2nd INTERNATIONAL CONFERENCE
on
ELECTRONICS, COMPUTERS
and ARTIFICIAL INTELLIGENCE
ECAI 2007, 29th – 30th June

hosted by

UNIVERSITY OF PITESTI

DEPARTMENT OF ELECTRONICS, COMMUNICATIONS AND COMPUTERS SCIENCE

PROGRAM

Organizers:

UNIVERSITY OF PITESTI:

- Faculty of Electronics, Communications and Computers (FETC);
  - Department of Electronics, Communications and Computers Science
  - Research Centre for Systems and Processes' Modeling and Simulation

IEEE ROMANIA SECTION

Co-organizers:

"POLITEHNICA" UNIVERSITY OF BUCHAREST:

- Faculty of Electronics Telecommunication and Information Technology
- Faculty of Automatics and Computers

INSTITUTE for THEORETICAL INFORMATICS of the ROMANIAN ACADEMY - Iaşi Branch

NATIONAL INSTITUTE FOR INVENTICS, Iaşi

MILITARY TECHNICAL ACADEMY, Bucharest

MILITARY TECHNICAL ACADEMY, Bucharest

GENERAL ASSOCIATION OF THE ENGINEERS - Arges Branch

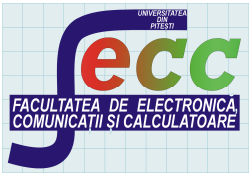
NATIONAL COMMUNICATIONS RESEARCH INSTITUTE – Bucuresti

NUCLEAR RESEARCH INSTITUTE, Piteşti

ROMANIAN MEDICAL COLLEGE/ASSOC. -Arges Branch

2nd INTERNATIONAL CONFERENCE
on
ELECTRONICS, COMPUTERS and ARTIFICIAL INTELLIGENCE

ECAI 2007, 29th – 30th June



Financial & technical sponsorship

Honorary Chair: Takeshi Yamakawa

General Chairs: Horia-Nicolai (L.) Teodorescu and Emil Sofron

Co-chairs: Gheorghe Serban and Ilie Popa

Program Chair: Nicu Bizon

Local Arrangements Chair: Ion Tutanescu

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Alexandru Serbanescu (Ro)
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Milan Stork (Cz)
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Horia N. L. Teodorescu (Ro)
Nicolae Tapus (Ro)
Ion Tutanescu (Ro)
Takeshi Yamakawa (Japan)

ECAI 2007, 29th – 30th June
Timetable and Program

Date	Time	Session or activity	Location
June 28	16:00-18:00	Authors Registration	"CD1" - "T" building, conference desk
	18:00-20:00	ECAI Welcome cocktail	"R1" – ECAI restaurant
June 29	8:00-9:00	Authors Registration	"CD2" - "C" building, conference desk
	9:00-9:20	ECAI Opening Ceremony	"C" building, PS room C1
	9:30-11:30	**Plenary Invited Session I**	"C" building, PS room C1
	11:45-12:00	Coffee Break	"PR" - "T" building, protocol room
	12:00-13:30	**Microwaves–Th. and Tech. & EMC – I**	"T" building, MW room
		Communications – I	"T" building, CM room
		Electronic Circuits & Equipments - I	"T" building, CE room
		Software & Computer Applications – I	"T" building, SC room
		Special Invited Section - I	"T" building, IS room
	13:30-15:30	Lunch Break& Coffee Break	"R2" – ECAI restaurant
	15:30-17:00	**Communications – II**	"T" building, CM room
		Electronic Circuits & Equipments - II	"T" building, CE room
		Software & Computer Applications – II	"T" building, SC room
		Expert Systems & AI - I	"T" building, AI room
		Special Invited Section - II	"T" building, IS room
	17.15-19.00	Japanese Traditional Music Concert	"Al. Davila" theatre
	19.00-19.45	Romanian Traditional Music Concert	"Al. Davila" theatre
	20.00-23.00	ECAI Banquet	"R3" – ECAI restaurant
June 30	8:30-9:00	Authors Registration	"CD2" - "E" building, conference desk
	9:00-11:00	**Plenary Invited Session II**	"T" building, PS room
	11:30-11:45	Coffee Break	"PR" - "T" building, protocol room
	11:45-13:15	**Electronic Circuits & Equipments - III**	"T" building, CE room
		Software & Computer Applications – III	"T" building, SC room
		Educational Multimedia Applications - I	"T" building, ED room
		Bio-medical app. & Biomaterials - I	"T" building, BB room
		Special Invited Section - III	"T" building, IS room
	13:45-14:30	Lunch Break	"R2" – ECAI restaurant
	14:30-14:45	Coffee Break	"PR" - "T" building, protocol room
	14:45-16:15	**Bio-medical app. & Biomaterials - II**	"T" building, BB room
		Microwaves–Th. and Tech. & EMC – II	"T" building, MW room
		Special Invited Section - IV	"T" building, CE room
		Special Invited Section - V	"T" building, AI room
		Special Invited Section - VI	"T" building, IS room
	16:15-16:30	Coffee Break	"PR" - "T" building, protocol room
	16:30-19:00	**Special Invited Section – VII**	"T" building, MW room
		Special Invited Section – VIII	"T" building, SC room
		Special Invited Section – IX	"T" building, AI room
		Special Invited Section – X	"T" building, CE room
	19:00-19:30	**FP7 Opportunities – Learning By Doing**	"T" building, PS room
	19:30-20:00	ECAI Closing Solemnity	"T" building, PS room
	20:00-23:00	ECAI Conference Dinner	"R4" – ECAI restaurant
July 1	9:00	ECAI Trip to Sibiu & Sighisoara	Departure from "T" building
July 2	19:00		Arrival in Pitesti

ECAI rooms and restaurants location is mention in the ECAI conference rooms plan.

PROGRAM

June 28, 16:00-18:00
Registration of the participants
"CD1" - "T" building, conference desk

June 28, 18:00-20:00
ECAI Welcome cocktail
"R1" – ECAI restaurant

ECAI OPENING CEREMONY

June 29, 8:00-9:00
Registration of the participants
"CD2" - "C" building, conference desk

June 29, 9:00-9:15
Welcome and Opening Addresses
"C" building, PS room

PLENARY INVITED SESSION I

June 29, 9:20-11:30
"C" building, PS room
Chairs: Horia N. L. TEODORESCU, Emil SOFRON

Bio-Inspired System Modeling —SOR Networks—
Takeshi YAMAKAWA
Professor, Kyushu Institute of Technology, Japan

Application of Biometrics in Internet Protocol Security (IPSec)
Charles A. SHONIREGUN
School of Computing & Technology, University of East London, UK

REGULAR AND SPECIAL INVITED SESSIONS

Microwaves–Th. and Tech. & EMC – I
(June 29, "T" building, MW room**,** 12:00-13:30**)**
Co-Chairs: George LOJEWSKI, Gheorghe GAVRILOAIA

Implementation of an Efficient Hybrid Method for the Analysis of Interference in High Frequency Circuits

M. BAHADORZADEH, M.Naser MOGHADDASI, R.A. SADEGHZADEH
Electrical Eng. Dept. Islamic Azad Univ. , Sci. & Research Campus, Tehran-Iran

Microwave Devices with Metamaterials

George LOJEWSKI
Politehnica University of Bucharest, Telecommunications Department & I.T.

