hernández de León, Héctor Ricardo	An Adaptive Geometrically-Complemented Approach for ECG Signal Denoising

Hernández Sánchez, Luis Francisco	Approximation Algorithms for the Street Sweeping Problem
Hernández, Liliana Fernanda	Influence of the recombination mechanism via band tails on the electric performance of a bulk heterojunction solar cell
Herrera Rivera, Maria Del Rosario	Manufacture of Ag, Cr and Cu-doped ZnO Pellets for Gas Sensor Applications
Herrera, M. Rosario	Synthesis and characterization of ZnO powders by homogeneous precipitation from different zinc precursors
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Islas Chuc, Mayolo	Detection of the Subpixel Floating Objects on an Agitated Sea Surface Using an Image Sequence
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Jardón, Hildeberto	Broadband PIFA Antenna for Mobile Communications Terminals
Jayaraman, Vinoth Kumar	Effect of rf power on Structural, Optical and Morphological Properties of Ultrathin Undoped ZnO films deposited by rf Magnetron Sputtering
Jimenez Perez, Abimael	Extracting the Floating Gate Voltage on the Multiple-Input FGMOS Transistor
Jiménez-Hernández, Hugo	Robust Higher Order Sliding Mode Based Impedance Control for Dual-User Teleoperation under Unknown Constant Time Delay.
Jurado, Francisco	Continuous-Time Decentralized Wavelet Neural Control for a 2 DOF Robot Manipulator
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Kassiba, Adi	Structural and optical properties of molybdenum doped bismuth vanadate powders
Keshtkar, Najmeh	Magnetic Control of Tethered Cube-Satellite Stabilized by Rotating
Keshtkar, Sajjad	Magnetic Control of Tethered Cube-Satellite Stabilized by Rotating

Ki Ahn, Choon	Adapting Horizon Size in Finite Impulse Response Filtering Through Switching Extensible FIR Filter Bank
Kontorovich, Valeri	Efficient multi-moment non-linear filtering: experimental study for low power chaotic signals
	Experimental Study of the Derivative-free Kalman Filtering for Chaos
Kosarev, Andrey	Effect of Transparent Conductive Oxide Material and Frontal Interface on Characteristics of Si:H p-i-n Junction
	Study of Morphological Characteristics of Si:H p-i-n Structures Deposited by Plasma on Plastic Substrates
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Ladd Parada, Jennifer	Analysis of P300 containing EEG through three non-linear methods
Lashkevych, Igor	Influence of Nonequilibrium Temperature and Charge Carriers on the Ohm's Law in a Bipolar Semiconductor
Lebedeva, Olga	Detection of the Subpixel Floating Objects on an Agitated Sea Surface Using an Image Sequence
Leija Salas, Lorenzo	SDNN Index of Heart Rate Variability as an Indicator of Change in Rats Exposed to Fine Particles: Study of the Impact of Air Pollution in Mexico City
	Realistic Novel Breast and Breast Cancer Phantoms for the Study of Imaging and Therapy Ultrasound
	A Foot Temperature Measuring System for Diabetic patients
Linares Aranda, Mónico	Analysis of the Impact of Vias on Resonant Rotary Traveling Wave Oscillators
Linares, Roberto	Broadband PIFA Antenna for Mobile Communications Terminals
Liu, Fei	Optimal FIR Estimator for Discrete Time-variant State-Space Model
Lobato Morales, Humberto	Heart Shaped Monopole Antenna with Defected Ground Plane for UWB Applications

Loginova, Liudmila	Metro train operation control algorithms with regulation restrictions adaptive to system state changes
Lopez, Fatima	A Foot Temperature Measuring System for Diabetic patients
Lopez-Escogido, Daniel	Automatic Extraction of Geometric Models from 3D Point Cloud Datasets
Lugo-Jiménez, Jorge	Towards an Automatic Counter of Lunar Craters
Luna-Lozano, Pablo	Portable device for heart rate monitoring based on impedance pletysmography
López Bracho, Rafael	A Fast 4-Approximation Algorithm for the Traveling Repairman Problem on a Line
López-Noriega, José Emiliano	Glove-Based Sign Language Recognition Solution to Assist Communication for Deaf Users
López-Segovia, Alan G.	Robust Higher Order Sliding Mode Based Impedance Control for Dual-User Teleoperation under Unknown Constant Time Delay.
M	
Maldonado Alvarez, Arturo	Manufacture of Ag, Cr and Cu-doped ZnO Pellets for Gas Sensor Applications
	Surface modified tin oxide pellets for CO Gas sensing
	Effect of rf power on Structural, Optical and Morphological Properties of Ultrathin Undoped ZnO films deposited by rf Magnetron Sputtering
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Maldonado, Yazmin	Design and hardware implementation of a closed-loop stable fuzzy controller
Markov, Andrey	Determination of Motion Freedom and Direct Kinematic Problem Solution of the Mechanism Similar to Delta Robot
Martin-Gonzalez, Anabel	Towards an Automatic Counter of Lunar Craters
Martinez Enriquez, Ana Maria	Agent Based Mobile Recommender System
Martinez Vazquez, Daniel Librado	Mini airplane: Design, Aerodynamic Modeling and Stability

Martinez, Geovanni	Maximum Likelihood Thresholding Algorithm Based on Four-Parameter Gamma Distributions
Martinez, Hiram	Effect of Transparent Conductive Oxide Material and Frontal Interface on Characteristics of Si:H p-i-n Junction
Martinez, Victor	Mini airplane: Design, Aerodynamic Modeling and Stability
Martínez Enríquez, Ana María	Cloud Service Recommender System using Clustering
Martínez-Sibaja, Albino	Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface
Matsumoto Kuwabara, Yasuhiro	Effect of rf power on Structural, Optical and Morphological Properties of Ultrathin Undoped ZnO films deposited by rf Magnetron Sputtering
May Alarcon, Manuel	Detection of the Subpixel Floating Objects on an Agitated Sea Surface Using an Image Sequence
Medina Monroy, José Luis	Heart Shaped Monopole Antenna with Defected Ground Plane for UWB Applications
Medina Santiago, Alejandro	An Adaptive Geometrically-Complemented Approach for ECG Signal Denoising
Medina Vazquez, Agustín Santiago	Extracting the Floating Gate Voltage on the Multiple-Input FGMOS Transistor
Medina-Hernandez, Jose-Antonio	Formation of Square Patterns using a model alike Swift-Hohenberg
Mendez Martinez, Francisco	Detection of the Subpixel Floating Objects on an Agitated Sea Surface Using an Image Sequence
Mendoza A., Salvador	Modal analysis of a structure used as a capacitive MEMS accelerometer sensor
	A Prototype Design for an Accelerometer Using a Multiple Floating-Gate MOSFET as a Transducer.

Mendoza, Sonia	Fault Tolerance In Heterogeneous Multi-Cluster Systems Through A Task Migration Mechanism
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	Supporting Face to Face Collaboration through Dynamic Arrays of Mobile Devices
	Support for resource aggregation in collaborative P2P systems
Mendoza-Martínez, Cyntia	Automatic Segmentation of Mammograms Using a Scale-Invariant FeatureTransform and K-Means Clustering algorithm
Meneses, Amilcar	Fault Tolerance In Heterogeneous Multi-Cluster Systems Through A Task Migration Mechanism
	Middleware Architecture for Control an Heterogeneous Expert System
Merupo, Victor Ishrayelu	Structural and optical properties of molybdenum doped bismuth vanadate powders
Mezura-Montes, Efrén	Synthesis of a Four-bar Mechanism for Position Control Using the Harmony Search Algorithm
Michtchenko, Alexandre	Biostimulation of the Growth of Wheat Seeds produced by modulated pulsed Diode Lasers radiation
Miguel Angel, García-Sánchez	Structural and optical properties of molybdenum doped bismuth vanadate powders
Min Pak, Jung	Adapting Horizon Size in Finite Impulse Response Filtering Through Switching Extensible FIR Filter Bank
Misyurin, Sergey	Solution of Forward Kinematics Problem of 5-rod Car Suspension Mechanism with Singularities
	Parametric Optimization of a Volumetric Pneumatic Actuator
	Determination of Motion Freedom and Direct Kinematic Problem Solution of the Mechanism Similar to Delta Robot
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Mondié, Sabine	Necessary Exponential Stability Conditions for Scalar Periodic Time-Delay Systems
Montoya-Suárez, Enrique	Integrated Digital Architecture for Measuring Temperature Using a VCO as Sensor
Morales Caporal, Roberto	Simulink-HDL Cosimulation of Direct Torque Control of a PM Synchronous Machine based FPGA
Morales-Mendoza, Luis	Triangulation-Based Indoor Robot Localization Using Extended FIR/Kalman Filtering
Moreno-Cadenas, José Antonio	Formation of Square Patterns using a model alike Swift-Hohenberg
	Multilayer perceptron network with integrated training algorithm in FPGA
	Photovoltaic panel emulator in FPGA technology using ANFIS approach
Moreno, Mario	Electrical characterization of textile electrodes for an ECG acquisition system
Munguía C., Jacobo E.	Modal analysis of a structure used as a capacitive MEMS accelerometer sensor
Muñoz-Hernandez, German	Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy
N	
Nader-Roa, Jorge	Representing Web Service Operations as N-ary Trees and RDF Serializations to Allow Service Comparison and Automatic Documentation
Naredo Villagrán, José Luis	Polyphase Filter-Bank Realization for the Simulation of Power System Transients
Neendoor Mohan, Rohini	Effect of milling time on mechanically alloyed Cu(In,Ga)Se2 nanoparticles
Nelyubin, Andrey	Solution of Forward Kinematics Problem of 5-rod Car Suspension Mechanism with Singularities
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Ochoa, Gilberto	Necessary Exponential Stability Conditions for Scalar Periodic Time-Delay Systems

Olvera Amador, Maria De La Luz	Synthesis and characterization of ZnO powders by homogeneous precipitation from different zinc precursors
	Surface modified tin oxide pellets for CO Gas sensing
	Manufacture of Ag, Cr and Cu-doped ZnO Pellets for Gas Sensor Applications
	Effect of rf power on Structural, Optical and Morphological Properties of Ultrathin Undoped ZnO films deposited by rf Magnetron Sputtering
	Optoelectronic Properties of ZnO:In Thin Films by Ultrasonic Spray Pyrolysis
Ortega Cisneros, Susana	Space-Time AER Protocol Receiver Asynchronously Controlled on FPGA
	Characterization Technique to Implement Self-Timed Cells for VLSI Design Blocks
Ortega Maynez, Leticia	Determination of Temperature in Neonates Based in a Face IR Thermography Image Segmentation Algorithm
Ortiz Santos, Salvador	Observer and parameter estimation for IWP: comparison of a super-twisting algorithm and an adaptive method
Osorio Figueroa, Javier	Analysis of the Impact of Vias on Resonant Rotary Traveling Wave Oscillators
Ospina Ocampo, Carlos Alberto	Study of Morphological Characteristics of Si:H p-i-n Structures Deposited by Plasma on Plastic Substrates
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Painchaud, Thomas	Oxidation of In2Se3 Precursor Films and its Effects on Preparation of CuInSe2 based Thin Film Solar Cells
Palacios Enríquez, Alfredo Eduardo	Comparing Two Methods of Object Detection in Autonomous Vehicle
Pastrana Palma, Alberto	Automatic Segmentation of Mammograms Using a Scale-Invariant FeatureTransform and K-Means Clustering algorithm
Pedraza Ortega, Jesus Carlos	Automatic Segmentation of Mammograms Using a Scale-Invariant FeatureTransform and K-Means Clustering algorithm

Pedraza Ortega, Jesús Carlos	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
Perez Garcia, Alvaro Narciso	Multilayer perceptron network with integrated training algorithm in FPGA
Pineda, Ana M.	Synthesis and characterization of ZnO powders by homogeneous precipitation from different zinc precursors
Pineda-Rico, Ulises	Performance of MADM Algorithms with Real Spectrum Measurements for Spectrum Decision in Cognitive Radio Networks
Pomarico-Franquiz, Juan	Triangulation-Based Indoor Robot Localization Using Extended FIR/Kalman Filtering
Ponomaryov, Volodymyr	Comparing Two Methods of Object Detection in Autonomous Vehicle
Portilla-Flores, Edgar	Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy
Portilla-Flores, Edgar Alfredo	Synthesis of a Four-bar Mechanism for Position Control Using the Harmony Search Algorithm
Posada-Gómez, Rubén	Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface
Poznyak, Alexander	Magnetic Control of Tethered Cube-Satellite Stabilized by Rotating
Pérez Arcos, Jorge Arturo	Smallest Primitive Embeddings of Planar Graphs
Pérez Arreguín, Jorge Israel	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
Pérez Pérez, Sergio Luis	Smallest Primitive Embeddings of Planar Graphs
	A Fast 4-Approximation Algorithm for the Traveling Repairman Problem on a Line
Pérez-González, Alfonso	Modeling of a Greenhouse Prototype Using PSO Algorithm Based on a LabView Application
Pérez-López, Antonio	Portable device for heart rate monitoring based on impedance pletysmography

R	
Ramirez-Garcia, Alfredo	Ultrasonic Estimation of Separation Change between Membranes in a Human Thorax Phantom Oriented to Pleural Effusion Detection
Ramos-Alarcon, Fernando	Efficient multi-moment non-linear filtering: experimental study for low power chaotic signals
Ramírez, Adrián	Predictive Control and Truncated Predictor: A Comparative Study on Numerical Benchmark Problems
Ramírez, Alfredo	Proposal of a Mechanism for an Electrical Elbow Prosthesis
Ramírez-Mendoza, Abigail	Study of the response of the connection of Adaptive Fuzzy Spiking Neurons with self-synapse in each single neuron
Rangel Magadaleno, Jose De Jesus	Simulink-HDL Cosimulation of Direct Torque Control of a PM Synchronous Machine based FPGA
Raygoza Panduro, Juan José	Characterization Technique to Implement Self-Timed Cells for VLSI Design Blocks
	Space-Time AER Protocol Receiver Asynchronously Controlled on FPGA
Reséndiz, Luis Martín	Polyfluorene-based ligh-emitting diodes using TiOx as an electron injection layer
	Influence of the recombination mechanism via band tails on the electric performance of a bulk heterojunction solar cell
Reyes Barranca, Mario Alfredo	A Prototype Design for an Accelerometer Using a Multiple Floating-Gate MOSFET as a Transducer.
	An Adaptive Geometrically-Complemented Approach for ECG Signal Denoising
	Modal analysis of a structure used as a capacitive MEMS accelerometer sensor
Reyes Barón, José Roberto	Space-Time AER Protocol Receiver Asynchronously Controlled on FPGA
	Characterization Technique to Implement Self-Timed Cells for VLSI Design Blocks
Reyes Figueroa, Pablo Itzam	Oxidation of In2Se3 Precursor Films and its Effects on Preparation of CuInSe2 based Thin Film Solar Cells

Saldaña, Griselda	Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy
Sandre Hernandez, Omar	Simulink-HDL Cosimulation of Direct Torque Control of a PM Synchronous Machine based FPGA
Santacruz-Reyes, Hugo	Robust Higher Order Sliding Mode Based Impedance Control for Dual-User Teleoperation under Unknown Constant Time Delay.
Sariñana-Toledo, Aarón	I-LQG Control of DC-DC Boost Converters
Sharpanova, Natalia	Determination of Motion Freedom and Direct Kinematic Problem Solution of the Mechanism Similar to Delta Robot
Shmaliy, Yuriy	Triangulation-Based Indoor Robot Localization Using Extended FIR/Kalman Filtering
	A Generalized Algorithm for Nonlinear State Estimation Using Extended UFIR Filtering
	Adapting Horizon Size in Finite Impulse Response Filtering Through Switching Extensible FIR Filter Bank
	Optimal FIR Estimator for Discrete Time-variant State-Space Model
Silva, Carmen	Electrical characterization of textile electrodes for an ECG acquisition system
Stevens-Navarro, Enrique	Performance of MADM Algorithms with Real Spectrum Measurements for Spectrum Decision in Cognitive Radio Networks
Subramaniam, Velumani	Structural and optical properties of molybdenum doped bismuth vanadate powders
	Effect of milling time on mechanically alloyed Cu(In,Ga)Se2 nanoparticles
	Oxidation of In2Se3 Precursor Films and its Effects on Preparation of CuInSe2 based Thin Film Solar Cells
Sun, Jian-Qiao	A Genetic Algorithm and Cell Mapping Hybrid Method for Multi-objective Optimization Problems

Sánchez-Márquez, Álvaro	Synthesis of a Four-bar Mechanism for Position Control Using the Harmony Search Algorithm
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Taeg Lim, Myo	Adapting Horizon Size in Finite Impulse Response Filtering Through Switching Extensible FIR Filter Bank
Tangirala, Venkata Krishna Karthik	Surface modified tin oxide pellets for CO Gas sensing
Toledo Peral, Cinthya L.	SDNN Index of Heart Rate Variability as an Indicator of Change in Rats Exposed to Fine Particles: Study of the Impact of Air Pollution in Mexico City
Tornez Xavier, Gerardo Marcos	Photovoltaic panel emulator in FPGA technology using ANFIS approach
	Multilayer perceptron network with integrated training algorithm in FPGA
Tovar Arriaga, Saúl	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
U	
Uc-Cetina, Victor	Towards an Automatic Counter of Lunar Craters
	Glove-Based Sign Language Recognition Solution to Assist Communication for Deaf Users
Urban Rivero, Luis Eduardo	A Fast 4-Approximation Algorithm for the Traveling Repairman Problem on a Line
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Vargas Soto, José Emilio	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
Vega Hernández, Susana	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
Vega Martínez, Gabriel	SDNN Index of Heart Rate Variability as an Indicator of Change in Rats Exposed to Fine Particles: Study of the Impact of Air Pollution in Mexico City
Vega-Alvarado, Eduardo	Synthesis of a Four-bar Mechanism for Position Control Using the Harmony Search Algorithm

Keywords

3	
3-stage process	Oxidation of In2Se3 Precursor Films and its Effects on Preparation of CuInSe2 based Thin Film Solar Cells
3D fitting	Automatic Extraction of Geometric Models from 3D Point Cloud Datasets
3D visualization	Automatic Extraction of Geometric Models from 3D Point Cloud Datasets
A	
A-Scan	Ultrasonic Estimation of Separation Change between Membranes in a Human Thorax Phantom Oriented to Pleural Effusion Detection
Accelerometer prototype design	A Prototype Design for an Accelerometer Using a Multiple Floating-Gate MOSFET as a Transducer.
adaboost	Towards an Automatic Counter of Lunar Craters
adaptive filter	An Adaptive Geometrically-Complemented Approach for ECG Signal Denoising
adaptive fuzzy spiking neuron	Study of the response of the connection of Adaptive Fuzzy Spiking Neurons with self-synapse in each single neuron
Adaptive Sliding Mode Observer	High performance Direct Torque Control for Induction Motors using an Adaptive Sliding Mode Observer
AER	Space-Time AER Protocol Receiver Asynchronously Controlled on FPGA
Aerodynamics	Mini airplane: Design, Aerodynamic Modeling and Stability
AFM characterization	Study of Morphological Characteristics of Si:H p-i-n Structures Deposited by Plasma on Plastic Substrates
air motor	Parametric Optimization of a Volumetric Pneumatic Actuator
Algorithm	A Generalized Algorithm for Nonlinear State Estimation Using Extended UFIR Filtering

Chua chaotic strange attractor	Efficient multi-moment non-linear filtering: experimental study for low power chaotic signals
	Experimental Study of the Derivative-free Kalman Filtering for Chaos
Cloud service	Cloud Service Recommender System using clustering
Cluster Computing	Fault Tolerance In Heterogeneous Multi-Cluster Systems Through A Task Migration Mechanism
Clustering	Cloud Service Recommender System using clustering
CMOS	Modal analysis of a structure used as a capacitive MEMS accelerometer sensor
CMOS Technology	Integrated Digital Architecture for Measuring Temperature Using a VCO as Sensor
CO sensors	Surface modified tin oxide pellets for CO Gas sensing
Cognitive Radio Networks	Performance of MADM Algorithms with Real Spectrum Measurements for Spectrum Decision in Cognitive Radio Networks
Collaborative Peer-to-Peer systems	Support for resource aggregation in collaborative P2P systems
Collision avoidance	Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface
Comparison of Syntactic Trees	Similarity of Sentences through Comparison of Syntactic Trees with Pairs of Similar Words
Computer interface	Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface
conductive	Electrical characterization of textile electrodes for an ECG acquisition system
cone fitting	Automatic Extraction of Geometric Models from 3D Point Cloud Datasets
Convolution	Polyphase Filter-Bank Realization for the Simulation of Power System Transients
Copper	Surface modified tin oxide pellets for CO Gas sensing

correlation	Ultrasonic Estimation of Separation Change between Membranes in a Human Thorax Phantom Oriented to Pleural Effusion Detection
Cosimulation.	Simulink-HDL Cosimulation of Direct Torque Control of a PM Synchronous Machine based FPGA
craters	Towards an Automatic Counter of Lunar Craters
Cube-Satellites	Magnetic Control of Tethered Cube-Satellite Stabilized by Rotating
CuIn0.5Ga0.5Se2 nanoparticle	Effect of milling time on mechanically alloyed Cu(In,Ga)Se2 nanoparticles
CuInSe2	Oxidation of In2Se3 Precursor Films and its Effects on Preparation of CuInSe2 based Thin Film Solar Cells
Current limitation in the induction motor start	High performance Direct Torque Control for Induction Motors using an Adaptive Sliding Mode Observer
cylinder fitting	Automatic Extraction of Geometric Models from 3D Point Cloud Datasets
D	
data gloves	Glove-Based Sign Language Recognition Solution to Assist Communication for Deaf Users
Data mining	Cloud Service Recommender System using clustering
data mining	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
decentralized control	Continuous-Time Decentralized Wavelet Neural Control for a 2 DOF Robot Manipulator
Defected ground plane	Heart Shaped Monopole Antenna with Defected Ground Plane for UWB Applications
degrees of freedom	Determination of Motion Freedom and Direct Kinematic Problem Solution of the Mechanism Similar to Delta Robot
Derivative-free filtering	Experimental Study of the Derivative-free Kalman Filtering for Chaos
descendent gradient	Multilayer perceptron network with integrated training algorithm in FPGA

detection	Towards an Automatic Counter of Lunar Craters
Detection performance	Detection of the Subpixel Floating Objects on an Agitated Sea Surface Using an Image Sequence
DFA	Analysis of P300 containing EEG through three non-linear methods
diabetes	A Foot Temperature Measuring System for Diabetic patients
diabetic foot ulcers	A Foot Temperature Measuring System for Diabetic patients
Diagnosis	Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy
Differentiator	Observer and parameter estimation for IWP: comparison of a super-twisting algorithm and an adaptive method
Diffuse reflectance spectra	Structural and optical properties of molybdenum doped bismuth vanadate powders
Digital Architecture	Integrated Digital Architecture for Measuring Temperature Using a VCO as Sensor
diode laser	Biostimulation of the Growth of Wheat Seeds produced by modulated pulsed Diode Lasers radiation
Direct Torque Control (DTC)	High performance Direct Torque Control for Induction Motors using an Adaptive Sliding Mode Observer
Direct Torque Control.	Simulink-HDL Cosimulation of Direct Torque Control of a PM Synchronous Machine based FPGA
Discrete time	A Generalized Algorithm for Nonlinear State Estimation Using Extended UFIR Filtering
Disparity Map	Comparing Two Methods of Object Detection in Autonomous Vehicle
Distributed Systems	Middleware Architecture for Control an Heterogeneous Expert System
Down-sampling	Polyphase Filter-Bank Realization for the Simulation of Power System Transients

Dual-user systems	Robust Higher Order Sliding Mode Based Impedance Control for Dual-User Teleoperation under Unknown Constant Time Delay.
dynamic acceleration	Modal analysis of a structure used as a capacitive MEMS accelerometer sensor
E	
ECG	An Adaptive Geometrically-Complemented Approach for ECG Signal Denoising
	Electrical characterization of textile electrodes for an ECG acquisition system
EDAX.	Effect of milling time on mechanically alloyed Cu(In,Ga)Se2 nanoparticles
eigendecomposition	Automatic Extraction of Geometric Models from 3D Point Cloud Datasets
electrical conductivity	Influence of Nonequilibrium Temperature and Charge Carriers on the Ohm's Law in a Bipolar Semiconductor
electronics	Electrical characterization of textile electrodes for an ECG acquisition system
ERPs	Analysis of P300 containing EEG through three non-linear methods
Ethylenediamine	Surface modified tin oxide pellets for CO Gas sensing
Expert Systems	Middleware Architecture for Control an Heterogeneous Expert System
Exploration of Trees	Similarity of Sentences through Comparison of Syntactic Trees with Pairs of Similar Words
Exponential stability.	Necessary Exponential Stability Conditions for Scalar Periodic Time-Delay Systems
Extended FIR filter	Triangulation-Based Indoor Robot Localization Using Extended FIR/Kalman Filtering
Extended FIR filtering	A Generalized Algorithm for Nonlinear State Estimation Using Extended UFIR Filtering

flexible substrates	Study of Morphological Characteristics of Si:H p-i-n Structures Deposited by Plasma on Plastic Substrates
Floating Gate	Extracting the Floating Gate Voltage on the Multiple-Input FGMOS Transistor
Floating-gate MOSFET as a transducer	A Prototype Design for an Accelerometer Using a Multiple Floating-Gate MOSFET as a Transducer.
forecasting	Metro train operation control algorithms with regulation restrictions adaptive to system state changes
four-bar mechanism	Synthesis of a Four-bar Mechanism for Position Control Using the Harmony Search Algorithm
FPGA	Space-Time AER Protocol Receiver Asynchronously Controlled on FPGA
	Photovoltaic panel emulator in FPGA technology using ANFIS approach
	Design and hardware implementation of a closed-loop stable fuzzy controller
	Multilayer perceptron network with integrated training algorithm in FPGA
	Simulink-HDL Cosimulation of Direct Torque Control of a PM Synchronous Machine based FPGA
frontal	Effect of Transparent Conductive Oxide Material and Frontal Interface on Characteristics of Si:H p-i-n Junction
fuzzy models-Sliding mode observers	Fault Detection and Isolation Problem: Sliding Mode Fuzzy Observers and Neural Networks
fuzzy similarity relation	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
G	
Gamma Distributions	Maximum Likelihood Thresholding Algorithm Based on Four-Parameter Gamma Distributions
gear	Proposal of a Mechanism for an Electrical Elbow Prosthesis
geometrical criterion	An Adaptive Geometrically-Complemented Approach for ECG Signal Denoising

Human–computer interaction.	Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface
Hybrid	Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy
I	
ideality factor	Influence of the recombination mechanism via band tails on the electric performance of a bulk heterojunction solar cell
IIR Filters	Polyphase Filter-Bank Realization for the Simulation of Power System Transients
image processing	Automatic Segmentation of Mammograms Using a Scale-Invariant FeatureTransform and K-Means Clustering algorithm
Image Segmentation	Maximum Likelihood Thresholding Algorithm Based on Four-Parameter Gamma Distributions
impedance control	Robust Higher Order Sliding Mode Based Impedance Control for Dual-User Teleoperation under Unknown Constant Time Delay.
Impregnation	Surface modified tin oxide pellets for CO Gas sensing
inclinometer	Modal analysis of a structure used as a capacitive MEMS accelerometer sensor
independent multi-link suspension	Solution of Forward Kinematics Problem of 5-rod Car Suspension Mechanism with Singularities
Induction motor	High performance Direct Torque Control for Induction Motors using an Adaptive Sliding Mode Observer
Integral Function Method	Harmonic distortion analysis implementation for the determination of distortion in analog circuits.
integrated circuits	Analysis of the Impact of Vias on Resonant Rotary Traveling Wave Oscillators
Intelligent agents	Agent Based Mobile Recommender System
Intelligent interface	Agent Based Mobile Recommender System
interconnects	Analysis of the Impact of Vias on Resonant Rotary Traveling Wave Oscillators

mammogram	Automatic Segmentation of Mammograms Using a Scale-Invariant FeatureTransform and K-Means Clustering algorithm
markers	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
Maximum Likelihood Thresholding	Maximum Likelihood Thresholding Algorithm Based on Four-Parameter Gamma Distributions
measure temperature	A Foot Temperature Measuring System for Diabetic patients
mechanical alloying	Effect of milling time on mechanically alloyed Cu(In,Ga)Se2 nanoparticles
mechanism	Determination of Motion Freedom and Direct Kinematic Problem Solution of the Mechanism Similar to Delta Robot
metro transportation control systems	Metro train operation control algorithms with regulation restrictions adaptive to system state changes
Middleware	Middleware Architecture for Control an Heterogeneous Expert System
Mobile phone antennas	Broadband PIFA Antenna for Mobile Communications Terminals
modal analysis	Modal analysis of a structure used as a capacitive MEMS accelerometer sensor
Modeling	Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy
Modelling	Mini airplane: Design, Aerodynamic Modeling and Stability
Modified matched subspace detector	Detection of the Subpixel Floating Objects on an Agitated Sea Surface Using an Image Sequence
Molybdenum doping	Structural and optical properties of molybdenum doped bismuth vanadate powders
Monopole antenna	Heart Shaped Monopole Antenna with Defected Ground Plane for UWB Applications
MOS transistor	Extracting the Floating Gate Voltage on the Multiple-Input FGMOS Transistor

Motor disability	Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface
MPI	Fault Tolerance In Heterogeneous Multi-Cluster Systems Through A Task Migration Mechanism
Multi-rate	Polyphase Filter-Bank Realization for the Simulation of Power System Transients
Multiagent systems	Agent Based Mobile Recommender System
multiobjective optimization	Parametric Optimization of a Volumetric Pneumatic Actuator
Multiple Attribute Decision Making	Performance of MADM Algorithms with Real Spectrum Measurements for Spectrum Decision in Cognitive Radio Networks
N	
Navigation assistance	Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface
Neural networks	Fault Detection and Isolation Problem: Sliding Mode Fuzzy Observers and Neural Networks
neural networks	Glove-Based Sign Language Recognition Solution to Assist Communication for Deaf Users
Neurofuzzy systems	Photovoltaic panel emulator in FPGA technology using ANFIS approach
neuron with self-synapse	Study of the response of the connection of Adaptive Fuzzy Spiking Neurons with self-synapse in each single neuron
neuropathy	A Foot Temperature Measuring System for Diabetic patients
Non-linear filtering	Efficient multi-moment non-linear filtering: experimental study for low power chaotic signals
	Experimental Study of the Derivative-free Kalman Filtering for Chaos
nonequilibrium charge carriers	Influence of Nonequilibrium Temperature and Charge Carriers on the Ohm's Law in a Bipolar Semiconductor
nonequilibrium temperature	Influence of Nonequilibrium Temperature and Charge Carriers on the Ohm's Law in a Bipolar Semiconductor