Resonating Antenna and Coupled-Line Directional Coupler Based on Metamaterials Approach

Stefan SIMION[1], Gheorghe SAJIN[2], Florea CRĂCIUNOIU[3]
[1]Military Technical Academy, [2]National Institute for Research and Development in Microtechnologies, Romania

Microstrip Cross-coupled Bandpass Filters with Aperture Couplings

Nicolae MILITARU [1], George LOJEWSKI [1], Marian Gabriel BANCIU [2]
[1]Telecommunications Department, University POLITEHNICA of Bucharest,
[2]Microwave Group, National Institute of Materials Physics, Romania

Design of Microwave Planar Bandpass Filters using Coupled Slot Resonators

Nicolae MILITARU [1], George LOJEWSKI [1], Marian Gabriel BANCIU [2]
[1]Telecommunications Department, University Politehnica of Bucharest
[2]Microwave Group, National Institute of Materials Physics, Romania

Communications – I

(June 29, "T" building, MW room**,** 12:00-13:30**)**
Co-Chairs: Maaruf ALI, Ion TUTANESCU

A Frequency Synthesizer Structure Based on Coincidence Mixer

Milan STORK
University of West Bohemia, Plzen, Czech Republic

A Unitary Mathematical Model for Error Control in a Class of ARQ Protocols

Adrian BARCARU, Constantin PINTILIE, Laurentiu APOSTOL
UTI SYSTEMS S.A., Romania

Radio Frequency Front-End Architectures and Data Conversion Methods in Software Defined Radios

Mariana JURIAN, Daniel Alexandru VISAN, Ioan LITA, Ştefan OPREA, Iulian BARBU
Electronics, Communications and Computers Department, University of Pitesti

Fractional-N Frequency Synthesizers Configurations

Emil TEODORU, Ştefan DEMETER
Land Forces Academy, Romania

A Spread-Spectrum System for Assuring Transmission Security in Communications

Ion TUTĂNESCU, Constantin ANTON
Faculty of Electronics, Comm. and Computers, University of Piteşti, Romania

Electronic Circuits & Equipments - I

(June 29, "T" building, CE room**,** 12:00-13:30**)**
Co-Chairs: Hakan KUNTMAN, Emil SOFRON

Novel Electronically Tunable Multifunctional Filter Using EDDCCS in 0.8μm BICMOS Technology

[1]Serhan YAMACLI, [2]Sadri OZCAN, [2]Hakan KUNTMAN
[1]Mersin University Tarsus Technical Education Faculty Department of Electronics and Computer Education, [2]Istanbul Technical University, Electrical-Electronics Faculty, Department of Electronics and Telecommunication Engineering, Istanbul, Turkey

Noise Sources in a CMOS Imager with a 3T Pixel and Double Sampling

Emil SOFRON[1], Paul VULPOIU[2]
[1]University of Pitesti, Romania, [2]Analog Designer, Dallas, USA

Power Factor Correction Using Single Phase Bidirectional-Hybrid Rectifier

Naci GENÇ, İres İSKENDER
Department of Electrical-Electronics Engineering, Gazi University, Ankara/Turkey

Using of Generalization Tellegen's Principle for System Structure Reconstruction Problem

Josef HRUSAK [1], Daniel MAYER [2], Milan STORK [1]
Dept. of Applied Electronics[1], Dept. of Theory of Electrical Engineering[2], University of West Bohemia, Plzen, Czech Republic

Adaptive Cathodic Protection for Crude Oil Pipeline

M.Ali AKCAYOL[a], M.Cengiz TAPLAMACIOGLU[b]
Gazi University, Faculty of Engineering and Architecture, [a]Department of Computer Engineering, [b]Department of Electrical and Electronics Engineering, Ankara, Turkey

Software & Computer Applications – I

(June 29, "T" building, SC room**,** 12:00-13:30**)**
Co-Chairs: Charles A. SHONIREGUN, Ion ŞTEFĂNESCU

Parallelizing Algorithms for the Pitch Detection
TEODORESCU Horia-Nicolai [1,2], ZBANCIOC Marius-Dan [1,2]
[1] Technical University of Iasi, [2] Institute for Theoretical Informatics of the Romanian Academy

An Efficient Network Strategy in Deep Minimizations of Deterministic and Nondeterministic Multivalued Decisional Systems
Principles and Comparative Results
Ion ŞTEFĂNESCU, Adrian ZAFIU
University of Piteşti,, România,

Shape Memory Alloy Influence in Hopping Robot Architecture
Nicu BÎZDOACĂ[1], Anca PETRIŞOR[2], Ilie DIACONU[1], Elvira BÎZDOACĂ[1]
[1]Faculty of Automation, Computers and Electronics - University of Craiova
[2]Faculty of Electromechanical Engineering - University of Craiova, Romania

Map Oriented Object-Relational Database Management System Kernel
Vasile CORNITA, Rodica STRUNGARU
Politehnica University of Bucharest, Faculty of Electronics, Telecommunications and Information Technology, Romania

Self-Replication and Evolution in Cellular Automata Systems
Petre ANGHELESCU, Emil SOFRON, Laurentiu IONESCU, Gabriel IANA
Department of Electronics and Computers, University of Pitesti, Romania

Special Invited Section – I

(June 29, "T" building, IS room**,** 12:00-13:30**)**
See Special Sections Program

Communications – II

(June 29, "T" building, CM room**,** 15:30-17:00**)**
Co-Chairs: Milan STORK, Ion BOGDAN

Capacity of Mimo Wireless Systems
Ion BOGDAN, Ştefan-Victor NICOLAESCU
Technical University "Gh, Asachi" of Iasi

GSM Security
Ion SIMA[1], Florin MATEI[2]
[1]University of Pitesti, [2]Special Telecommunications Service

Use of Cyclic Redundany Check in Data Communication Systems
Constantin ANTON, Ion TUTĂNESCU, Gheorghe GAVRILOAIA
Faculty of Electronics, Communications and Computers, University of Pitesti

Kalman Filtering in Multisensor Fusion
Marian-Silviu GÎRNIȚĂ
Military Technical Academy, Romania

Software Approach for GPS Signals Acquisition and Tracking
Ioan LITA, Mariana JURIAN, Ştefan OPREA, Daniel Alexandru VISAN, Iulian BARBU
Faculty of Electronics, Communications and Computers, University of Pitesti

Multichannel Data Acquisition Techniques for Systems Used in Medical Applications
Ioan LITA, Ştefan OPREA, Daniel Alexandru VISAN, Ion Bogdan CIOC, Iulian BARBU
Faculty of Electronics, Communications and Computers, University of Pitesti

Aspects Regarding Hardware Implementation of the Crytographic Algorithms
Paul BURCIU, Ionuț Mihai SIMA
University of Pitești

Electronic Circuits & Equipments – II

(June 29, "T" building, CE room**,** 15:30-17:00**)**
Co-Chairs: Gheorghe SERBAN, Dorel AIORDACHIOAIE

On the Problem of System Identification Using a Prefiltering Bank with Wavelet Impulse Responses
Mugur ALEXIU[1], Viorel NICOLAU[2], Dorel AIORDACHIOAIE [2]
[1] ITC Networks Ltd Bucharest, [2] "Dunarea de Jos" Galati University Electronics and Telecommunications Department, Romania

Detection System of the Gaseous Fission Products within a CANDU Nuclear Power Plant
George MATEI[1], Mircea CRUCEAN[1], Mariana JURIAN[2]
[1]Institute for Nuclear Research-Pitesti, [2]University of Pitesti, Department of Electronics and Computers, Romania