Nonlinear state-space model	A Generalized Algorithm for Nonlinear State Estimation Using Extended UFIR Filtering
Novel transduction method	A Prototype Design for an Accelerometer Using a Multiple Floating-Gate MOSFET as a Transducer.
numerical methods	Solution of Forward Kinematics Problem of 5-rod Car Suspension Mechanism with Singularities
O	
Object Detection	Comparing Two Methods of Object Detection in Autonomous Vehicle
object tracking	Rao-Blackwellized Particle Filter for Multiple Object Tracking in Video Analysis
Observers	Observer and parameter estimation for IWP: comparison of a super-twisting algorithm and an adaptive method
OpenCL	Fault Tolerance In Heterogeneous Multi-Cluster Systems Through A Task Migration Mechanism
optical trackers	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
Optimal estimator	Triangulation-Based Indoor Robot Localization Using Extended FIR/Kalman Filtering
Optimal filter	Optimal FIR Estimator for Discrete Time-variant State-Space Model
Oscillators	Analysis of the Impact of Vias on Resonant Rotary Traveling Wave Oscillators
outerplanar graph	Smallest Primitive Embeddings of Planar Graphs
Oxidation	Oxidation of In2Se3 Precursor Films and its Effects on Preparation of CuInSe2 based Thin Film Solar Cells
P	
p-i-n	Study of Morphological Characteristics of Si:H p-i-n Structures Deposited by Plasma on Plastic Substrates
P300	Analysis of P300 containing EEG through three non-linear methods
particle filter	Rao-Blackwellized Particle Filter for Multiple Object Tracking in Video Analysis

Particle Swarm Optimization	Modeling of a Greenhouse Prototype Using PSO Algorithm Based on a LabView Application
particle swarm optimization	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
pattern formation	Formation of Square Patterns using a model alike Swift-Hohenberg
Peer-to-Peer	Support for resource aggregation in collaborative P2P systems
Pellets	Surface modified tin oxide pellets for CO Gas sensing
performance characteristics	Parametric Optimization of a Volumetric Pneumatic Actuator
Periodic time delay systems.	Necessary Exponential Stability Conditions for Scalar Periodic Time-Delay Systems
PFO	Polyfluorene-based ligh-emitting diodes using TiOx as an electron injection layer
phantom	Realistic Novel Breast and Breast Cancer Phantoms for the Study of Imaging and Therapy Ultrasound
Phase synchronisation	Analysis of P300 containing EEG through three non-linear methods
Photovoltaic panel	Photovoltaic panel emulator in FPGA technology using ANFIS approach
PIFA	Broadband PIFA Antenna for Mobile Communications Terminals
pin	Effect of Transparent Conductive Oxide Material and Frontal Interface on Characteristics of Si:H p-i-n Junction
pivoting	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
planar graph	Smallest Primitive Embeddings of Planar Graphs
plastic user interfaces	Supporting Face to Face Collaboration through Dynamic Arrays of Mobile Devices
PLED	Polyfluorene-based ligh-emitting diodes using TiOx as an electron injection layer
pleural effusion	Ultrasonic Estimation of Separation Change between Membranes in a Human Thorax Phantom Oriented to Pleural Effusion Detection

PMSM.	Simulink-HDL Cosimulation of Direct Torque Control of a PM Synchronous Machine based FPGA
Polyphase Filter Structures	Polyphase Filter-Bank Realization for the Simulation of Power System Transients
Predictive control	Predictive Control and Truncated Predictor: A Comparative Study on Numerical Benchmark Problems
primitive embedding	Smallest Primitive Embeddings of Planar Graphs
prosthesis	Proposal of a Mechanism for an Electrical Elbow Prosthesis
Q	
Quality attributes	Cloud Service Recommender System using clustering
R	
R-wave location	SDNN Index of Heart Rate Variability as an Indicator of Change in Rats Exposed to Fine Particles: Study of the Impact of Air Pollution in Mexico City
Raman	Structural and optical properties of molybdenum doped bismuth vanadate powders
rat EKG	SDNN Index of Heart Rate Variability as an Indicator of Change in Rats Exposed to Fine Particles: Study of the Impact of Air Pollution in Mexico City
RDF	Representing Web Service Operations as N-ary Trees and RDF Serializations to Allow Service Comparison and Automatic Documentation
Real-time execution.	Modeling of a Greenhouse Prototype Using PSO Algorithm Based on a LabView Application
Reception	Space-Time AER Protocol Receiver Asynchronously Controlled on FPGA
recombination	Influence of Nonequilibrium Temperature and Charge Carriers on the Ohm's Law in a Bipolar Semiconductor
Recombination mechanism	Influence of the recombination mechanism via band tails on the electric performance of a bulk heterojunction solar cell

Recommender model	Cloud Service Recommender System using clustering
Recommender systems	Agent Based Mobile Recommender System
Reconfigurable	Space-Time AER Protocol Receiver Asynchronously Controlled on FPGA
recurrent neural networks	Continuous-Time Decentralized Wavelet Neural Control for a 2 DOF Robot Manipulator
Reflective-stickers	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
Resource aggregation	Support for resource aggregation in collaborative P2P systems
Resource collaboration	Support for resource aggregation in collaborative P2P systems
resource discovery	A User Restrictions-Based Semantic Matchmaking Service for Resource Discovery
rf power	Effect of rf power on Structural, Optical and Morphological Properties of Ultrathin Undoped ZnO films deposited by rf Magnetron Sputtering
Robot localization	Triangulation-Based Indoor Robot Localization Using Extended FIR/Kalman Filtering
robot manipulator	Continuous-Time Decentralized Wavelet Neural Control for a 2 DOF Robot Manipulator
Rossler chaotic strange attractor	Efficient multi-moment non-linear filtering: experimental study for low power chaotic signals
	Experimental Study of the Derivative-free Kalman Filtering for Chaos
rough set theory	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
S	
Sample entropy	Analysis of P300 containing EEG through three non-linear methods
scheduling problem	A Fast 4-Approximation Algorithm for the Traveling Repairman Problem on a Line

schematic structure	Determination of Motion Freedom and Direct Kinematic Problem Solution of the Mechanism Similar to Delta Robot
SDNN	SDNN Index of Heart Rate Variability as an Indicator of Change in Rats Exposed to Fine Particles: Study of the Impact of Air Pollution in Mexico City
Segmentation	Determination of Temperature in Neonates Based in a Face IR Thermography Image Segmentation Algorithm
segmentation	Automatic Segmentation of Mammograms Using a Scale-Invariant FeatureTransform and K-Means Clustering algorithm
Self-timed	Characterization Technique to Implement Self-Timed Cells for VLSI Design Blocks
semantic matchmaking	A User Restrictions-Based Semantic Matchmaking Service for Resource Discovery
serially connected neurons	Study of the response of the connection of Adaptive Fuzzy Spiking Neurons with self-synapse in each single neuron
servomotor	Proposal of a Mechanism for an Electrical Elbow Prosthesis
SIFT	Automatic Segmentation of Mammograms Using a Scale-Invariant FeatureTransform and K-Means Clustering algorithm
sign language	Glove-Based Sign Language Recognition Solution to Assist Communication for Deaf Users
signal denoising	An Adaptive Geometrically-Complemented Approach for ECG Signal Denoising
Signal processing	Polyphase Filter-Bank Realization for the Simulation of Power System Transients
Similarity of Sentences	Similarity of Sentences through Comparison of Syntactic Trees with Pairs of Similar Words
similarity quality measure	Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms
singularities	Determination of Motion Freedom and Direct Kinematic Problem Solution of the Mechanism Similar to Delta Robot
Sliding Mode	Magnetic Control of Tethered Cube-Satellite Stabilized by Rotating

Sliding-mode	Observer and parameter estimation for IWP: comparison of a super-twisting algorithm and an adaptive method
smallest primitive embeddings	Smallest Primitive Embeddings of Planar Graphs
Smart wheelchairs	Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface
Soft	Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy
Sol-gel	Structural and optical properties of molybdenum doped bismuth vanadate powders
Space Tether	Magnetic Control of Tethered Cube-Satellite Stabilized by Rotating
spectral	Effect of Transparent Conductive Oxide Material and Frontal Interface on Characteristics of Si:H p-i-n Junction
Spectrum Decision	Performance of MADM Algorithms with Real Spectrum Measurements for Spectrum Decision in Cognitive Radio Networks
Spectrum Measurements	Performance of MADM Algorithms with Real Spectrum Measurements for Spectrum Decision in Cognitive Radio Networks
Sputtering	Effect of rf power on Structural, Optical and Morphological Properties of Ultrathin Undoped ZnO films deposited by rf Magnetron Sputtering
squares patterns	Formation of Square Patterns using a model alike Swift-Hohenberg
Stable fuzzy controller	Design and hardware implementation of a closed-loop stable fuzzy controller
Standard cell	Characterization Technique to Implement Self-Timed Cells for VLSI Design Blocks
State estimation	Adapting Horizon Size in Finite Impulse Response Filtering Through Switching Extensible FIR Filter Bank
	Optimal FIR Estimator for Discrete Time-variant State-Space Model
state estimator	Rao-Blackwellized Particle Filter for Multiple Object Tracking in Video Analysis

Stereo Vision	Comparing Two Methods of Object Detection in Autonomous Vehicle
stereo-camera	Design and construction of tools with reflecting-disks fiducials for optical stereo trackers
street sweeping problem	Approximation Algorithms for the Street Sweeping Problem
Subpixel floating object	Detection of the Subpixel Floating Objects on an Agitated Sea Surface Using an Image Sequence
Super-peers	Support for resource aggregation in collaborative P2P systems
surface morphology	Study of Morphological Characteristics of Si:H p-i-n Structures Deposited by Plasma on Plastic Substrates
Swift-Hohenberg equation	Formation of Square Patterns using a model alike Swift-Hohenberg
switched-mode power supply	I-LQG Control of DC-DC Boost Converters
Switching extensible FIR filter bank (SEFFB)	Adapting Horizon Size in Finite Impulse Response Filtering Through Switching Extensible FIR Filter Bank
synchronization	Analysis of the Impact of Vias on Resonant Rotary Traveling Wave Oscillators
synthesis	Synthesis of a Four-bar Mechanism for Position Control Using the Harmony Search Algorithm
system of activation	Proposal of a Mechanism for an Electrical Elbow Prosthesis
system of transmission	Proposal of a Mechanism for an Electrical Elbow Prosthesis
T	
TCO	Effect of Transparent Conductive Oxide Material and Frontal Interface on Characteristics of Si:H p-i-n Junction
tco	Optoelectronic Properties of ZnO:In Thin Films by Ultrasonic Spray Pyrolysis
teleoperation	Robust Higher Order Sliding Mode Based Impedance Control for Dual-User Teleoperation under Unknown Constant Time Delay.

Temperature Sensor	Integrated Digital Architecture for Measuring Temperature Using a VCO as Sensor
textiles	Electrical characterization of textile electrodes for an ECG acquisition system
Thermography	Determination of Temperature in Neonates Based in a Face IR Thermography Image Segmentation Algorithm
thin films	Optoelectronic Properties of ZnO:In Thin Films by Ultrasonic Spray Pyrolysis
time-delay systems	Predictive Control and Truncated Predictor: A Comparative Study on Numerical Benchmark Problems
TiOx	Polyfluorene-based ligh-emitting diodes using TiOx as an electron injection layer
Toolkit	Support for resource aggregation in collaborative P2P systems
torque	Proposal of a Mechanism for an Electrical Elbow Prosthesis
trajectory tracking	Continuous-Time Decentralized Wavelet Neural Control for a 2 DOF Robot Manipulator
Transient simulations	Polyphase Filter-Bank Realization for the Simulation of Power System Transients
transitions between individual and collaborative work modes	Supporting Face to Face Collaboration through Dynamic Arrays of Mobile Devices
Traveling repairman problem	A Fast 4-Approximation Algorithm for the Traveling Repairman Problem on a Line
truncated predictor	Predictive Control and Truncated Predictor: A Comparative Study on Numerical Benchmark Problems
U	
UAV	Mini airplane: Design, Aerodynamic Modeling and Stability
ubiquitous collaborative environments	A User Restrictions-Based Semantic Matchmaking Service for Resource Discovery
Ultra thin films	Effect of rf power on Structural, Optical and Morphological Properties of Ultrathin Undoped ZnO films deposited by rf Magnetron Sputtering

ultrasonic spray	Optoelectronic Properties of ZnO:In Thin Films by Ultrasonic Spray Pyrolysis
ultrasound	Ultrasonic Estimation of Separation Change between Membranes in a Human Thorax Phantom Oriented to Pleural Effusion Detection
	Realistic Novel Breast and Breast Cancer Phantoms for the Study of Imaging and Therapy Ultrasound
unit time windows	A Fast 4-Approximation Algorithm for the Traveling Repairman Problem on a Line
up-sampling	Polyphase Filter-Bank Realization for the Simulation of Power System Transients
UWB	Heart Shaped Monopole Antenna with Defected Ground Plane for UWB Applications
V	
VCO	Integrated Digital Architecture for Measuring Temperature Using a VCO as Sensor
Verilog-A	Harmonic distortion analysis implementation for the determination of distortion in analog circuits.
VHDL	Photovoltaic panel emulator in FPGA technology using ANFIS approach
vibration sensor	Modal analysis of a structure used as a capacitive MEMS accelerometer sensor
video analysis	Rao-Blackwellized Particle Filter for Multiple Object Tracking in Video Analysis
W	
wavelet	Continuous-Time Decentralized Wavelet Neural Control for a 2 DOF Robot Manipulator
wearable	Electrical characterization of textile electrodes for an ECG acquisition system
Web service comparison	Representing Web Service Operations as N-ary Trees and RDF Serializations to Allow Service Comparison and Automatic Documentation

Web service documentation	Representing Web Service Operations as N-ary Trees and RDF Serializations to Allow Service Comparison and Automatic Documentation
wheat seeds	Biostimulation of the Growth of Wheat Seeds produced by modulated pulsed Diode Lasers radiation
Wideband mobile phone antennas	Broadband PIFA Antenna for Mobile Communications Terminals
windy postman problem	Approximation Algorithms for the Street Sweeping Problem
WSDL	Representing Web Service Operations as N-ary Trees and RDF Serializations to Allow Service Comparison and Automatic Documentation
X	
X-ray diffraction	Synthesis and characterization of ZnO powders by homogeneous precipitation from different zinc precursors
Z	
z-Transform	Polyphase Filter-Bank Realization for the Simulation of Power System Transients
zinc oxide	Optoelectronic Properties of ZnO:In Thin Films by Ultrasonic Spray Pyrolysis
Zinc Oxide	Synthesis and characterization of ZnO powders by homogeneous precipitation from different zinc precursors
ZnO	Effect of rf power on Structural, Optical and Morphological Properties of Ultrathin Undoped ZnO films deposited by rf Magnetron Sputtering
ZnO Pellets	Manufacture of Ag, Cr and Cu-doped ZnO Pellets for Gas Sensor Applications
ZnO Powders	Manufacture of Ag, Cr and Cu-doped ZnO Pellets for Gas Sensor Applications

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Abstracts

Automatic Control (AC)

1 Session AC1: Time-delay systems

Wednesday October 1, 2014
9:00-10:00
Session Chair: Dr. Pavel Vorobiev

1.1 Necessary Exponential Stability Conditions for Scalar Periodic Time-Delay Systems

Marco A. Gomez, Sabine Mondié and Gilberto Ochoa

Abstract: In this article necessary conditions for exponential stability for scalar periodic systems with one delay are presented. They are obtained in the framework of Lyapunov-Krasovskii functionals of complete type and depends exclusively on the Lyapunov function of the delay system.

1.2 Robust Higher Order Sliding Mode Based Impedance Control for Dual-User Teleoperation under Unknown Constant Time Delay

Hugo Santacruz-Reyes, Luis G. García-Valdovinos, Hugo Jiménez-Hernández, Alan G. López-Segovia and Omar A. Domínguez-Ramírez

Abstract: This paper presents a dual-user teleoperation scheme to perform a collaborative task using n-DOF nonlinear manipulators as masters and slave. It consists on impedance controllers for the manipulators in order to achieve a desired dynamic behavior depending on the user's necessities. Moreover, to cope with the uncertainty in the slave, a sliding mode controller is introduced and a desired impedance model for the salve is chosen as the sliding surface. Since the slave teleoperator is in contact with a rigid environment, the slave controller requires a free of chattering control strategy, which makes first order sliding mode teleoperation control unsuitable. Then a higher order sliding mode based impedance controller is proposed to guarantee robust impedance tracking under constant, but unknown time delay. Therefore, a position scaling factor is incorporated to deal with the different workspaces among masters and slave. The validity of the proposed control scheme is demonstrated via simulations performed on a 3-DOF dual-user teleoperation system. The simulation setup includes a Phantom Premium 1.0, a Phantom Omni, a Catalyst-5 and communication channels which suffer from constant unknown time delays.

1.3 Optimal FIR Estimator for Discrete Time-variant State-Space Model

Shunyi Zhao, Yuriy Shmaliy and Fei Liu

Abstract: State estimation and tracking often require optimal or unbiased estimators. In this paper, we discuss the batch optimal finite impulse response (OFIR) filter for time-variant systems in white Gaussian noise. To reduce the computation time, we further derive the fast iterative form of this algorithm. It is shown that the OFIR filter has the Kalman filter (KF) form with the special initial conditions on the averaging horizon. A simulation example is given to demonstrate some important advantages of the OFIR filter against the unbiased FIR filter in a comparison to KF.

2 Session AC2 : Robotic systems

Wednesday October 1, 2014
12:30-13:50
Session Chair: Dr. Marco Antonio Blanco

2.1 Triangulation-Based Indoor Robot Localization Using Extended FIR/Kalman Filtering

Moises Granados-Cruz, Juan Pomarico-Franquiz, Yuriy Shmaliy and Luis Morales-Mendoza

Abstract: A combined extended finite impulse response (EFIR) and Kalman (EFIR/Kalman) algorithm is proposed for mobile robot localization via triangulation. A distinctive

advantage of the EFIR algorithm is that it completely ignores the noise statistics which are typically not well known to the engineer. Instead, it requires an optimal averaging interval of Nopt points. To run this algorithm, several initial Kalman estimates are used for the roughly set noise covariances. We consider a mobile robot travelling on an indoor floorspace and localized via triangulation with three nodes in a view. We show that the EFIR/Kalman filter is more accurate than the extended Kalman filter under the uncertain noise statistics and initial state.

2.2 Comparing Two Methods of Object Detection in Autonomous Vehicle

Dario Ivan Rosas Miranda, Volodymyr Ponomaryov and Alfredo Eduardo Palacios Enríquez

Abstract: Autonomous obstacle avoidance in mobile robots has been an active field in image processing and control theory. In this paper, we propose and evaluate two methods for multiple objects detection for a mobile robot in outdoor. The first method uses a block matching algorithm to obtain a disparity map and SURF features detector. The second strategy uses a semi-global stereo vision environment. Two methods are tested during detecting pedestrian, boxes and cones using a sequence video in validation of a robot.

2.3 Metro train operation control algorithms with regulation restrictions adaptive to system state changes

Leonid Baranov, Ekaterina Balakina, Liudmila Loginova and Pavel Vorobiev

Abstract: A metro centralized train operation control algorithm is proposed which answers to the changes in the regulation restrictions, normally considered fixed, caused by perturbations in the system. A method is explained of using special regulative characteristics of every station-to-station block of the metro line, which allows the usage of more flexible running and station times for the trains. Proposed algorithm lowers the quantity of restrictive signals generated by the safety system ("red lights") and, by consequence, lowers the quantity of emergency stops between stations, allowing to save energetic resources spent on repeated train acceleration and to raise, in general, the quality of the transportation process.

3 Session AC3: State estimation

Wednesday October 1, 2014
15:30-16:30
Session Chair: Dr. Alberto E. Petrilli Barceló

3.1 A Generalized Algorithm for Nonlinear State Estimation Using Extended UFIR Filtering

Moises Granados-Cruz, Yuriy Shmaliy and Shunyi Zhao

Abstract: The unbiased finite impulse response (UFIR) filter provides better accuracy when the noise statistics are not fully known. Based on the UFIR approach, a generalized algorithm is developed for extended UFIR (EFIR) filtering of nonlinear models in discrete time state space. As well as the UFIR filter, the EFIR filter completely ignores the noise statistics and requires an optimal averaging horizon of Nopt points. The optimal horizon can be determined via measurements with much smaller efforts and cost than for the noise statistics. These properties of EFIR filtering are distinctive advantages against the extended Kalman filter (EKF). Extensive simulations confirm that the proposed iterative EFIR filtering algorithm is more successful in accuracy and more robust than EKF under the unknown noise statistics and model uncertainties.

3.2 High performance Direct Torque Control for Induction Motors using an Adaptive Sliding Mode Observer

Gabriel Calzada-Lara and Jaime Álvarez-Gallegos

Abstract: The principal objective of this work is to show that the performance of the control techniques well known like the Direct Torque Control, can be improved by the introduction of an adaptable state observer structure to

estimate variables that cannot be easily measured like the magnetic flux and torque; and that also, allow at the same time to know the stator resistance of the three phase squirrel cage induction motor, indispensable for their control using the DTC scheme. The secondary objective consists on developing a control strategy that allows limiting the current that is presented in the motor start, since this can be from 6 to 8 times the nominal current, which originates that the power devices are subjected to big efforts.

3.3 Observer and parameter estimation for IWP: comparison of a super-twisting algorithm and an adaptive method

Jesus N. Guerrero Tavares, Salvador Ortiz Santos and Humberto Aguirre Becerra

Abstract: In this paper the comparison of an adaptive method with Super-Twisting for states and parameters estimation of an IWP is presented. The estimated states are arm speed and pendulum wheel velocity through the position measurement (outputs) and the control signal (input). Subsequently the parameter estimator is implemented. The adaptive law estimates the states and parameters at once. For this, a passivity-based controller for positioning the pendulum in its inverted position is used. Finally the results simulated in Simulink / Matlab are presented.

4 Session AC4: Identification and Modelling

Wednesday October 1, 2014
9:00-10:00
Session Chair: Dr. Marco Antonio Blanco

4.1 Adapting Horizon Size in Finite Impulse Response Filtering Through Switching Extensible FIR Filter Bank

Jung Min Pak, Choon Ki Ahn, Myo Taeg Lim and Yuriy Shmaliy

Abstract: In finite impulse response (FIR) filtering, horizon size (memory size) is an important parameter that influences estimation performance. In this paper, in order to improve the estimation performance of a linear FIR filter, we propose a new method to manage horizon size. The proposed method adapts (adjusts) horizon size based on the likelihood of observation and it is called switching extensible FIR filter bank (SEFFB). The SEFFB exhibits smaller estimation errors than a single FIR filter that uses the best constant horizon size.

4.2 Modeling of a Greenhouse Prototype Using PSO Algorithm Based on a LabView Application

Alfonso Pérez-González, Ofelia Begovich-Mendoza and José Javier Ruiz-León

Abstract: This paper presents a simple method based on Particle Swarm Optimization (PSO) to identify several parameters in a proposed mathematical model of a greenhouse prototype. These parameters are sought in order to approximate the real characteristics of a greenhouse physic prototype building in CINVESTAV Unidad Guadalajara, by using the PSO to minimize a proposed error function, based on the estimation of the two more representative dynamics of the climate conditions inside the greenhouse: the air temperature and relative humidity. The implementation is carried out in an offline optimization schedule using real data recorded through the LabView SignalExpress application, and a real-time implementation in a LabView code to optimize the model in a sample-to-sample execution of the PSO. Validation shows a good agreement in a direct comparison with the real dynamic behavior of temperature and relative humidity measures inside the greenhouse prototype, as shown by the reached level of adaptation of the model through the several PSO tests under the best calibration conditions.

4.3 Formation of Square Patterns using a model alike Swift-Hohenberg

Jose-Antonio Medina-Hernandez, Felipe Gomez-Castaneda and José-Antonio Moreno-Cadenas

Abstract: Mechanisms for pattern formation in biological organisms and chemical reac-

tions have been broadly studied in last half of past century, because of they were frequently observed in many experiments. Traditional static patterns on the plane are patches forming hexagons, stripes and inverted hexagonal patches. Frequently, they are studied using reaction-diffusion models. The equation of Swift-Hohenberg has also been a paradigm for the formation of these structures, and for studies of localized patterns. In this paper, the behavior of a new equation similar to Swift-Hohenberg is analyzed, being able to produce square patterns having different shapes and sizes.

5 Session AC5: Intelligent Systems

Wednesday October 1, 2014
12:30-13:50
Session Chair: Dra. Ofelia Begovich

5.1 Intelligent Diagnosis Scheme applied to Model Hybrid Energy Power Generation System in presence of Soft Faults requirements: An FDI novel strategy

Carlos Gracios-Marin, German MuÑoz-Hernandez, Alejandro Díaz Sánchez, Edgar Portilla-Flores, Héctor Vázquez and Griselda Saldaña

Abstract: this article is a preliminary version of several improvements developed in last books and articles published by several authors in the actual theme of Scheduling for Hybrid Electrical Power Generation system. The hybrid system is implement using 1 aerogenerator system, 1 stirling motor connected with 1 generator, one solar kit and a battery system bank to transfer the energy conversion a controlled load system. The principal contribution is to obtain the Intelligent Diagnosis Scheme using a Fault Detection and Isolation (F.D.I.) Architecture describe using a Computational Equipment. Matlab Environment where the algorithms were coded and linked using Labview with a N.I. DAQ presents the results obtained by the F.D.I. structure. The models are evaluated in normal function and in presence of faults to determine the relationship between them. The final application of this scheme is developed in the insertion of novel Efficient Energy structure in automotive architectures. The potential final user is to test banks for Audi Laboratory Centre

5.2 Continuous-Time Decentralized Wavelet Neural Control for a 2 DOF Robot Manipulator

Luis A. Vázquez and Francisco Jurado

Abstract: This paper presents a decentralized wavelet neural control scheme for trajectory tracking of a two degrees of freedom (DOF) vertical robot manipulator. A decentralized recurrent wavelet first order neural network (RWFONN) structure is proposed to identify online, in a series-parallel configuration and using the filtered error (FE) training algorithm, the dynamics behavior of the plant. Based on the RWFONN subsystem, a local neural controller is designed via backstepping approach. The performance of the decentralized wavelet neural controller is validated via simulation.

5.3 Fault Detection and Isolation Problem: Sliding Mode Fuzzy Observers and Neural Networks

Juan Anzurez, Elisa Espinosa and Bernardino Castillo

Abstract: In this paper results of the application of a hybrid Fault Detection and Isolation scheme are presented. A Takagi-Sugeno fuzzy model is used to describe the system and a class sliding mode observers are designed to estimate the system state vector, from this the diagnostic signal-residual, is generated by the comparison of measured and estimated output. Neural Networks are proposed in order to solve the fault isolation problem based in signal-residual. The faulted component is identified from the active signal-residuals by means of application of the presented technique based on neural networks. This paper shows an application of the fault diagnosis technique which was tested satisfactorily in a two-tank hydraulic system.

5.4 Study of the response of the connection of Adaptive Fuzzy Spiking Neurons with self-synapse in each single neuron

Abigail Ramírez-Mendoza

Abstract: The study of the response of the connection of adaptive fuzzy spiking neurons with self-synapse in each single neuron is presented, based on the mathematical model. The simulations results for a single neuron with self-synapse and three neurons connected in series with self-synapse each one, are presented and performed in Simulink of MatlabTM.

6 Session AC6: Automatic Control I

Wednesday October 1, 2014
15:30-16:30
Session Chair: Dra. Ofelia Begovich

6.1 Magnetic Control of Tethered Cube-Satellite Stabilized by Rotating

Sajjad Keshtkar, Alexander Poznyak and Najmeh Keshtkar

Abstract: Active magnetic control have been used to develop the rotating stabilization of tethered nano-satellites. It uses magnetic control to stabilize the orbit position by controlling angular velocity of rotating TCS. The system uses Earth's magnetic field as energy source to interact with a long conductive tether and consecutively reach the rotational stability on Low Earth Orbit (LEO). The mathematical model and control design describing orbiting system for two connected cube-satellites with a 1-km- length tether have been studied. The adaptive version of sliding mode control was used to control the system in presence of unmodelled dynamics and perturbations. The performance of this system has been investigated via simulation.

6.2 Predictive Control and Truncated Predictor: A Comparative Study on Numerical Benchmark Problems

Liliam Rodríguez, Adrián Ramírez and Carlos Cuvas

Abstract: In this paper we revisit the procedures leading to a safe implementation of the well-known predictor-based feedback controller. Using a case study we reveal the limitations of such procedures and how the so-called truncated predictor feedback is able to avoid them. We also present a numerical comparison of the aforementioned controllers applied to a benchmark problem and provide a performance evaluation of both control schemes in terms of stability.

6.3 I-LQG Control of DC-DC Boost Converters

Leobardo Camacho-Solorio and Aarón Sariñana-Toledo

Abstract: We present a detailed design of a linear quadratic Gaussian control system with integral action (I-LQG) for a switched-mode DC-DC boost converter. Initially, identification tests were carried out to obtain an adequate linear model of the converter – using a black-box simulation model in MATLAB and Simulink –. Then, we proceeded with the design of LQG and I-LQG control systems in three steps. First, we designed a linear quadratic regulator (LQR). After that, we constructed a linear quadratic estimator (LQE) of Kalman type and completed a LQG control system using the separation principle. Finally, we added integral action to the system and derived new LQR and LQE to construct the I-LQG control system. We tested the LQG and I-LQG control systems in the black-box model. These tests showed the effectiveness of the controllers for the regulation of the converter's output, for the rejection of constant perturbations, and for the attenuation of noise in measurements.