Implementation of a Moving System in a Labyrinth
Marius Constantin POPESCU, Anca PETRIŞOR
Faculty of Electromechanical Engineering - University of Craiova

A Multichannel Pulse Acquisition System for Reactor Dosimetry Data
Corneliu Mihail TALPALARIU, Jeni Elena TALPALARIU, Corina MATEI, Valentin STOICA , Nicolae VÂJA, Ileana POPA
Institute for Nuclear Research

Theoretical and Practical Aspects of Current Mode RC Oscillators
Luiza GRIGORESCU
"Dunarea de Jos" University, Romania

Comparison Between Two Kalman Filter Variants: EKF and UKF
Marian-Silviu GÎRNIȚĂ
Military Technical Academy

Software & Computer Applications – II

(June 29, "T" building, SC room**,** 15:30-17:00**)**
Co-Chairs: Alexandru ŞERBĂNESCU, Ilie POPA

Component-Based Software Technology
Viorel PĂUN
University of Pitesti, Romania

An Efficient Generative Algorithm Developed for the Minimization of Multi-valued Specifications of Decisional Systems
Adrian ZAFIU
University of Pitesti, Romania

System Software for Automotive in Traffic Localization and Monitoring
Constantin GHIȚĂ, Ilie POPA, Adrian ZAFIU
University of Pitesti, Electronics and Computers Department**,** Romania

Evolvable Hardware: from Theory to Practical Implementation
Laurentiu-Mihai IONESCU[1], Vasile-Gabriel IANA[1], Alexandru ŞERBĂNESCU[2], Gheorghe ŞERBAN[1]
[1]Department of Electronics and Computers, University of Pitesti, [2]Military Technical Academy, Romania

Failed Fuel Location System Operating Improvements by Software Package
Gheorghe-Dorin CIOBANU, Liviu-Gabriel GRUIA
Institute for Nuclear Research, Romania

Expert Systems & AI – I

(June 29, "T" building, AI room**,** 15:30-17:00**)**
Co-Chairs: Vasile LAZARESCU, Nicu BIZON

Geometrical Form Recognition Using Neural Network
Rodica CONSTANTINESCU, V. LAZARESCU, R. TAHBOUB
Politehnica University of Bucharest, Electronics, Telecomm. & I.T. Faculty

Pneumatic System Force Control by the Hybrid Adaptive Neuro-Fuzzy Model Reference Control
Shahram HOSSEINZADEH[1], Ahmad ZEHTABCHI[2], Nader SAMSUNCHI[3]
Department of Engineering, Azarbijan University of tarbiat moallem, Tabriz, Iran[1,3] Islamic Azad University Science and Research Branch, Tehran, Iran[2]

Intelligent Integrated Control for the Power Flows of the Sources and Storage Devices Used on an Energy Generation System
Nicu BIZON
University of Pitesti, Electronics and Computers Department**,** Romania

A Comparative Study Concerning the Influence of RBF Neural Networks Centers Selection on Classification Performances
Constantin-Iulian VIZITIU
Military Technical Academy

Computational Intelligence Applied in Power Control Systems Fuzzy Design in a DC Power Control System: Fuzzy Design in a DC Power Control System
Adriana FLORESCU, Constatin RADOI, Vasile LAZARESCU
Politehnica University of Bucharest, Electronics,Telecomm. & I.T. Faculty

Computational Intelligence Applied in Power Control Systems Fuzzy Design in a DC Power Control System: Neuro - Fuzzy Design in a DC Power Control System
Adriana FLORESCU, Constatin RADOI, Vasile LAZARESCU
Politehnica University of Bucharest, Electronics,Telecomm. & I.T. Faculty

Fuzzy-Neuro Control of Flexible Manipulator using Feedback Error Learning Mode
MOHSEN- NAIMI[1], M. ALIYARI[2], M. TESNEHLAB, A. R. ZEHTABCHI
[1]Islamic Azad University Meymeh Branch, Iran, [2]Islamic Azad University Science and Research Branch, Tehran, Iran

DC Motor Speed Control Using Fuzzy Neural Network
Ahmad Reza ZEHTABCHI[1], Shahram HOSSEINZADEH[2], Mohammad Ali TAVAKOLI[3].
[1]Islamic Azad University Science and Research Branch, Tehran, Iran, [2]Department of Engineering, Azarbijan University of tarbiat moallem, Tabriz, Iran, [3]Young Researchers Club, Islamic Azad University, South Tehran Branch

Maximum Likelihood Estimation for the ICA Model
Doru CONSTANTIN, Viorel PAUN
University of Pitesti, Romania

Special Invited Section – II

(June 29, "T" building, IS room**,** 15:30-17:00**)**
See Special Sections Program

SECOND CONFERENCE DAY

June 30, 8:30-9:00
Registration of the participants
"CD2" - "T" building, conference desk

PLENARY INVITED SESSION - II

June 30, 9:00-11:00
"T" building, PS room
Chairs: **Gheorghe SERBAN, Ilie POPA**

The Latest Advances in Video Compression and the MPEG Family
Maaruf ALI
Department of Electronic Engineering, School of Technology, Oxford Brookes University, UK

Management of Imperfect Knowledge and Some Medical Applications
[1]Eugene ROVENTA, [2]T. SPIRCU
[1]York University, Glendon College, Toronto, Canada, [2]University of Medicine and Pharmacy, Department of Medical Informatics, Bucharest, Romania

Moisil Centenary – An Event for Romanian Science
Radu MUNTEANU
Technical University of Cluj-Napoca

REGULAR AND SPECIAL INVITED SESSIONS

Electronic Circuits & Equipments - III

(June 30, "T" building, CE room**,** 11:45-13:15**)**
Co-Chairs: Ion LITA, Dumitru SCHEIANU

Some Aspects Concerning the Infrared Radiation Temperature Measurement with Optical Fibre Sensors

Monica-Anca CHITA
University of Pitesti, Faculty of Electronics, Communications and Computers Science

Simulation of a Hilbert Transform Optical Correlator

Andrei DRĂGULINESCU, Valentin FEIEŞ, Ovidiu IANCU
"Politehnica" University of Bucharest, Optoelectronics Research Center,Bucharest, Romania

Simulation of an Optical Correlator Used for the Securization of the Access in Buildings

Andrei DRĂGULINESCU, Valentin FEIEŞ, Ovidiu IANCU
"Politehnica" University of Bucharest, Optoelectronics Research Center, Bucharest

The Analysis of Dynamics of Devices of Modulation of Infra-red Radiation

Vagif MAHARRAMOV, Natig THAVADOV, Gulustan KHALILOVA
Azerbaijan Technical University, Baku

The Dynamic Analysis of the Infra-red Radiation Devices

Vagif MAHARRAMOV, Natig THAVADOV, Gulustan KHALILOVA
Azerbaijan Technical University, Baku

Supercapacitors :Manufacturing Technology, Performance and Applications

Vasile V.N. Obreja[1)], Emil Sofron[2)], Dumitru Scheianu[2)], Marian Raducu[2)], Nicu Bizon[2)], Ion Lita[2)], Mihai Oproescu[2)]
National R&D Institute for Microtechnology (IMT), [2)]University of Pitesti, Ro.