Biomedical engineering (BIO)

7 Session BIO1: Biomedical Engineering

Thursday October 2, 2014
9:00-10:00
Session Chair: Dr. Carlos Alvarado

7.1 An Adaptive Geometrically-Complemented Approach for ECG Signal Denoising

Luis A. Gordillo, Mario Alfredo Reyes Barranca, Alejandro Medina Santiago, José Ángel Zepeda Hernández and Héctor Ricardo Hernández de León

Abstract: This paper proposes a geometrical criterion for denoising a single-lead ECG signal. It was designed to ease the use of heuristic procedures for removing the most common types of noises from ANSI/AAMI-compliant ECG signals. However, in this paper, only the system-noise was considered to illustrate how this geometrical criterion is applied to the signal. The proposal here presented relies on a voltage-level slope detector that marks where the signal starts to increase, decrease or remain at the same level in order to perform an abstract segmentation of the ECG signal. The resulting segments are quantitatively classified as significant segments or noisy segments by analyzing their amplitude and time duration according to a previously defined threshold-level with the intention of helping the algorithm to decide its own operational parameters. The system-noise filter proposed here has five different operation modes. The main one is based on the arithmetic mean operation to smooth out short-term fluctuations; additionally, it is complemented with geometrical estimations for preserving the physiological characteristics of the ECG signal. The other operation modes are purely based on geometric estimations to calculate the filter output. The geometrical criterion described here differs from many other approaches presented until now owing to its low mathematical complexity and low computational consumption since all calculations can be performed with raw ADC readings and arithmetical operations, characteristics that make this filter easy to implement on embedded systems. This denoising approach was designed for online processing applications but it also works well with previously recorded signals.

7.2 Analysis of P300 containing EEG through three non-linear methods

Jennifer Ladd Parada, Carlos Alvarado Serrano and Juan Manuel Gutierrez Salgado

Abstract: Along the electroencephalography signal one may identify several frequency intervals as well as negative and positive potentials which are related to conscience states (e.g. awake and asleep) and to neuronal processes such as the response to a variety of stimuli and their interpretation. The P300 is among the latter. The fact that these potentials are the result of the sum of several neurons activation, which are in turn shaped by cognitive processes, makes the EEG signal a good candidate for three types of non-linear analysis: DFA, sample entropy and phase synchronization. All 3 methods showed a higher information production rate and hemisphere synchronization for EEG segments containing P300, when applied to the recordings of 2 subjects from a BCI database. The most significant one was a γ=0.83 for the electrode pair PO3-PO4. Given that the differences between both studied patterns (visual ERP with and without P300), the measures obtained in this paper may be used as viable characteristics for the identification of such patterns.

7.3 SDNN Index of Heart Rate Variability as an Indicator of Change in Rats Exposed to Fine Particles: Study of the Impact of Air Pollution in Mexico City

Gabriel Vega Martínez, Cinthya L. Toledo Peral, Octavio Gamaliel Aztati-Aguilar, Andrea de Vizcaya-Ruiz, Carlos Alvarado-Serrano and Lorenzo Leija Salas

Abstract: This paper comprises the analysis of rats electrocardiogram (EKG) recorded within a toxicology study. Acquired signals are processed to assess changes in heart response to air pollution in Mexico City, by means of Heart Rate Variability (HRV) using the SDNN index. EKG records were acquired along 8 days from 12 rats, divided into control group, supplied with filtered air (FA), and exposed group, who was provided a concentration of fine particles (FP) in the polluted air

of Mexico City. After 8 recordings, FP group showed a significant decrease (p=0.028) in SDNN index values, while FA group showed no significant change (p=0.752) in SDNN index values.

8 Session BIO2: Biomedical Engineering

Thursday October 2, 2014
11:30-12:30
Session Chair: Dr. Carlos Alvarado

8.1 Proposal of a Mechanism for an Electrical Elbow Prosthesis

Diana Contreras, Alfredo Ramírez, Francisco Gallegos and Ivonne Bazán

Abstract: This work focuses on the description of the system of mechanism for a electrical prosthesis. Considering system performance and system of transmission, both will allow to make the movements of the electrical prosthesis. The electrical prosthesis was designed to replace the function of the elbow joint of an upper limb. In the system of transmission is based on rotary motion since it is similar to the movements of the elbow joint which is flexion and extension, to carry out these movements were determined using the gears; of which were calculated to produce them, it is described in this work. On the other hand, the system performance was chosen by using the electrical actuators for high efficiency, high availability and variety of sizes. To be able to define our system of mechanism of a electrical prosthesis, it should be considered several criteria listed in this work, and fi-nally the torque output was calculated to know how much weight can load the prosthesis designed.

8.2 Electrical characterization of textile electrodes for an ECG acquisition system

Cristina Guevara, Carmen Silva, Roberto Ambrosio, Aurelio Heredia and Mario Moreno

Abstract: Electrocardiograph signals (ECG) are one of the most important parameters used for monitoring the human physiological state. Nowadays, the research works using fabric conductive textiles for ECG are focusing on reliable and wearable systems. However, a complete characterization of textile electrodes is required to integrate it in standard clothing. Therefore, this work is devoted to the electrical characterization of electrodes based on conductive textile for an ECG system that monitoring the different human positions and also a comparison using the traditional silver (Ag/AgCl) chloride electrodes is presented allowing to demonstrate that ECG measured signal with these devices is proper for applications in wearable health monitoring.

8.3 Portable device for heart rate monitoring based on impedance pletysmography

Pablo Luna-Lozano, Oscar García-Zetina, Antonio Pérez-López and Carlos Alvarado-Serrano

Abstract: The design of a portable device for heart rate monitoring is described in this work. The cardiac activity is detected through the noninvasively measurement of blood volume changes in the forearm. When blood volume arrives to the forearm from the left ventricle, the electrical properties of the body segment change. These changes, that mainly comprise the electrical impedance of the tissue, are measured through the injection of a safely ac current and the detection of the voltage changes due to blood flow. Such a method is known as electrical impedance plethysmography. A peak-detection-software is used in a microcontroller to estimate the heart rate. Results of measuring the heart rate have shown accuracy that accomplishes the AAMI standards for heart rate monitors.

9 Session BIO3-BIO4: Biomedical Engineering

Thursday October 2, 2014
15:00-17:00
Session Chair: Dr. Arturo Vera

9.1 Realistic Novel Breast and Breast Cancer Phantoms for the Study of Imaging

and Therapy Ultrasound

Fernando Arce, Lorenzo Leija and Arturo Vera

Abstract: This paper describes the procedure to make a realistic and novel breast and breast cancer phantoms in order to mimic acoustic and geometric properties of the woman breast. Comparing the propagation speed of sound in our phantoms with others papers, we achieved 96.34 % of similarity in breast phantoms and 96.99 % of similarity in breast cancer phantoms by using accessible and cheap materials; furthermore, the phantom is easy to prepare. Images taken with a commercial equipment are presented.

9.2 Ultrasonic Estimation of Separation Change between Membranes in a Human Thorax Phantom Oriented to Pleural Effusion Detection

Josafat Cruz-Prieto, Ivonne Bazan and Alfredo Ramirez-Garcia

Abstract: The objective of this paper is to develop an ultrasound signal processing technique suitable to measure changes in distance between two membranes that simulate the pleural membranes in a basic human thorax phantom. The proposed technique is based on the correlation and autocorrelation methods. Obtaining an accuracy of 96.83 percent compared to those measures obtained with a caliper.

9.3 Obstacle Avoidance Embedded System for a Smart Wheelchair with a Multimodal Navigation Interface

Amberlay Ruíz Serrano, Rubén Posada-Gómez, Miriam C. Reyes-Fernández, Albino Martínez-Sibaja and Alberto A. Aguilar-Lasserre

Abstract: Many users with motor disabilities, such as quadriplegics are unable to handle a power wheelchair securely, without causing harm to others, to themselves or their surroundings. Smart wheelchairs usually have been instrumented with a collection of sensors and computers using systems and algorithms that have been designed to provide safe navigation assistance through collision avoidance. This paper proposes a real-time obstacle avoidance embedded system adapted to work with a multimodal navigation interface. 26 Ultrasonic sensors (Sonars) were used to provide feedback of the distance between the wheelchair and the obstacles.

9.4 A Foot Temperature Measuring System for Diabetic patients

Fatima Lopez, Lorenzo Leija and Arturo Vera

Abstract: Diabetic foot ulcers (DFUs) are a major precursor to lower-limb amputations and a prominent cause of morbidity in patients with diabetes. There are several points on the foot susceptible to ulcers that are directly related to a temperature change. The aim of this study was to design and implement a foot temperature monitoring system. This system is capable of recording the temperature of four foot areas more susceptible to ulceration and then analyzed and processed the data collected. We tested our system over five diabetic and non-diabetic patients. The results indicate that there is a temperature difference between the right and the left foot on some of the diabetic patients.

9.5 Determination of Temperature in Neonates Based in a Face IR Thermography Image Segmentation Algorithm

Lucia Berenice Chávez Rivera, Leticia Ortega Maynez and Roberto Carlos Ambrosio Lázaro

Abstract: The temperature is a factor for the health of a newborn. In this paper, an algorithm for automatic face segmentation in digital thermal images of is proposed. A one hundred thermal images database was belonging to five different neonates, twenty images for each one. For the neonate facial segmentation, the active contour method Chan-Vese was used and for the separation of interest regions, fuzzy sets were implemented. The temperature data obtained using two mathematical equations. For interpretation of the data, a graphical user interface was created, where the user can choose between automatic

or manual mode, for the analysis of the temperature. Finally, the proposed algorithm was tested using metric of segmentation.

9.6 Biostimulation of the Growth of Wheat Seeds produced by modulated pulsed Diode Lasers radiation

Jose Alfonso Domínguez Chávez, Alexandre Michtchenko and Andrey Budagovskii

Abstract: In this work we determine the radiation intensities and times for a system designed on base of pulsed diode lasers with λ = 904 nm to produce biostimulation effects on two physiological parameters of wheat seed "Triticum aestivum L" of the variety Nahuatl F2000: the growth of steam and root. The experimental design was carried out through the guidelines and requirements established by the ISTA (International Seed Testing Association) 2009. Descriptive statistic was applied to analyze the existence of stimulatory effects in this type of seeds.

Communications Systems

10 Session COM1
Thursday October 2, 2014
9:00-10:00
Session Chair: Dr. Marco Aurelio Cárdenas Juárez

10.1 Efficient multi-moment non-linear filtering: experimental study for low power chaotic signals

Valeri Kontorovich and Fernando Ramos-Alarcon

Abstract: This paper presents experimental results related to the multi-moment non-linear filtering of chaotic signals. For simplicity of implementation only the particular case of two moments filtering (2MM) is developed here. The 2MM filtering approach is especially suited for estimation of extremely weak chaotic signals immersed on an accompanying noise signal (Additive White Gaussian Noise, AWGN) or together with some other type of information signal. The performance of the 2MM technique is rather efficient in the sense that very small values of the Normalized Mean Square Error (NMSE) can be achieved for Chaos/Noise or Chaos/signal ratios below 0 dB. This experimental study allows establishing clearly the trends of the multi-moment approach.

10.2 Experimental Study of the Derivative-free Kalman Filtering for Chaos

Valeri Kontorovich and Carmen Beatriz Rodriguez Estrello

Abstract: An experimental study related to the derivative-free Kalman filtering scheme for chaotic signals is presented in this paper. Some previously published papers had proposed some effective quasi-optimum nonlinear filtering algorithms for chaotic signals. However, digital implementation of these approaches has certain limitations such as loose of stability, cumulative errors, high computational complexity, etc. In order to avoid these shortcomings, in this paper we propose a new robust and rather efficient alternative approach for the nonlinear filtering based on differential flatness property of some chaotic non-linear dynamic systems. Moreover, experimental results presented in this paper allow comparing non-linear filtering algorithms for chaos with derivative-free technique under different scenarios.

10.3 Detection of the Subpixel Floating Objects on an Agitated Sea Surface Using an Image Sequence

Victor Golikov, Olga Lebedeva, Marco Rodriguez Blanco, Manuel May Alarcon, Francisco Mendez Martinez and Mayolo Islas Chuc

Abstract: The optical subpixel detection of the floating objects on an agitated sea surface remains a hard problem. In this paper, we conduct a comparative study and investigate the relationship between two techniques in image sequence detection: well-known matched subspace detection (MSD) and recently proposed modified MSD (MMSD). MMSD

approach extends the optimum Neymann-Pearson methodology to detection of a subspace signal in correlated additive Gaussian background when the background power may be different under the null (H0) and alternative (H1) hypotheses. It is assumed that the background covariance structure and power under the null hypothesis are known but under the alternative hypothesis the background power can be unknown. This situation occurs in optical systems when the presence of a small point (subpixel) object decreases the background power. The proposed detector structure contains the additional adaptive corrective term in the threshold. This corrective term decreases the value of presumed threshold automatically and, therefore, increases the probability of detection. Computer simulation and experimental results have shown that the proposed detector outperforms the conventional MSD. The influence of the adaptive threshold on the detector performance has been evaluated for the example scenario of the subpixel floating object on the agitated sea surface by using the experimental and simulation results.

11 Session COM2:
Thursday October 2, 2014
11:30-12:30
Session Chair: Dr. Victor Golikov

11.1 Performance of MADM Algorithms with Real Spectrum Measurements for Spectrum Decision in Cognitive Radio Networks

Rafael Aguilar-Gonzalez, Marco Cardenas-Juarez, Ulises Pineda-Rico and Enrique Stevens-Navarro

Abstract: Spectrum decision is an important functionality of a cognitive radio terminal, which allows the selection of the appropriate frequency band from the available underutilized spectrum. Spectrum decision conducts itself in accordance to the communication requirements of the secondary (or cognitive) users in the forthcoming Cognitive Radio Networks (CRNs). Selecting the best spectrum for a given transmission involves making preference decisions over the set of available alternatives of frequency bands, which are indeed characterized by different attributes. Therefore, spectrum decision can be modeled as a multiple attribute decision making (MADM) problem. In this paper, we evaluate the performance of MADM decision algorithms such as Simple Additive Weighting (SAW), Technique for Order Preferences by Similarity to Ideal Solution (TOPSIS) and the Compromise Ranking Method VIKOR for spectrum decision. The study, however, is conducted using real spectrum occupancy measurements to evaluate the performance of the aforementioned algorithms in a practical scenario. Some important attributes of underutilized spectrum are proposed for consideration in the decisions. Results show that SAW algorithm performs well for the preferred spectrum attributes in the selected scenarios, while offering a good performance also in other parameters.

11.2 Heart Shaped Monopole Antenna with Defected Ground Plane for UWB Applications

Cruz Ángel Figueroa Torres, José Luis Medina Monroy, Humberto Lobato Morales, Ricardo Arturo Chavez Perez and Andres Calvillo Tellez

Abstract: In this paper a monopole antenna with shape of heart for Ultra Wide Band (UWB) applications is proposed. The structure is a simple patch with shape of heart designed on FR-4 substrate and fed by a 50 Ohms microstrip line. The ground plane of the antenna has been modified including several defects to improve its behavior in matching and wideband. A parametric study has been performed to the semicircular slots located in the ground plane area. The frequency range measured for S11<-10dB was from 2.7 - 26 GHz. The total dimensions of the antenna are 48x40mm (W x L).

11.3 Broadband PIFA Antenna for Mobile Communications Terminals

Ricardo Gómez, Hildeberto Jardón and Roberto Linares

Abstract: A broadband PIFA antenna that operates in the 800-970 MHz and 1.5-5.9 GHz bands with VSWR less than 3 is proposed for wireless communications terminals. This wideband is enough to cover the most important mobile communications services around the world such as GSM 850/900, DCS, PCS, UMTS, WiFi, Bluetooth, WiMAX, and the major part of the LTE bands. Antenna volume of 4x2x1 cm3 is within acceptable limits for different mobile terminals including portable handheld devices and embedded WLAN antennas. Besides its wideband characteristic, the proposed antenna exhibits adequate gain and radiation patterns, and has the advantages of any PIFA antenna such as low SAR and stable tuning.

Computer science and computer engineering (CS)

12 Session CS1:
Thursday October 2, 2014
9:00-10:00
Session Chair: Dr. Alberto E. Petrilli Barceló

12.1 Supporting Face to Face Collaboration through Dynamic Arrays of Mobile Devices

Marco Castro and Sonia Mendoza

Abstract: Nowadays, it is difficult to find applications for mobile devices that allow co-located users to carry out transitions between individual and collaborative work modes. In fact, most of the single-user applications cannot be used to work with others, and vice-versa. The main contribution of this work is the design and implementation of a development support that allows programmers to extend their applications with functions to accomplish such work mode transitions, by relying on coupling and decoupling gestures on heterogeneous mobile devices to respectively do and undo irregular arrays of such devices. The proposed development support has been implemented for Android platforms following a P2P architecture.

12.2 Support for resource aggregation in collaborative P2P systems

Damian Arellanes, Sonia Mendoza and Dominique Decouchant

Abstract: In the last years, usage alternatives of P2P systems have been proposed, in which nodes provide resources and use resources of others in a collaborative way, in order to accomplish high scale tasks. Such systems are called "Collaborative P2P Systems" and have an important role in resource aggregation: advertisement, discovery, selection, matching, and binding phases. However, any toolkit does not allow developers to incorporate resource aggregation support into such systems using a specific programming language. In addition, existent solutions do not achieve cohesion among the key phases of resource aggregation (selection, matching, and binding). The main contribution of this paper is the design and implementation of a novel support that provides cohesion among such key phases and allows developers to aggregate multi-attribute, single-attribute, dynamic, static, and heterogeneous resources into collaborative P2P systems. The proposed Java-based support follows an unstructured topology based on super-peers, which advertise, select, match, and bind resources on behalf of their peers, reducing the network traffic. To validate our proposal, we developed a collaborative P2P application that generates the Mandelbrot set by means of the collaboration of several heterogeneous resources.

12.3 Fault Tolerance In Heterogeneous Multi-Cluster Systems Through A Task Migration Mechanism

Uriel Cabello, Guadalupe Rodriguez, Amilcar Meneses, Sonia Mendoza and Dominique Decouchant

Abstract: The GRID computing paradigm consists of multiple heterogeneous distributed clusters connected by heterogeneous net-

work interfaces. One advantage of this paradigm is to analyze massive amounts of data employing computing resources at different geographic places with different platforms. However in order to harness the power of those resources, many problems must be solved. In this work we deal with the problem of fault tolerance on heterogeneous computer systems. Our proposal aims to ease the process of recovery when system failures are detected at run-time avoiding the necessity for application restarts. Our proposal works through a set of services that performs transparent task migration over the computing nodes, hiding the complexity related with error handling when a hybrid programming model based on Open MPI and OpenCL is employed.

13 Session CS2:
Thursday October 2, 2014
11:30-12:30
Session Chair: Dr. José Gabriel Réding Domínguez

13.1 Representing Web Service Operations as N-ary Trees and RDF Serializations to Allow Service Comparison and Automatic Documentation

Jorge Nader-Roa, José Rodríguez and Maricela Bravo

Abstract: With the increasing development of Web services (WS) it is necessary to use tools capable of providing better and more efficient search and classification mechanisms. Bringing to users the facility to select a service or a set of services that satisfy the specified functional requirements of an application. However, the existing methods for classification and searching are developed with similar aims, but they use different input elements for its running, making them mutually incompatible among all approaches developed, avoiding their reusability. Therefore, we propose the representation of WS operations as N-ary trees for semantic and/or structural comparisons. Allowing independent comparison algorithms use N-ary trees as the same input, to making them compatible. Allowing Make more specific and focused algorithms, which can separate the semantic part of an operation with its structure by using a unique input, either they have semantic annotations or not because our N-ary trees have all necessary information for semantic or structural comparisons. Additionally, we propose to process service operations as tree structures and represent them using RDF - a language for knowledge representation - to execute inferences and get semantic annotations. This semantic representation will specify easily the relation between composite variables names and the names of their primitive variables which are contained in a WS operation. Generating RDF serializations that easy the automatic extraction of semantic relations between the variables names of an operation and allowing to link variables names with their semantics defined in a different RDF resource. Generating automatic documentation for web services operations by using the information of semantic repositories.

13.2 Similarity of Sentences through Comparison of Syntactic Trees with Pairs of Similar Words

Karla Duran, Jose Rodriguez and Maricela Bravo

Abstract: The comparison of sentences has several applications and they can be addressed by different approaches. One of them is to compare a pair of sentences through analysis of syntactic trees. In this work we present a method to evaluate the similarity between a pair of sentences, through the comparison of syntactic trees. The method makes an exploration of branches of trees trying to find similar nodes between them, giving a degree of similarity by each comparison. The method is designed to take into account the type of each node and, the number of them on each tree and the nodes to match on trees compared, i.e. this proposal considers all of nodes and not only if one tree is contained into another tree.

13.3 A User Restrictions-Based Semantic

Matchmaking Service for Resource Discovery

Salma Velasco, Sonia Mendoza, Kimberly García and Dominique Decouchant

Abstract: Most of the semantic matchmaking algorithms have been developed for the search of Web services, since there is a huge need for tools that help taking advantages of services that already exist, but which most of the times are under exploited because their existence remains unknown; thus to promote their usage, matchmaking algorithms are build. However, similar types of solutions for resource discovery in organizations are quasi-inexistent mainly due to the difficulty that represents the management of all the resources available in organizations where human interaction and their implications must be considered. In this paper, we explore an approach to the search of shared resources in collaborative settings by profiting from several principles of the typical semantic match- making algorithms. The main contribution of our proposal is to consider people's collaborative context, preferences, and social relationships in order to evaluate their current restrictions when they make a request regarding shared resources. In this way, the users will receive a highly personalized match.

14 Session CS3:
Thursday October 2, 2014
15:00-17:00
Session Chair: Dr. Bassam Ali

14.1 Agent Based Mobile Recommender System

Muhammad Aslam, Ana Maria Martinez Enriquez and Sahar Moin

Abstract: Social networking websites (SNS) are attaining a lot of recognition by researchers as they prove to be a reservoir of huge amount of data. These sites have revolutionized the world of technology by allowing their users to form a virtual world of their own. The main notion behind building the social networking websites is to bring people from all walks of life together, having some link with each other either on the base of their philosophies or ideas about life, or belonging to same occupational class, or sharing same thoughts and views, in a form of virtual community. SNSs provide a medium for people to remain in contact with their beloved ones, get global as well as local updates, and share their feelings with others. Additionally, these sites have also been used effectively for marketing and advertising almost every kind of products. Companies announce their pages while giving demonstrations of their items. Thus, SNS have basically emerged most common recommender engines. However, most of the times, unnecessary and irrelevant information are displayed on these social interaction pages which causes high data traffic and distract of user concentration. This issue becomes severe in case a user visits multiple social websites frequently. Thus, a personalized system is needed that could provide a single platform to make recommendations based on user's friends circle on different SNS sites. Different multi agent system architectures have been proposed to efficiently carryout different search and recommendation procedure but, little attention was given to the user interface. In this research, we solve this issue by the design and development of adaptable intelligent agent based interface. The objective is to intelligently present the personalize recommendations help a user to get what he needs from his social Web site in a blink of eye without wasting time in dealing with a complex search procedures.

14.2 Cloud Service Recommender System Using Clustering

Muhammad Aslam and Ana María Martínez Enríquez

Abstract: The prevalence of cloud computing has resulted in an increased number of services developed for the Web. Selecting an appropriate cloud service from amongst a lot of commonly featured available services has become very difficult particularly for non-IT users i.e. it is cumbersome for users to select a cloud service that is best suited to their re-

quirements. Quality of service is considered as one of the main criteria's in the selection process. This paper focuses on cloud service selection method allowing users to specify their perception of quality criteria. Our approach is based on the data mining technique clustering which is an unsupervised learning technique. Developed algorithm classifies the cloud services into different number of groups based on selected quality attributes and ranks them accordingly. The research aims to assist every type of users for choosing a cloud service without engaging into any financial contract. In order to validate our approach of best service selection, we test our system with cloud vendors like Google, Microsoft, and Amazon.

14.3 Glove-Based Sign Language Recognition Solution to Assist Communication for Deaf Users

José Emiliano López-Noriega, Miguel Iván Fernández-Valladares and Victor Uc-Cetina

Abstract: This manuscript presents the research and development of a software that help deaf-mute communication by identifying the position of the fingers of the hand with 5DT gloves. The sign language is adopted by nearly all people with hearing deficiency, making it their main form of communication, but this communication is only successfully achieved if all the participants of the conversation are familiar with the sign language. The goal is to be able to translate hand signs into words and phrases with the possibility to send audio signals to allow deaf-mute users to communicate to people not familiar with the sign language. The recognition of hand gestures is accomplished using a neural network tested using five different training algorithms. A cross-validation experiment is provided to illustrate the robustness of our methods.

15 Session CS4:
Friday October 3, 2014
9:00-10:00
Session Chair: Dr. Luis Gerardo de la Fraga

15.1 Smallest Primitive Embeddings of Planar Graphs

Sergio Luis Pérez Pérez, Gloria Aguilar Cruz, Celene Dorali Alfaro Quintero, Jorge Arturo Pérez Arcos and Francisco Javier Zaragoza Martínez

Abstract: A graph is said to be planar if it can be drawn on the plane with vertices as different points and edges as continuous curves that only intersect its vertices. An embedding of a graph is said to be primitive if its edges are primitive segments. A recent conjecture is that all planar graphs with n vertices have a primitive embedding in a square grid of side O(n). It is known that trees have that type of embedding. A smallest primitive embedding is that in which the square grid has side as small as possible. In this work we present some results about the smallest primitive embeddings for trees, outerplanar graphs, and planar graphs with few vertices, as a computational approach to give evidence that the above conjecture might be true.

15.2 A Fast 4-Approximation Algorithm for the Traveling Repairman Problem on a Line

Sergio Luis Pérez Pérez, Luis Eduardo Urban Rivero, Rafael López Bracho and Francisco Javier Zaragoza Martinez

Abstract: The traveling repairman problem is a scheduling problem in which a repairman is supposed to visit some customers at their locations to perform some jobs. Each customer has a time window during which the repairman is allowed to arrive to perform the jobs. The goal is to maximize the number of visited locations. In this work we deal with a special case in which the locations are on a line, the processing time of each job is zero, and the time window length is unitary. Although the general TRP is NP-Hard, the complexity of this special case remains unknown. We introduce a quadratic 4-approximation algorithm based on the 8-approximation algorithm proposed in 2005 by R. Bar-Yehuda, G. Even, and S. Shahar.

15.3 Approximation Algorithms for the Street Sweeping Problem

Luis Francisco Hernández Sánchez, Laura Elena Chávez Lomelí and Francisco Javier Zaragoza Martínez

Abstract: The Street sweeping problem (SSP) is a variation of the Windy postman problem (WPP) in which we must construct two tours traversing every edge, and each edge must be traversed once in each direction: one on the first tour and the opposite in the second tour. The computation complexity of this problem remains open. We present a ((3/2)alpha +1)-approximation algorithm for the SSP using an alpha-approximation algorithm for the WPP. We also present exact algorithms for some classes of graphs.

16 Session CS5:
Friday October 3, 2014
11:30-12:50
Session Chair: Dr. Luis Gerardo de la Fraga

16.1 Design and construction of tools with reflecting-disks fiducials for optical stereo trackers

Jorge Israel Pérez Arreguín, Saúl Tovar Arriaga, Jesús Carlos Pedraza Ortega, José Emilio Vargas Soto, Jorge Álvares Servín and Susana Vega Hernández

Abstract: In this article, a rapid prototyping tool design and construction for the development of tools for navigation optical systems is presented. Theses markers differentiate from commonly used ones because they use cheap reflective stickers as markers fiducials. We built markers with a 3D printer and tested two different sized circular reflective stickers with calibration errors bellow to 0.25 mm. The reflection angle of the sticker fiducials are their mayor problem. Nevertheless, the obtained calibration accuracy (quite similar to state of the art fiducials) could be a fast and cheap option to be used with non-risky applications, such as metrology or object digitalization in which the reflection loss due to critical angles is not an issue.

16.2 Towards an Automatic Counter of Lunar Craters

Victor Uc-Cetina, Jesús Cabrera-González, Anabel Martin-Gonzalez and Jorge Lugo-Jiménez

Abstract: Quantification of impact craters on planetary surfaces is relevant to understand the geological history of the planet. In order to automatize quantification of lunar craters in digital images, the first step is to develop a computational tool capable of classifying a subwindow of pixels into two possible outputs: crater / non-crater. In this paper, we provide preliminary experimental results using an adaptive boosting algorithm to train a binary classifier for lunar crater identification. Using 30 weak classifiers we obtain 0.925 and 0.94 of sensitivity and specificity, respectively.

16.3 Automatic Extraction of Geometric Models from 3D Point Cloud Datasets

Daniel Lopez-Escogido and Luis Gerardo De La Fraga

Abstract: We present in this work a methodology for fitting 3D primitive geometric models to a non-organized point cloud datasets. First, a mathematical model for the plane, sphere, cylinder and cone primitives are introduced, then we use the Random Sample Consensus algorithm to detect and extract one or several of those primitives. As an additional step, the scene reconstruction using only the primitive models and constructive solid geometry can be generated. The proposed models can be used for both, to reduce the space required in their representation, from thousand of 3D points to a single equation, and to obtain the 3D reconstruction from single and composited geometric objects. Furthermore, the models can be used for render them in different graphic software tools like CAD, OpenGL, or Povray.

17 Session CS6:
Friday October 3, 2014
9:00-10:00
Session Chair: Dr. Bassam Ali

17.1 Maximum Likelihood Thresholding Algorithm Based on Four-Parameter Gamma Distributions

Peter De Ford and Geovanni Martinez

Abstract: In this contribution, we present a segmentation algorithm based on thresholding to subdivide an intensity image in the regions of object and background. The optimal threshold is found by maximizing a likelihood function derived from a novel intensity probability density function model, which consists of the sum of two weighted four-parameter gamma distributions, as a more flexible alternative to currently used models consisting of the sum of two weighted two-parameter Gaussian distributions. According to our experiments with 132 images, the proposed algorithm is in average slightly better than the best found in the scientific literature, performing particularly good in low contrast images. The additional parameters and complexity of its likelihood function resulted in an increase of the processing time by a factor of 3, from 0.003 sec/image to 0.009 sec/image.

17.2 Learning Similarity Measures from Data with Fuzzy Sets and Particle Swarms

Yumilka Fernandez, Lenniet Coello, Yaima Filiberto, Rafael Bello and Rafael Falcon

Abstract: Gauging the similarity among objects is a fairly common and important task that underpins many popular machine learning endeavours such as classification, clustering or regression. Uncertainty representation mechanisms, such as rough set theory, or information processing paradigms like granular computing also lean upon well-defined similarity measures to better model the objects in the universe of discourse. In this information-laden world, the responsibility of designing these crucial granular constructs is shifting from domain experts to intelligent systems that automatically learn from data. An approach that hybridizes particle swarm optimization with elements from rough set theory has been recently proposed [1] to build these similarity measures from scratch. However, this scheme still remains fairly sensitive to the values of the similarity thresholds both in the input attribute space and the decision space. In this paper, we tackle this limitation by employing fuzzy sets to categorize the domain of both similarity thresholds. The efficacy of the proposed methodology is illustrated with the K-nearest neighbor classifier. Empirical results over several well-known repositories confirm that this approach preserves the classification accuracy while reducing the number of system parameters and enhancing its interpretability.