Influence of Reverse Leakage Current on the Breakdown Voltage of Commercial High Voltage Silicon Rectifier Diodes

Vasile V.N. Obreja[1)], Emil Sofron[2)]
National R&D Institute for Microtechnology (IMT-Bucuresti), [2)]University of Pitesti, Romania

Software & Computer Applications – III

(June 30, "T" building, SC room**,** 11:45-13:15**)**
Co-Chairs: Eugene ROVENTA, Ionita SILVIU

Implementation of Tent Map in Reprogramable Hardware Structures

Cristian-Iulian RÎNCU[1], Vasile-Gabriel IANA[2], Petre ANGHELESCU[2]
Communication and military electronic systems Department, Military Technical Academy, Department of Electronics and Computers, University of Pitesti

Numerical Simulator for the CANDU Fueling Machine Operators'Ttraining
Cezar DOCA, Constantin PĂUNOIU
Institute for Nuclear Research Piteşti

Enterprise Databases Development Using Open Source Software
Sebastian Marius ROŞU[1], Marius GURAN[2], George DRĂGOI[2]
[1]Special Telecommunications Service, [2]University POLITEHNICA of Bucharest, PREMINV Research Center

Face Recognition Using Eigenimages
Ionuț Mihai SIMA, Paul BURCIU
University of Pitesti, Romania

Educational Multimedia Applications - I

(June 30, "T" building, ED room**,** 11:45-13:15**)**
Co-Chairs: **Mariana JURIANU, Mircea-Novac STEFANESCU**

Using Graphs to Improve the Structure of a WEB Site – the Sounds Archive for the Romanian Language –
Horia-Nicolai TEODORESCU, Laura PISTOL
Institute for Computer Science of the Romanian Academy, Iasi, Romania

A DHTML-Based Storage System for Illustrative Applications
Mircea-Novac STEFANESCU
Clinical Hospital "Coltea"

A Theory of Illustrative Applications
Mircea-Novac STEFANESCU
Clinical Hospital "Coltea"

Alghoritm for Multimedia Databases Processing
Florentina Magda ENESCU, Mihaela TEODORESCU
University of Pitesti

The Administration of the Students' Activity Attending Learning at Distance
Luminița ŞERBĂNESCU, Mariana JURIAN
University of Piteşti

Some Aspects Concerning Internet-Based Research, Education and Training in Measurement, Instrumentation and Test Management
Monica-Anca CHITA, Corina SAVULESCU
University of Pitesti, Faculty of Electronics, Comm. and Computers Science

Bio-medical app. & Biomaterials – I

(June 30, "T" building, BB room**,** 11:45-13:15**)**
Co-Chairs: Horia-Nicolai TEODORESCU, **TAPLAMACIOGLU Cengiz**

Tactile System for Information Transmission in Visual-Aid
Cătălin Jan IOV[1], TEODORESCU Horia-Nicolai[1,2]
[1]Technical University of Iasi, [2]Institute for Computer Science, Romanian Academy

Analytical Model for Whole-Body Vibration Analyses
Daniela Mariana BARBU, Ion BARBU
Transilvania University from Braşov, Romania

On the Fem Modeling of the Absorption in the Human Head of the Near EMF Radiated by a Mobile Phone Antenna
Dumitru CAZACU[1], Constantin STANESCU[2], Anca PETRISOR[1),2)]
Electronics, Communications and Computers Science Faculty, Electrical Engineering Dept., University of Pitesti, [3)]Faculty for Electromechanics, Craiova

Human Visual Function Simulation
Daniela Mariana BARBU
Transilvania University from Braşov, Romania

Study of Human Joint Angle Using Centre of Mass "Wavelet" Analysis
Ovidiu SPATARI
„Lucian Blaga" University of Sibiu,„Hermann Oberh" Engineering Faculty

Special Invited Section – III

(June 30, "T" building, IS room**,** 11:45-13:15**)**
See Special Sections Program

Bio-medical app. & Biomaterials – II

(June 30, "T" building, BB room**,** 14:45-16:15**)**
Co-Chairs: Paul SCHIOPU, Stanescu CONSTANTIN

Esophagytis Multimedia Diagnostic
Florentina Magda ENESCU, Mihaela TEODORESCU
University of Pitesti, Romania

System for Measuring the Radiation in Infrared
P. SCHIOPU, C. SCHIOPU, N. GROSU, I. CRISTEA
Politehnica University of Bucharest, Faculty of Electronics, Telecomm. & I.T.

Improving Image Compressing Using Wavelet Algorithms

Dumitru BREBEANU [1], Toni – Cristian VOICULESCU [1], Mariana JURIAN [2], Constantin ANTON [2]

[1]Special Telecommunication Service – Argeş, [2]University of Piteşti

The Contribution of the Proximal Apical Dendrites to the Discharge Pattern in Burst Firing Layer 5 Neocortical Cells

Otilia PĂDURARU

The Institute for Theoretical Computer Science, Romanian Academy

Investigation of Pentagon Coil Magnetic Stimulation

Zabach BAREEA[1], Azzouzi MESSAOUDA[2]

[1]Politehnica University/Department of Medical Electronics and Informatics, Bucharest, Romania, [2]Politehnica University/Department of Automatic Control and Systems Engineering, Bucharest, Romania

Acupuncture Stimulator Designing

Zabach BAREEA[1], Salim GHOGGALI[1], Lamia YOUB[2]

[1]Politehnica University/Department of Medical Electronics and Informatics, Bucharest, Romania, [2]Politehnica University/Department of electrical engineering, Bucharest, Romania

Investigation of Arc Coil Magnetic Stimulation

Zabach BAREEA[1], Azzouzi MESSAOUDA[2]

[1]Politehnica University/Department of Medical Electronics and Informatics, Bucharest, Romania, [2]Politehnica University/Department of Automatic Control and Systems Engineering, Bucharest, Romania

Microwaves–Th. and Tech. & EMC – II

(June 30, "T" building, MW room**,** 14:45-16:15**)**

Co-Chairs: Teodor PETRESCU, Ion SIMA

Microwave Power Divider Based on Metamaterials

Gheorghe GAVRILOAIA [1], Emil SOFRON [1], Andrei SARBU [2], Radu NARITA [3], Stefan OPREA [1], Constantin ANTON [1], Rodica-Mihaela TEODORESCU [1]

[1] University of Pitesti, Romania, [2] INCDCP-ICECHIM – Bucharest, Romania, [3] Military Technical Academy, Bucharest, Romania

Bulk Acoustic Wave Resonators Equivalent Electrical Circuits

Alina BULEANDRA [1], Teodor PETRESCU [1]

Politehnica University of Bucharest, Electronics,Telecomm. & I.T. Faculty

Compact Band-Pass Filters Using New Microstrip Resonators
Marian Gabriel BANCIU [1], Nicolae MILITARU [2], Liviu NEDELCU [1], Marian SIMA [1], Andrei IOACHIM [1], George LOJEWSKI [2]
[1]National Institute of Materials Physics, [2]Telecommunications Department, University POLITEHNICA of Bucharest, Bucharest, Romania

Small-Size Cross-Coupled Microstrip Filters for UMTS Applications
Marian Gabriel BANCIU [1], Nicolae MILITARU [2], Liviu NEDELCU [1], Marian SIMA [1], Andrei IOACHIM [1], George LOJEWSKI [2]
[1]National Institute of Materials Physics, [2]Telecommunications Department, University POLITEHNICA of Bucharest, Bucharest, Romania

Electromagnetic Propagation for Different Material Properties
Vasile DRAGHICI, Cristian EREMIA
University of Pitesti