17.3 Design and hardware implementation of a closed-loop stable fuzzy controller

Nohe R Cazarez-Castro and Yazmin Maldonado

Abstract: In this paper a stable in Lyapunov sense closed-loop fuzzy control system is designed and hardware instrumented (embedded) in a FPGA, to solve the velocity regulation problem of a DC motor. The design process allow to minimize the size of the fuzzy rule-base and the number of membership function for each input-output variable. Moreover, the design process automatically gives the granulation of the input-output variables. The resulting FLC is targeted to a Xilinx Spartan 3A device using Xilinx foundation environment and Xilinx System Generator.

18 Session CS7-CS8:
Friday October 3, 2014
11:30-12:50
Session Chair: Dr. Jorge Alberto Ruiz Vanoye

18.1 Space-Time AER Protocol Receiver Asynchronously Controlled on FPGA

Susana Ortega Cisneros, Juan José Raygoza Panduro, Daniel Tonali Aranda Bretón and Jose Roberto Reyes Barón

Abstract: Neuromorphic systems have been increasing in size and complexity in recent years, due to the adoption of the Address-Event Representation (AER) as a standard for transmitting signals among chips, and building multi-chip event-based systems.

The data amount and speed are keys in address-event receiver devices. Actual receiver designs are based on VLSI and ASIC-FPGA implementation. In this article we present a receiver implemented on reconfigurable devices FPGA, preserving the virtues of useful reconfiguration for design and development inherent of FPGAs. We present the design of the receiver and experimental results, which show the data management capability and speed of reception.

18.2 Automatic Segmentation of Mammograms Using a Scale-Invariant FeatureTransform and K-Means Clustering algorithm

Luis Antonio Salazar Licea, Cyntia Mendoza-Martínez, Marco Antonio Aceves Fernandez, Alberto Pastrana Palma and Jesus Carlos Pedraza Ortega

Abstract: In this work, a Scale-Invariant Feature Transform method, together with a K-means clustering is used in order to find regions of interest (ROI's) in mammograms. This paper focuses on presenting a tool that can improve the search of suspicious areas that contain abnormalities, leaving the final decision to the radiologist. The methodology is divided into three sections: first, a pre-processing step that consist in acquiring image and reduction its size erasing the background leaving only the breast area and eliminating noise. The second step is to improve the image quality through image thresholding and histogram equalization limited contrast (CLAHE). Last step of the methodology is the location of regions of interest in the image and is done using Scale-Invariant Feature Transform (SIFT) as the main tool and is complemented with Binary Robust Independent Elementary Features (BRIEF) to find descriptors and as classifier K-Means Clustering. Finally in the results are presented the location of ROI's and they are compared with the position of abnormalities diagnosed by the Mammographic Image Analysis Society.

18.3 Middleware Architecture for Control an Heterogeneous Expert System

Guillermo Barrera, José Rodríguez and Amilcar Meneses

Abstract: Expert Systems are tools used when it is required to take decisions, since they have artificial intelligence and human-like reasoning capacity, they need expertise and knowledge of human experts in the area where it will be used; they serve as support to the human experts to monitor and manage systems of various kinds. An Expert System that is used as an auxiliary tool in large systems or with lots of events, needs to be able to scale as the supervised system grows. This paper presents a Middleware architecture that allows to add to an Expert System the following capabilities: scalability, high availability and fault tolerance. The Middleware is designed to distribute the services of the system among multiple instances, ensuring that there is always an instance that can replace any other failed. In this way, an Expert System could have some features of the distributed systems. The Middleware encapsulates the communication mechanisms of the distributed system and saves the user from having to deal with this layer. In this proposal the Middleware is composed of TAO, which is an implementation of the CORBA specification for distributed systems, also incorporates the Boost library to enable a concurrent work on each of the modules of the system and uses an interface type REST to establish communication with the user.

18.4 Rao-Blackwellized Particle Filter for Multiple Object Tracking in Video Analysis

Sergio Gonzalez-Duarte and Mario I. Chacon-Murguia

Abstract: Object tracking is one of the most important tasks in video analysis systems. Starting with a precise object tracker it is possible to performvideo analysis tasks such aspeople counting, object classification or determine abnormal behaviors to name a few. This paper reports a Rao-Blackwellized Particle Filter model for multiple object trac-

king. The reported model shows good results handlingwith single, multiple and unknown number of targets. It was also tested considering various occlusion conditions, which are not frequently reported in literature. The model works on a binary image generated with a moving object segmentation algorithm, differentiating object and background classes.This characteristic provides the opportunity of integrating this particle filter model to other segmentation algorithms and moving object detectors in video sequences. The paper reports both qualitative results and quantitative metrics to show the performance of the systems under diverse conditions.

Mechatronics (MEC)

19 Session MEC1:
Wednesday October 1, 2014
9:00-10:00
Session Chair: Dr. Rogelio De Jesús Portillo Vélez

19.1 Synthesis of a Four-bar Mechanism for Position Control Using the Harmony Search Algorithm

Álvaro Sánchez-Márquez, Eduardo Vega-Alvarado, Edgar Alfredo Portilla-Flores and Efrén Mezura-Montes

Abstract: Harmony Search (HS) algorithm, explored in recent literature, is an efficient metaheuristic optimization technique based on the musical improvisation process. Different versions of HS have been developed and used in solving real-world problems; however, most of the applications are oriented to combinatorial optimization. This paper presents a novel application of a modified HS for the synthesis of a four-bar planar mechanism that follows a specific trajectory, in order to demonstrate the capabilities of this algorithm for handling numerical optimization problems. Four-bar mechanisms are a good example of hard optimization problems, since they are used in a wide variety of industrial applications. HS algorithm was modified to handle design constraints by implementing Deb's feasibility rules. Simulation results show a high-precision control of the proposed trajectory for the designed mechanism, thus demonstrating that HS can be applied successfully not only to classical benchmark problems but for solving real engineering cases.

19.2 Parametric Optimization of a Volumetric Pneumatic Actuator

Vladimir Ivlev, Victor Bozrov and Sergey Misyurin

Abstract: A procedure for selecting the basic design parameters of the radial_piston air motor, which implement the maximal power output with the minimal compressed air consumption and the minimal dimensions, is developed based on the detailed mathematical model of the motor. The multiobjective optimization of systems with a great number of variable parameters and the decision support are used.

19.3 Solution of Forward Kinematics Problem of 5-rod Car Suspension Mechanism with Singularities

Sergey Misyurin and Andrey Nelyubin

Abstract: In this paper kinematics of independent 5-rod vehicle suspension mechanism is solved numerically by multidimensional Newton method with regularization. Kinematical characteristics of the suspension that affect the performance of the whole vehicle guiding mechanism are discussed.

20 Session MEC2:
Wednesday October 1, 2014
12:30-13:50
Session Chair: Dr. Rogelio De Jesús Portillo Vélez

20.1 Determination of Motion Freedom and Direct Kinematic Problem Solution of the Mechanism Similar to Delta Robot

Andrey Markov, Natalia Sharpanova and Sergey Misyurin

Abstract: The article describes a new mani-

pulator with three degrees of freedom, similar to the well known Delta robot. The analysis of motion freedom of the mechanism was conducted and presented in section 2. It was shown that the mechanism have negative mobility in general case. The improved schematic structure of mechanism with three degrees of freedom equivalent to the previously reported scheme [4] was also proposed in section 2 for the purpose of solving direct and inverse kinematic problems. In section 3 we have shown the new method of determining the mobility of mechanism based on constrained equations analysis. The method is demonstrated by the spatial mechanism similar to the Delta robot.

20.2 Mini airplane: Design, Aerodynamic Modeling and Stability

Fernando Guerrero, Victor Martinez, Octavio Garcia and Daniel Librado Martinez Vazquez

Abstract: This paper presents the development of a mini airplane UAV, focusing on the aerodynamic design, modeling and stability. Mathematical model of the vehicle is obtained using the Euler-Lagrange formulation and includes aerodynamic parameters of the design. For the stability, a classic control law is proposed taking in account the aerodynamic parameters and the sensors bandwidth implemented in the aircraft. Simulation results are shown for the closed-loop system of the vehicle. Finally, aerodynamic design and avionics are based on flying and handling qualities for having a mini airplane that performs a reliable and stable flight.

20.3 Polyphase Filter-Bank Realization for the Simulation of Power System Transients

Jean René Zuluaga Duque and José Luis Naredo Villagrán

Abstract: This work illustrates the simulation of power-system transients through equivalent multi-rate models based on Filter Banks and IIR-FIR representation of the electric system. The processing structure is composed by a sub-band coder with M channels subsampled and a Polyphase implementation of filters. This concept is applied in time domain using signal processing theory, filter banks and z-Transform. The calculation scheme is implemented obtaining the transfer function from the study system and applying the convolution whit the proposed method. The calculation scheme is developed via independent systems allowing a parallel implementation which reduces the computational effort of each processor without loss of accuracy.

20.4 Simulink-HDL Cosimulation of Direct Torque Control of a PM Synchronous Machine based FPGA

Omar Sandre Hernandez, Jose De Jesus Rangel Magadaleno and Roberto Morales Caporal

Abstract: This paper presents the cosimulation of Direct Torque Control (DTC) for a Permanent Magnet Synchronous Machine (PMSM) based on the technology of Field Programmable Gate Array (FPGA). This approach is suitable to visualize the behavior of the control system before its implementation, which can prevent problems that could lead to damage in the machine under control. The DTC algorithm and the methodology for hardware description language in VHDL are presented. The cosimulation is carried out based on Matlab/Simulink and Active-HDL; simulation results are presented to validate the effectiveness of the presented methodology.

Nanotechnology (NANO)

21 Session NANO1: Nanotechnology

Friday October 3, 2014
9:00-10:00
Session Chair: Dr. Sergio Martínez Vargas

21.1 Structural and optical properties of molybdenum doped bismuth vanadate powders

Victor Ishrayelu Merupo, Velumani Subramaniam, Adi Kassiba and García-Sánchez Miguel Angel

Abstract: Molybdenum doped BiVO4 powders were prepared by Sol-gel method. Monoclinic scheelite phase was confirmed from X-ray diffraction (XRD) patterns and micro-Raman vibrational bands. Substitution of molybdenum in crystal sites of BiVO4 was evidenced from XRD by higher angle 2⊠ shift of the characteristic peak (-121) and from Raman showing lower frequency shift of dominant peak from 831 to 822 cm-1 which corresponds to V-O symmetric stretching mode. The morphological properties were analyzed by FE-SEM which confirmed homogeneous spherical shaped particles with size around 200-300nm. Optical properties were analyzed by Diffuse Reflectance Spectra which show higher absorption in the range of 550-850nm. Optical band gap energies were calculated by using Kubelka- Munk formula, i.e, 2.46 eV for 2 wt% Mo- BiVO4 and 2.47eV for undoped BiVO4. This confirms that, Mo-BiVO4 particles have the same band gap but induce higher absorption in visible light region compared to BiVO4.

21.2 Manufacture of Ag, Cr and Cu-doped ZnO Pellets for Gas Sensor Applications

Maria Del Rosario Herrera Rivera, Maria De La Luz Olvera Amador and Arturo Maldonado Alvarez

Abstract: Starting from a mixture of zinc acetate and potassium hydroxide, zinc oxide (ZnO) powders were prepared by the homogenous precipitation method. The powders were calcined at 800°C for 2h, and subsequently milled in a planetary ball milling during 8 h at a constant speed of 400 rpm. The crystalline phase was determined from X-Ray diffraction (XRD). The morphology of the particles was analyzed by using Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM). From XRD results the wurtzite structure of ZnO was corroborated. SEM images showed a homogenous distribution of the particle size, whereas from TEM analysis the particle size was determined with a higher precision. From the milled and calcined powders, a mixture of ZnO powders with alumina (Al2O3) was developed at different weight ratios for manufacturing 1 mm thick pellets. After measuring the sensing properties of undoped pellets, the [ZnO]/[Al2O3] ratio presenting the maximum sensitivity was taken as reference, and then, doped by impregnation pellets were manufactured to analyze the dopant effect. Three different dopants were used, namely, Cu, Ag, and Cr. The sensing properties of the pellets were tested in an atmosphere of propane, 500 ppm, and different operation temperatures, 200 and 300°C.

21.3 Synthesis and characterization of ZnO powders by homogeneous precipitation from different zinc precursors

Ana M. Pineda, M. Rosario Herrera and M. De La Luz Olevera

Abstract: This work presents the results obtained on the effect of two different zinc precursors (zinc nitrate and zinc acetate) and different parameters on the synthesis of ZnO powders. The ZnO powders were synthesized by the homogeneous precipitation technique, using sodium hydroxide as precipitant agent. All the resultant precipitates in the process were dried and calcined to produce the ZnO powders. The powders were characterized by X-ray diffraction (XRD) and scanning electron microscopy (SEM). The characterization results revealed a hexagonal wurtzite structure with an average particular size of 34.4 to 53.5 nm. All the synthesized particles presented different sizes with an irregular geometry.

22 Session NANO2: Nanotechnology – SSM6- Solid State

Friday October 3th, 2014

11:30-12:50

Session Chair: Dr. Sergio Martínez Vargas

22.1 Effect of rf power on Structural, Optical and Morphological Properties of Ultrathin Undoped ZnO films deposited by rf Magnetron Sputtering

Vinoth Kumar Jayaraman, Maria De La Luz

Olvera, Arturo Maldonado and Yasuhiro Matsumoto Kuwabara

Abstract: Undoped ZnO Ultra thin films were deposited on glass substrates by rf magnetron sputtering. Thin films were deposited at various rf powers 50, 75, 100 and 150 W. The measured thickness of the films were less than 50 nm. Structural properties were studied by X-ray diffraction (XRD) which confirmed that the films were crystalline with a (002) preferential orientation. The optical properties were studied by UV-Vis spectrophotometry in the 300-1000 nm range, obtaining an average transmittance around 70 %. The AFM characterization revealed that rms roughness value increases with rf power.

22.2 Optoelectronic Properties of ZnO:In Thin Films by Ultrasonic Spray Pyrolysis

Rajesh Roshan Biswal, Arturo Maldonado and Maria De La Luz Olvera

Abstract: Transparent and conductive Indium-doped zinc oxide (ZnO:In) thin films were deposited on glass substrates by the ultrasonic spray pyrolysis technique. ZnO:In thin films were prepared by mixing 0.2M zinc acetate and 0.2M indium sulphate dissolved in a mixture of water, acetic acid and methanol. Indium sulphate which acts as the In source was chosen at three different atomic concentrations, namely, 1, 2, and 3 at % and the films were deposited at a temperature ranging between 385 0C and 430 0C. The dependence of the electrical and optical properties on the substrate temperature and the dopant concentration was studied. Electrical resistivity as low as 1.6×10−3 Ωcm, electron mobility around 11 cm2/(V-s), carrier concentration in the range 4.96-8.98 ×1020 cm−3, and an optical transmittance of about 80 % was achieved for 3 at % ZnO:In thin films.