Microwave Properties of BZT Dielectric Resonators
Andrei IOACHIM, Liviu NEDELCU, Mariana Irina TOACSAN, Marian Gabriel BANCIU, Adam LÖRINCZI, Mihai POPESCU, Sorin JINGA[1] and Ecaterina ANDRONESCU[1]
National Institute of Materials Physics, [1]University "Politehnica" of Bucharest, Bucharest, Romania

Special Invited Section – IV
(June 30, "T" building, CE room**,** 14:45-16:15**)**

Special Invited Section – V
(June 30, "T" building, AI room**,** 14:45-16:15**)**

Special Invited Section – VI
(June 30, "T" building, IS room**,** 14:45-16:15**)**

Special Invited Section – VII
(June 30, "T" building, MW room**,** 16:30-19:00**)**

Special Invited Section – VIII
(June 30, "T" building, SC room**,** 16:30-19:00**)**

Special Invited Section – IX
(June 30, "T" building, AI room**,** 16:30-19:00**)**

Special Invited Section – X
(June 30, "T" building, CE room**,** 16:30-19:00**)**
See Special Sections Program

FP7 Opportunities – Learning By Doing

(June 30, "T" building, PS room**,** 19:00-19:30**)**

Chairs: Silviu IONITA, Gheorghe SERBAN

ECAI CLOSING CEREMONY

June 30, 19:30-20:00

Conclusions and Closing Addresses

"T" building, CS room

Local Organizing Committee:

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Mihaela Teodorescu	Daniel Visan
Corina Savulescu	Cioc Bogdan
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Special Invited Section – I÷X

New Issues on e-Health - organized by prof. dr. Silviu IONITA[1] and Sorin PUSCOCI[2] ([1]University of Pitesti, INSCC Bucharest)

Embedded Systems - organized by prof. dr. Serban GHEORGHE[1] and prof. dr. Emil Sofron[1];([1]University of Pitesti)

Special Materials (Materiale speciale)- organized by prof. dr. Ilie POPA[1], prof. dr. Constantin STANESCU[1] and dr. Ioan BAILA[1]; ([1]University of Pitesti)

Hydrogen Technology and Green Power Applications - organized by prof. dr. Ioan STEFANESCU[1], prof. dr.Scheianu DUMITRU[2] and prof. dr. Nicu BIZON[2] ([1]ICSI Ramnicu Valcea; [2]University of Pitesti)

Microwave Circuits - organized by IEEE Romanian Chapter "Microwave Theory and Techniques Society" – organized by prof. dr. Ioan SIMA[1] and George LOJEWSKI[2]; ([1] University of Pitesti, [2]University POLITEHNICA of Bucharest)

EV and HEV Technologies - organized by prof. dr. Lefter EMILIAN[1] ([1]University of Pitesti)

New issues on EM Compatibility (Probleme actuale in Compatibilitatea electromagnetica), organized by prof. Dr.Popa Ilie[1], Prof. .Dr. Marinescu Andrei[2], prof. Dr. Ignea Alimpia[3], prof. Dr.Munteanu Calin[4], prof. Dr. Bitoleanu Alexandru[5] ([1]University of Pitesti,[2] ICMET Craiova, [3]University "Politehnica" Timisoara, [4]Universitatea Tehnica Cluj-Napoca,[5]University of Craiova)

Integrated System for Mobile User - organized by the SIUM Research Program with the following partner: ICI Bucharest, Politehnica University of Bucharest, A.S.E. Bucharest and University of Pitesti

Technanoconel - *Supercapacitor* - organized by the INM Bucharest, ICPE-CA Bucharest and University of Pitesti

Research & Technological transfer & Business: the EU opportunities triangle for the SE European countries - organized by Bursa EMO[1], Chamber of Commerce and Industry of Arges[2], and Chamber of Commerce and Industry of Romania (CCIR)[2], Romanian association for business environment of the electronic and software industry (ARIES)[2] and the General Association of Engineers (AGIR)[2] ([1]Turkish Chambers of Electrical and Electronics Engineering-Bursa Section; [2]Romania)

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Contents

Continued from front cover

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Contents

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Contents

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Contents

Continued from front cover

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Contents

Continued from front cover

Number 1/ 2007 ISSN – 1843 – 2115

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Contents

Number 1/ 2007 ISSN – 1843 – 2115

Series: ELECTRONICS, COMPUTERS and ARTIFICIAL INTELLIGENCE - ECAI

Contents

Number 1/ 2007 ISSN – 1843 – 2115

Series: ELECTRONICS, COMPUTERS and ARTIFICIAL INTELLIGENCE - ECAI

Contents

Continued from front cover

Number 1/ 2007 ISSN – 1843 – 2115

PLENARY SECTIONS

BIO-INSPIRED SYSTEM MODELING —SOR NETWORKS—

TAKESHI YAMAKAWA
Professor, Kyushu Institute of Technology, Japan
Chairman, Fuzzy Logic Systems Institute, Japan

Human experts can model the outer events in their brain by watching the behavior of the system of interest. Many data of cause-and-result relationship are summarized to acquire the knowledge which is utilized for effective inference. The knowledge is represented in the form of a set of IF-THEN rules and each one includes furzy linguistic terms to obtain the smaller number of IF-THEN rules than the number of raw data, which was expected by Lotfi A. Zadeh (1965).

A human brain facilitates the topological mapping of the external complex information (multiple-dimensional) to the cortex (two-dimensional) by sensing and watching. The topological mapping was modeled as SOM (Self-Organizing Maps) by Teuvo Kohonen (1982), which enables the vector quantization and the reduction of multiple dimension of information to one or two dimensions (visualization of similarities). Since the SOM visualizes, on the competitive layer, the similarity of raw information, it can be utilized in the field of pattern classification, data analysis, and so on. However, it cannot model the input-output characteristics of the system of interest, that is, it cannot represent the knowledge of a human expert.

In order to squeeze out the essence from the data set with evaluation obtained by trial and error, the novel modeling tool was developed by the author (1999), which is the extension of SOM and in which the input-output relationship of the system is mapped onto the competitive layer. The system is named as self-organizing relationship network (SOR network). A set of units on the competitive layer of the SOR network after learning exhibits a set of typical input-output characteristics of the system of interest and thus the network achieves the knowledge acquisition (IF-THEN rules) from the raw data with evaluation.

The evaluation for each data necessary for the learning of the SOR network is possibly intuitive and deterministic. This paper presents three applications of SOR network, (1) image enhancement of photograph as intuitive evaluation, (2) power system stabilizer as deterministic evaluation and (3) trailer-truck back-up control as deterministic evaluation

APPLICATION OF BIOMETRICS IN INTERNET PROTOCOL SECURITY (IPSEC)

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The open design of the Internet has not only opened many new opportunities for communications, but it has also opened many new avenues for attackers against organisations network and computing resources. The Internet Protocol Security (IPSec) may be used in three different security domains: Virtual private networks, Application-level security, and Routing security. But when used in application-level security or routing security, the IPSec is not a complete solution and must be coupled with other security measures to be effective. In depth research has also led to more significant reasons why IPSec has failed in certain situation. This paper identifies the current security problems facing IPSec and proposed a model that synchronising Internet protocol security (SIPSec) with biometrics.

THE LATEST ADVANCES IN VIDEO COMPRESSION AND THE MPEG FAMILY

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Keywords: H.262, H.263, H.264, H.265, MPEG AVC, MPEG-1, MPEG-2, MPEG-4, MPEG-7, MPEG-21, MVC, SVC, VC-1, WMV

This paper presents an overview of the latest video compression standards related to the MPEG family. MPEG-4 is specifically covered including its latest standard, MPEG-4 Part 10, otherwise known as AVC (Advanced Video Coding). Extension of AVC to operate in a heterogenous environment, known as SVC (Scaleable Video Coding) is also explained, along with some non-standard algorithms.

MANAGEMENT OF IMPERFECT KNOWLEDGE AND SOME MEDICAL APPLICATIONS

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York University
Glendon College
Toronto, Canada

Prof. T. Spircu
University of Medicine and Pharmacy
Department of Medical Informatics
Bucharest, Romania

Management of imperfection in ES design is discussed. A review of imperfection of knowledge is provided. A general framework of problem modeling is listed. Defining units for measuring of imperfection are explored. Probability distributions, possibility distributions, belief assignments and fuzzy sets are presented. Some measures of imperfection of knowledge are reviewed. Relationships among fuzzy measures, belief measures, probability measures and possibility measures are provided. The management of imperfect knowledge in some examples of production rules used in medical decision support systems, combining different types of imperfection, is explored.

BIO-MEDICAL APPLICATIONS & BIOMATERIALS

TACTILE SYSTEM FOR INFORMATION TRANSMISSION IN VISUAL-AID

IOV Cătălin Jan *, TEODORESCU Horia-Nicolai *, **
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** Institute for Computer Science, Romanian Academy, Blvd. Carol I No. 8, Iasi, zip code 700506, hteodor@etc.tuiasi.ro

Keywords: visual prosthesis, tactile sense, visual-aid, Virtual Reality

We propose a tactile sub-system for conveying of visual information for persons with poor or no sight. The design aimed to optimize the information transmission, taking into account the properties of the tactile sensors in the skin of the human hand. The system complements an artificial retina we have developed in a previous research. Application of the combined system to Virtual reality is also discussed.

THE CONTRIBUTION OF THE PROXIMAL APICAL DENDRITES TO THE DISCHARGE PATTERN IN BURST FIRING LAYER 5 NEOCORTICAL CELLS

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Keywords: burst firing neuron, multicompartmental model, proximal apical dendrites

To examine the influence of the architecture of the proximal apical dendrites to the discharge pattern of a burst firing layer 5 neocortical cell, five model neurons were developed and tested. One of these was considered as a ‘standard’ model while the rest of them were obtained by altering the morphology of the proximal apical dendrites of this model. All models were endowed with 16 types of active ionic currents and complex Ca^{2+} dynamics. Long current pulses were injected either into the soma or into the apical trunk. Since the enlargement of the proximal apical arborization led to the augmentation of the number of spikes/burst, it was concluded that this structure plays an active role in burst generation.

SYSTEM FOR MEASURING THE RADIATION IN INFRARED

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Keywords: pyroelectric detector, infrared radiation measuring

The study of the operation of a system designed to measure the flux emitted by a body in the infrared domain is presented. The spectral band is sufficiently narrow for the absolute temperature of the body to be evaluated from its thermal radiation spectrum.

ANALYTICAL MODEL FOR WHOLE-BODY VIBRATION ANALYSES

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Keywords: Human Body, Vibration, Analytical Model

Vibration is most simply defined as oscillating motion. It could be periodic or nonperiodic. Repeated loading of the lumbar spine occurs in activities of daily living like lifting and driving. The chronic exposure results in mechanical and chemical changes in the spinal components leading to spinal degeneration. These disorders in a person may lead to discomfort, loss in productivity, and an enormous increase in health care cost to society. In a chronic vibration environment, the prevalence of low-back problems is dependent on a host of factors including subject age, subject posture, magnitude of input vibration, and exposure time. It is imperative that efforts be made to understand the effects of whole body vibration on the spine and how these can be prevented. This paper focuses on our contributions of the mathematical models in this area.

ESOPHAGYTIS MULTIMEDIA DIAGNOSTIC

ENESCU Florentina Magda, TEODORESCU Rodica Mihaela
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Keywords: data base, indexing, retrieving, virtual, distributed information, tendency, similitude, iso-segment, co-occurrence, pixel, texture, relevant image,

Any user has access to the multitude of images acquisition in digital format. Today its represents more of 95% of the accessible images frequently. At the ordinary images add the images with specially use, such as are the medical images appreciable at more than 2 billions annually.

IMPROVING IMAGE COMPRESSING USING WAVELET ALGORITHMS

BREBEANU Dumitru, VOICULESCU Toni - Cristian
Special Telecommunication Service – Argeş
JURIAN Mariana, ANTON Constantin
University of Piteşti

Keywords: image compression, bit plane encoding algorithm, EZW algorithm (Embedded Zerotree Wavelet), SPIHT algorithm (Set Partitioning In Hierarchical Trees), WDR algorithm (Wavelet Difference Reduction).

Video and image signal processing domain has a real progress and remains a very interesting area for research.
This paper tries to introduce new image compressing techniques and algorithms because there is no lossy compression method being in the mean time universal and perfect in all possible applications, and therefore there is no unique performances evaluation criteria.

The motivation of this is sustained by the necessity of using compression / decompression software structures with wavelet transform algorithms.

INVESTIGATION OF PENTAGON COIL MAGNETIC STIMULATION

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Keywords: Magnetic simulation, Painless stimulation, Electric field, Activation function, Coil.

Magnetic stimulation involves using a very strong magnetic field created by a stimulating coil held close to the area of the body which is intended to be stimulated. It is non-invasive method and it is able to stimulate the human cortex and all spinal roots, as well as peripheral nerves, easily and painlessly, and it can be used in diagnosis, prognosis and therapy in a range of nervous and psychiatric disorders. The shape of the coil affects its stimulation characteristics, which pushes the researcher to examine large variety of shapes and designs of stimulating coils, trying to enhance the results and the outcome of magnetic stimulation

ACUPUNCTURE STIMULATOR DESIGNING

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Keywords: Acupuncture stimulator, Acupuncture, Electrical stimulating ┐

Electrical stimulation of acupuncture points has been used to produce analgesia in some types of surgery, for decades now. The study presented in this paper uses microcontroller to design an acupuncture stimulator, the design has an interactive interface to assist the user and allow him to choose operating settings, Testing the design proved that the stimulator functions work properly.

INVESTIGATION OF ARC COIL MAGNETIC STIMULATION

BAREEA Zabach, MESSAOUDA Azzouzi

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Keywords: Magnetic stimulation, Magnetic fields, Activation function, Coil.

The electromagnetic induction phenomenon was exploited to develop many instruments that are useful in the human life, especially in the medical field. This study investigates new coil which has the form of an arc for magnetic stimulation by calculating the induced magnetic and electrical field strengths, in order to establish the benefits or disadvantages of the new design. The idea here is to construct a coil that has the shape of an arc with an opening angle of 120^{o}, it could be a complete half circle but choosing a smaller opening angle makes the arc smaller and more suitable to adapt with various scalp anatomy.

HUMAN VISUAL FUNCTION SIMULATION

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Keywords: Eye, Vision, Simulation, Numerical Analyses

Achieved the optic simulation visual functions needs to is followed the parameters optic ocular models and the optic quality systems. The maul the cut must established average specific feature of the eye and the parameters of the complete eye. Therefore, using the optic simulation program OSLO, the optic representation ocular systems is achieved, established the gait of the rays through system and is caused the aberrations systems. After it made optical ocular model determination, to finalize ocular simulation, is necessary to made optical analysis quality of the system. For this, first, we need to make modeling of diffraction thru circular pinhole and, than, we made analysis of a punctiform imagine formation thru real optical system, like eye.