22.3 Study of Morphological Characteristics of Si:H p-i-n Structures Deposited by Plasma on Plastic Substrates

Carlos Alberto Ospina Ocampo and Andrey Kosarev

Abstract: In this work we present a study of material substrates and fabrication process effect on morphological characteristics of Si:H films and related p-i-n structures. Measurements of the spectral dependence of optical transmittance of plastic substrates in the ultraviolet and visible range were performed. AFM measurements were conducted over area of 10 × 10 μm2 to reveal defects and over area of 2 × 2 μm2 to determine morphological characteristics of the substrates, substrates coated by Ti and top surface of device structures: plastic+Ti+(Si:H p-i-n). Performance of the device structures was characterized by density current-voltage measurements in dark and under AM1.5 illumination. Teflon substrate demonstrated transmittance in the UV range, which is not observed in PEN and Kapton. Teflon also exhibits higher transmittance in visible range, compared to that in PEN and Kapton films. The results of the AFM measurements showed effect of Ti deposition and p-i-n fabrication on the surface morphology for the plastic substrates studied. Finally performance characteristics of the devices fabricated on PEN and Kapton substrates are compared.

22.4 Oxidation of In2Se3 Precursor Films and its Effects on Preparation of CuInSe2 based Thin Film Solar Cells

Pablo Itzam Reyes Figueroa, Velumani Subramaniam, Thomas Painchaud, Ludovic Arzel and Nicolas Barreau

Abstract: The present work deals with the air-annealing effects on In2Se3 precursor layers and the related CISe based heterojunction solar cell devices. CISe films were grown based on a modified 3-stage co-evaporation process that enabled the oxidation of In2Se3 precursor layer at the end of the first stage. To study the role of grain boundaries on oxidation, precursor layers were prepared at high and low temperatures. In2Se3 precursor thin film grown at high temperature shows a gamma-phase with (110) preferential orientation and grain size of 0.5-1 micrometer. Precursor layer prepared at low temperature showed

amorphous structure with grains size around 300 nm. CISe films prepared with both precursor layers (high and low temperature) exhibit chalcopyrite structure with a (112) preferential orientation. Comparison between samples prepared with and without air-annealing do not exhibit clear morphological or structural changes. The effect of oxidation process on electrical properties of the solar cells was studied with current-voltage and external quantum efficiency measurements. These results showed that, as compared to devices with non-oxidized CISe, the device with 1h-oxidized CISe film exhibit a decrement in open circuit voltage of 65mV. This could be related to passivation of interface states on the CdS/CISe interface. Comparing oxidized-CISe cells with different grain boundary density, more degradation of electrical parameters were observed on samples with high number of grain boundaries. Our result show that oxygen introduction to CISe films through the air-annealing of In2Se3 precursors is detrimental to the CISe based solar cell performance.

Solid-state materials, Electron Devices and Integrated Circuits (SSM)

23 Session SSM1:
Wednesday October 1, 2014
9:00-10:00
Session Chair: Dr. Mohamed Abatal

23.1 Surface modified tin oxide pellets for CO Gas sensing

Venkata Krishna Karthik Tangirala, Dra. Maria De La Luz Olvera Amador and Arturo Maldonado Alvarez

Abstract: Tin oxide (SnO2) powders were obtained by the homogeneous precipitation method by using urea as precipitation agent. The SnO2 powders were later ball milled for 6 h, at 400 rpm. Further, the milled powders were put in a home-made stainless steel die and pressed with a pressing machine to manufacture thin pellets. After several experimental trials, stable SnO2 pellets were formed by pressing with 16 tons for 90 min. Copper (Cu) modified SnO2 pellets (Cu-SnO2) were prepared by impregnation method. Manufactured pellets were surface modified from two different aqueous 1 wt% Cu solutions. The metallic copper residues were removed from a further heat treatment at 500 0C for 2h. Structural analysis was performed by X-Ray diffraction (XRD) to confirm the SnO2 rutile phase. The morphological and compositional characteristics of the pellets were analyzed by Scanning Electron Microscopy (SEM) and Energy dispersive spectrometry (EDAX) techniques, respectively. Later, silver contacts were deposited on the pellets surface by the thermal evaporation technique. The sensing properties of these pellets were measured in carbon monoxide (CO) atmosphere at different operation temperatures. Metallic copper crystals and porous CuO bars were formed on the surface of the pellets, depending on the impregnated solutions. The sensing properties of the SnO2 pellets were tested as a function of the gas concentration and measuring temperatures.

23.2 Effect of milling time on mechanically alloyed Cu(In,Ga)Se2 nanoparticles

Rohini Neendoor Mohan, Pablo Reyes, Velumani Subramaniam and Ignacio G Becerril-Juárez

Abstract: Copper indium gallium diselenide alloy powders were synthesised by mechanical alloying of elemental Cu,In,Ga and Se in a planetary ball mill. Effect of milling time on structure of CIGS nanoparticles was studied using X-ray diffraction measurements. Influence of milling time on phase evolution, cell parameters and crystallite size was reported in detail. FESEM analysis provided information on the morphological changes of CIGS particle during milling. EDAX results revealed dependence of milling time on composition of product particles. A tendency of increasing Cu and decreasing Se concentration with milling time was observed. Cu and Ga rich CIGS nanoparticles were obtai-

ned after milling for 6 h. The sample obtained after 6 h of milling showed homogeneous composition.

23.3 Influence of Nonequilibrium Temperature and Charge Carriers on the Ohm's Law in a Bipolar Semiconductor

Yuri G. Gurevich and Igor Lashkevych

Abstract: Abstract: The linear electrical conductivity of a bipolar semiconductor which is connected to a metal from both sides is investigated in general case, i.e., when the influence of both nonequilibrium charge carriers (electrons and holes) and nonequilibrium temperature on transport of electrical charges is taken into account. Let us notice that the electrical and energy nonequilibriums arise automatically in a bipolar semiconductor when electrical current flows even in a linear approximation with respect to an electrical current. The expression for the electrical conductivity is obtained for a bipolar semiconductor which depends on the electrical conductivity of electrons and holes, the thermal conductivity, the bandgap, the lifetime of charge carriers, the surface recombination rate on a semiconductor-metal contact.

24 Session SSM2:
Wednesday October 1, 2014
12:30-13:50
Session Chair: Dr. Mohamed Abatal

24.1 Modal analysis of a structure used as a capacitive MEMS accelerometer sensor

G. Stephany Abarca, Alfredo M. Reyes B., Salvador Mendoza A., Jacobo E. Munguía C. and Miguel A. Alemán A.

Abstract: In this paper a modal analysis for a proposed capacitive MEMS accelerometer sensor that can be used as inclinometer, dynamic acceleration or vibration sensor, is shown. An analysis of the effect of frequency over the displacement of the movable electrode is made. Besides, it is shown that the natural frequencies and vibration modes depend on the application given to this capacitive sensor. Additionally, the structure here proposed can be manufactured using standard CMOS technology. This paper shows how the same capacitive structure can be used in a MEMS sensor no matter what type of application you will provide. A model of the accelerometer is presented. The simulations shown were obtained using COMSOL.

24.2 Extracting the Floating Gate Voltage on the Multiple-Input FGMOS Transistor

Claudia Davila Saldivar, Agustín Santiago Medina Vazquez, Abimael Jimenez Perez and Marco Gurrola Navarro

Abstract: The extraction of the floating gate voltage on the Multiple-Input Floating-Gate Transistor is discussed in order to understand their behavior in a better way. The lack of linearity at very low voltage is discussed. The presence of a residual charge on the floating gate is experimentally shown despite the use of metal contact to discharge it. This analysis is useful to enhance the mathematical model and consequently to have better results in the simulation process especially when this device is used as an entirely analog processing element. Methods to extract and plot the floating gate voltage are addressed. A comparison between analytical and experimental results is shown.

24.3 A Prototype Design for an Accelerometer Using a Multiple Floating-Gate MOSFET as a Transducer

Sergio Domínguez, M. Alfredo Reyes, G. Stephany Abarca and Salvador Mendoza

Abstract: In this work, a design for a high G sensor is proposed demonstrating a novel transduction technique that can be fabricated with a standard 0.5 um CMOS technology. No additional modifications to the fabrication steps are needed to achieve a MEMS (Micro-Electro-Mechanical System) accelerometer. The proposed system uses Multiple Input Floating-gate MOS transistors (MIFGMOS) as capacitive transduction elements. A variable capacitance is configured between fingers attached to the proof mass as one plate, and to the fixed structure, as the other

plate. When acceleration is applied, this results in a modification of the floating gate voltage of the FGMOS, with a corresponding current change that can be correlated to acceleration. Also, a mechanical study was made with a given geometry structure, as well as an electrical analysis of the FGMOS transistor performance. Finally, a layout is proposed for the accelerometer system. Therefore, it is demonstrated that this design can be fabricated with the desired specifications through a standard CMOS technology. Additionally a novel transduction alternative compared to that used in conventional designs is demonstrated.

25 Session SSM3:
Wednesday October 1, 2014
15:30-16:30
Session Chair: Dr. Marco Antonio Blanco

25.1 Analysis of the Impact of Vias on Resonant Rotary Traveling Wave Oscillators

Javier Osorio Figueroa and Mónico Linares Aranda

Abstract: Rotatory traveling wave oscillator (RTWO) is an innovative technique for gigahertz rate clock signal generation and distribution. However, the increasing of metal levels in current manufacturing technologies also increases the parasitic elements of vertical interconnections (vias), causing a degradation in the integrity of the signal of the RTWO. In this paper are presented the analysis and quantification of undesirable effects introduced by vias. Simulations are performed by simulation tools HFSS (high frequency structural simulator) and Mentor Graphics, for different technologies (350, 180 and 130nm). The simulation results from oscillators RTWO show a range of reduction in the frequency of up to 1GHz, when the effect of vias is considered and the RTWO is operating at 30GHz; thus affecting the performance of systems that use them.

25.2 Effect of Transparent Conductive Oxide Material and Frontal Interface on Characteristics of Si:H p-i-n Junction

Hiram Martinez and Andrey Kosarev

Abstract: In this work we study the influence of frontal interface modification with titanium and carbon layers between p+-layer and transparent conductive oxide (TCO). Indium titanium oxide (ITO) and zinc oxide doped by aluminum (AZO) are used as TCO. Impact on performance characteristics is determined by current voltage measurements in dark and under AM1.5 illumination together with spectral measurements in the range of hν = 1.5 to 3.5 eV. The Si:H p-i-n structures with carbon film inserted between TCO and p+ layer as window show increase of the short circuit current by 37% compared to those without carbon film due to enhancement of short wavelength response.

25.3 Integrated Digital Architecture for Measuring Temperature Using a VCO as Sensor

Enrique Montoya-Suárez, Ivette O. Rodríguez-Ruiz and Héctor J. Saavedra-Gómez

Abstract: The proposed architecture is based on the linear response f0 vs. T of a Voltage Controlled Oscillator (VCO), which is used as a temperature sensor. The simplicity of the architecture makes digital integration in a CMOS technology 0.5um, 5V, N-Well feasible; this is achieved by using basic combinational and sequential digital circuit to implement the characteristic equation for the temperature depending on the oscillation frequency.

26 Session SSM4:
Thursday October 2, 2014
9:00-10:00
Session Chair: Dr. Outmane Onbram

26.1 Characterization Technique to Implement Self-Timed Cells for VLSI Design Blocks

Susana Ortega Cisneros, Juan Jose Raygoza Panduro, José Roberto Reyes Barón, Daniel

Tonali Aranda Bretón and Antonio Casillas Z

Abstract: In this article, a methodology to obtain the characterization of the standard cell library SXLIB is presented which is available within Alliance tools. The later proposal is developed based on the spreading analysis that the signal has throughout each cell, this with the objective of obtaining a delay time according to the technology of the manufacture's receiver. This characterization technique can be used with any set of standard cells, for a manufacturing technology that differs by the default one used by Alliance, then, the results of the new characterization are presented of the specific library SXLIB. The importance of knowing the spreading time of the signal, is dued to the required time to include the necessary delays in the design of self-timed structures. This is, one of the key phases of the design and synthesis process, expressed in structural language VHDL that generate Alliance tools. Throughout this phase, the designer will prove that the IC works under the desired behavior, in form (logic operation) as in time (maximum and minimum delays, maximum work frequencies, etc), that is because the obtained results from using the characterized library represents a key point in the design of self-timed structures.

26.2 Photovoltaic panel emulator in FPGA technology using ANFIS approach

Gerardo Marcos Tornez Xavier, Luis Martín Flores Nava, Oliverio Arellano Cárdenas, Felipe Gómez Castañeda and José Antonio Moreno Cadenas

Abstract: In this manuscript we present the implementation in FPGA of ANFIS system (Adaptive Network-based Fuzzy Inference Systems) for a two-input architecture with three membership functions per input and nine fuzzy rules, used to set up a photovoltaic panel emulator. The starting point is the photovoltaic panel electric analog model simulated with ELDO, a tool of Mentor Graphics Suite, having as inputs irradiation and temperature from a meteorological data base so we can obtain the short-circuit current (ISC) and open circuit voltage (VOC) of the panel. With this information, ANFIS was trained within Matlab environment to approximate the photovoltaic panel response. The training was carried out for both, current and voltage, independently, and once achieved minimum error parameters, they were downloaded into the FPGA implemented architecture in order to assess its performance.

26.3 Polyfluorene-based ligh-emitting diodes using TiOx as an electron injection layer

Mónica Vuelvas Trinidad, Luis Resendiz, Victor Cabrera and Magali Estrada

Abstract: We have fabricated polyfluorene-based polymer light emitting diodes (PLEDs), in which a sol-gel TiOx layer introduced between the polymer and an eutectic alloy Woods metal cathode to increase device performance, maintaining low temperature and low cost fabrication process. The emission of the PFO/TiOx PLEDs showed a red shift of 11nm with respect to the PLEDs without TiOx.

27 Session SSM5:
Thursday October 2, 2014
11:30-12:30
Session Chair: Dr. Outmane Onbram

27.1 Multilayer perceptron network with integrated training algorithm in FPGA

Alvaro Narciso Perez Garcia, Gerardo Marcos Tornez Xavier, Luis Martin Flores Nava, Felipe Gomez Castaneda and Jose Antonio Moreno Cadenas

Abstract: In this manuscript we present the implementation of an artificial neural network type Multilayer Perceptron (ANN-MP or NNMP) in Field-Programmable Gate Arrays (FPGA), including Back-Propagation training method based on descendent gradient. This network has 2 reconfigurable hidden layers, adjustable parameters (epochs and ratio learning) and batch learning. The proposed architecture aims to reduce the number of logical elements to be used, so se-

rial processing is utilized. In order to test the performance of the trained network, a non-linear function was approximated with satisfactory results.

27.2 Influence of the recombination mechanism via band tails on the electric performance of a bulk heterojunction solar cell

Liliana Fernanda Hernández, Victor Cabrera-Arenas and Luis Martín Reséndiz

Abstract: Trap assisted recombination via tail states model was simulated and the results were compared with those obtained from direct recombination model. It is shown that the dark ideality factor of the first one depends directly on both the Urbach energies and charge carrier capture coefficients. These parameters were directly related to the loss of efficiency in organic solar cells. When either one of capture coefficients or Urbach energies increase, the density of traps increases as well, and solar cell ideality factor deviates from 1 to 2. On the contrary, the ideality factor is close to unity as long as the density of states is low, in such case the recombination becomes band to band type. Under our assumptions, the dark ideality factor is influenced by trap assisted recombination model and under illumination, solar cell parameters are strongly reduced by trap assisted model via band tails recombination as we will demonstrate in our results.

27.3 Harmonic distortion analysis implementation for the determination of distortion in analog circuits

Esteban Contreras, Antonio Cerdeira and Oscar Garcia

Abstract: This work present an implementation of the Harmonic distortion analysis in Verilog-A using the Integral Function Method in order to use it for the determination of the harmonic distortion in analog circuits using DC analysis