STUDY OF HUMAN JOINT ANGLE USING CENTRE OF MASS "WAVELET" ANALYSIS

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Keywords**:** JAGO mechanical model, wavelet analysis, high and low frequency of ground reaction dynamics.

This study considered that discussion point one mechanical model of the human body (JAGO model). The mechanical JAGO model for human body have associate one mathematical model with all kinematics equation in mono-dimensional rigid links with three links. In this article we will presentation one method for electrical measurement of one human mechanical model-ground reaction. The wavelet analysis can be one solution for dynamic study of ground reaction in high (muscle neurological activity) and low frequency (centre of mass movement) situation. This measure will be make using one force measure platform in six free degrease.

ON THE FEM MODELING OF THE ABSORPTION IN THE HUMAN HEAD OF THE NEAR EMF RADIATED BY A MOBILE PHONE ANTENNA

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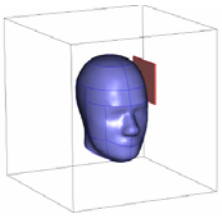
[3)]Faculty for electromechanics, Craiova

Keywords: finite element, SAR, human head models

Scientists use the SAR (specific absorption rate) to determine the amount of radiation that human tissue absorbs. This evaluation is especially important for mobile phones which radiate close to the brain. It is particularly important to avoid radiation into the brain. At a microscopic scale SAR (W/Kg) is defined as the absorbed power per unit mass for an infinitesimal volume of tissue $SAR = \frac{\sigma \cdot E^2}{\rho}$, where the E is the rms value of the electric field strength, σ is the electric conductivity and ρ is the mass density of the tissue.

In this paper some 2D FEM models describing the penetration of the near EMF in the human head will be presented in the next figure. Different spherical models will be presented :homogenous, three layers, four layers, six layers. Also combinations of spherical and ellipsoidal layers will be considered.
Different types of antennas will be investigated: half - wavelength dipole antenna, quarter wavelength monopole antenna.
The electromagnetic field distribution, the E field and SAR values will be determined.
The numerical computation used for the 2D FEM models is based on the Comsol software [4], the RF module, the axisymmetric transversal magnetic waves (TM), harmonic mode propagation.
The wave equation to be solved is:



$$\nabla \times (\frac{1}{\underline{\varepsilon}} \nabla \times \underline{\overline{H}}) - \omega^2 \mu_0 \underline{\overline{H}} = 0$$

where $\underline{\overline{H}}$ is the complex magnetic field strength, $\underline{\overline{\varepsilon}}$ is the complex permittivity $, \underline{\overline{\varepsilon}} = \varepsilon - j\frac{\sigma}{\omega}$, ω is the angular frequency and σ is the electric conductivity.

Feeding antennas with proper signals can be difficult. The signal is often defined as a voltage and voltages are not well defined in electromagnetic wave formulations. The magnetic frill solution was used to define a magnetic frill voltage generator for a dipole antenna.

The SAR values and the electric field strength inside the human head were compared for different frequencies and exposure standards. The results had shown the existence of SAR hot spots inside the head, in the ear region. The dependence of the EMF distribution inside the head on the head shape will be analyzed.
Comparations with analytical results will be performed. Further analysises on 3D models will continue.

COMMUNICATION

A FREQUENCY SYNTHESIZER STRUCTURE BASED ON COINCIDENCE MIXER

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Keywords: Coincidence, Frequency mixer, Phase Locked Loop

A frequency synthesis is a combination of electrical system elements that results in the generation of one or many frequencies from one or a few reference sources. The fine frequency resolution, low spurious signals, accuracy and stability are most important for these devices. The frequency synthesizers are an essential part of any modern communication system. They generate clock and oscillator signals needed for up and down conversion. In this paper, some new principles for synthesizers are described.

CAPACITY OF MIMO WIRELESS SYSTEMS

BOGDAN Ion, NICOLAESCU Ştefan-Victor
Technical University “Gh. Asachi” of Iasi

Keywords: wireless systems, MIMO, simulation

Multi-Input-Multi-Output (MIMO) wireless communication systems usse multiple antennas at the both ends of link. A MIMO system model was built and simulated using the Matlab environment. The system capacity was computed for the transmitting techniques. This paper firstly presents the analytical and simulation results for the pre-MIMO technology of diversity antenna reception and the similar results for MIMO systems.

RADIO FREQUENCY FRONT-END ARCHITECTURES AND DATA CONVERSION METHODS IN SOFTWARE DEFINED RADIOS

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Keywords: software defined radio, frequency conversion, data conversion.

Software-defined radios process high-speed communication signals using as much digital technology as possible in order to obtain wireless telecommunication systems more flexible and adaptive. First section of the paper addresses the requirements for design of a

software defined radio front end, including issues of RF technology and architecture developments. Are examined comprehensively different front end structures such as the zero IF stage, superheterodine etc. Here is included a detailed analysis of the specific issues which arise from this architectures.

The next section in the paper treats the problem of data conversion in software radios. Are identified the analog to digital converter architectures that are suitable for software radio technology and then are presented the influence of the converter performance on the overall system performances.

GSM SECURITY

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Keywords: GSM, 3G, security, mobile, communications, network.

The paper presents some aspects about security in GSM and UMTS, new directions for a new technology and some algorithms for cryptographic mechanisms, security features for authentication, confidentiality and anonymity, to prevent cloning and to be no more vulnerable to eavesdropping than fixed phones.

A SPREAD-SPECTRUM SYSTEM FOR ASSURING TRANSMISSION SECURITY IN COMMUNICATIONS

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University of Piteşti, ROMANIA
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Keywords: communications security (ComSec), transmission security (TranSec), spread-spectrum signal, binary phase shift keying (BPSK) modulation, direct sequence, pseudo-random code generator.

In order to assure transmissions security in communications, there are used signals with a complex structure and a great number of low amplitude components, such as spread spectrum signals.

In this paper it is simulated a direct sequence spread spectrum system, whose security is based mainly on the randomness of the sequence added to message. Because of fact that a spread-spectrum system distributes the transmitted energy over a wide bandwidth, the signal-to-noise ratio at the receiver input is low. The receiver is capable of operating successfully, because the transmitted signal has distinct characteristics relative to the noise.

USE OF CYCLIC REDUNDANY CHECK IN DATA COMMUNICATION SYSTEMS

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Faculty of Electronics, Communications and Computers
University of Pitesti

Keywords:cyclic redundancy codes, checksum, detecting burst errors, serial implementations, shift-register-based circuit

Checksum and cyclic redundancy codes (CRCs) form a powerful class of codes suited especially for detecting burst errors in data storage and communications applications.

In traditional hardware implementations, a simple shift-register-based circuit performs the computation by handling the data one bit at a time. Parallel implementations can perform the necessary logic operations much faster than serial implementations; therefore, parallel implementations are very suitable to be applied in today's high-speed systems employing CRC checking. In this paper, we examine the behaviour of various checksums and CRCs over real data.

KALMAN FILTERING IN MULTISENSOR FUSION

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Keywords: Kalman filtering, multisensor fusion

There is an important decision in multisensor problem which fusion type we choose: centralized or decentralized, inside a sensors net. The scenario is to tracking a target with a Kalman filter, having a sensors net as the information sources. We make a comparison between centralized and decentralized schemes by observing the accuracy of tracking, namely MSE (Mean Square Error) of the state estimation for some situations.

SOFTWARE APPROACH FOR GPS SIGNALS ACQUISITION AND TRACKING

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Keywords: acquisition, tracking, software processing

The hardware-based GPS receivers provide the least user flexibility. Thus, it is necessary to develop software-based GPS receivers for easy and quick implementation, simulation and analysis of algorithms. In this paper the front-end device that converts the radio frequency signal from the antenna to an intermediate frequency is based on dedicated circuits.

The obtained data is then processed using software programs to achieve acquisition and tracking of the GPS signals. The obtained software GPS receiver can perform acquisition and tracking using different parameters and threshold values. This flexibility of operation allows weaker signals to be tracked and processed.

MULTICHANNEL DATA ACQUISITION TECHNIQUES FOR SYSTEMS USED IN MEDICAL APPLICATIONS

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Keywords: data acquisition, multichannel systems, sensor.

In this paper are presented and analyzed two methods of implementing multichannel data acquisition systems with cyclical, accelerated and simultaneous sensor polling: time-division channelling, based on multiplexing sensors (time-shared data acquisition from each sensor) and space-division channelling (based on simultaneous data acquisition from all the sensors). Also are given some information about how to calculate the time-polling cycle for a sensor and how to analyze the accuracy and speed of data acquisition.

Multichannel data acquisition systems are intended for the transformation of the initial parameters of processes and events (output signals from one or several sensors and transducers) into equivalent digital signals, suitable for further processing, transferring and input into a central computer, which controls the channeling data acquisition and forms data arrays for further display or its use in control systems.

FRACTIONAL-N FREQUENCY SYNTHESIZERS CONFIGURATIONS

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Keywords: frequency synthesis, PLL, fractional-N, ΔΣ modulator.

The fractional-N frequency synthesis is a performant modern way to achieve high frequency oscillations with very good frequency resolutions and spectral purity. By using a greater f_{ref} and a smaller N, the bandwidth is larger and the phase noise decrease. In ΔΣ solutions, using compensation of the quantization noise methods, the gain in the bandwidth size can be significant. Some architecture of fractional-N frequency synthesizers and phase-noise compensating solutions are presented.

A UNITARY MATHEMATICAL MODEL FOR ERROR CONTROL IN A CLASS OF ARQ PROTOCOLS

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Keywords: ARQ, SW, GBN, SR, Markov decision processes, Decision functions, Functional costs, Historic states

We are planning to build a unitary mathematical model for the process to control the frame errors and losses for an ARQ protocols class, like: Stop-and-Wait (SW), Go-Back-N (GBN), Selective Repeat (SR). We will not consider the flux control process, which can be considered as being independent from the control process we are analyzing in this paper. For this model we assumed no overcharging phenomena. The control process is modeled using the Markov decision processes (MDP), non-randomized and homogenous; we also consider that the data transfer process is continuous and stationary.

ASPECTS REGARDING HARDWARE IMPLEMENTATION OF THE CRYTOGRAPHIC ALGORITHMS

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Keywords: Encryption Key, Cryptographic Module, Mode Of Operation, Rijndael, Advanced Encryption Standard

In present, the hardware implementations of the encryption algorithms are in competition with the software implementations, speed beeing the prioritary criteria which recommends the first ones. By comparing to software, the hardware implementations will offer certain advantages, at least in two constructive variants: the first one, in the case of high speed applications in which they are integrated, is that the encryption operations may be performed by cryptographic co-processors, discharging important resources to the system (processing unit, memory, etc.) and the second one, in applications where we find restrictions concerning the power consumption, or the dimensions of the implementation, always beeing necessary to ensure the security of the cryptographic keys (regarding both the generation and the use).

EDUCATIONAL MULTIMEDIA APPLICATIONS

USING GRAPHS TO IMPROVE THE STRUCTURE OF A WEB SITE – THE SOUNDS ARCHIVE FOR THE ROMANIAN LANGUAGE –

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Keywords: web site, navigability, graph, spanning trees, Hamiltonian graph

The aim of this paper is to discuss the structure of the Web site “Sunetele Limbii Române” (SLR) (in English, “Sounds of the Romanian Language”) and the methods and tools used to improve the structure and the navigability.

A DHTML-BASED STORAGE SYSTEM FOR ILLUSTRATIVE APPLICATIONS

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Keywords: Illustrative Programs, DHTML, Syntax Coloring

Illustrative programs are intensively used for training in programming languages and various programming techniques, but are effective only when used in large numbers. A DHTML-based management system is proposed, with an enhanced syntax-coloring system, advanced control objects and other various features.

A THEORY OF ILLUSTRATIVE APPLICATIONS

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Keywords: Illustrative Programs, Application-oriented Informatics, Software Engineering

Illustrative programs are intensively used for training in programming languages and various programming techniques. A theory is proposed for increasing the effectiveness of such programs, mainly based on new software engineering acquisitions.

ALGHORITM FOR MULTIMEDIA DATABASES PROCESSING

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Key words: image processing, texture, co-occurrence matrixes, iso-segments

Any user has access to the multitude of images acquisition in digital format. The followed directions consist in the modalities of analysis, exploitation and recover of the visual informations stocked in multimedia data bases. An images indexing and recovered system can

resolve countless problems so complicated, their description through words being excessive complex. Thus in the paper it analyse a statistical method of information processing according to of texture characteristic.

THE ADMINISTRATION OF THE STUDENTS' ACTIVITY ATTENDING LEARNING AT DISTANCE

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Keywords: elearning, managerial module, secretary module, teaching module, students module

The Learning at Distance system provides the development of the learning process by organizing and correlating the following: general managerial activities, organizing activities of the learning process, sustaining activities of the learning process. The present paper presents a key for improving the administration of the students' activity in a faculty, using the WEB technologies.

SOME ASPECTS CONCERNING INTERNET-BASED RESEARCH, EDUCATION AND TRAINING IN MEASUREMENT, INSTRUMENTATION AND TEST MANAGEMENT

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Keywords: Internet-based research, education, training, modern tools

The paper presents some aspects concerning the modern tools for Internet-based research, education and training in measurements, instrumentation and test management and the modern tools of knowledge management to bridge the gap between traditional measurement theory and actual demands in technical and non-technical systems.

ELECTRONIC CIRCUITS AND EQUIPMENTS

NOVEL ELECTRONICALLY TUNEABLE MULTIFUNCTIONAL FILTER USING EDDCCS IN 0.8MM BICMOS TECHNOLOGY

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Keywords: Multifunctional filter, EDDCC, electronically tuneable

An electronically tuneable multifunctional voltage-mode filter is proposed in this paper. The presented filter employs electronically tuneable differential difference current conveyors (EDDCCs) to achieve tuneable characteristics. The pole frequency and the quality factor of the filter can be orthogonally tuned. The filter is simulated with 0.8μm BiCMOS parameters that verify the proper operation of the circuit.

ADAPTIVE CATHODIC PROTECTION FOR CRUDE OIL PIPELINE

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Keywords: Artificial neural network, Cathodic protection, Microcontroller

Impressed current cathodic protection is broadly used to prevent corrosion of structural steels. However, corrosion can have damaging side effects on structural integrity, particularly if the steel is overprotected and its potential is lower than that strictly required to prevent corrosion. Usually, PID controllers have been widely used with their gains manually tuned based on the desired reference voltage. But, PID controllers require different gains at the lower and higher end of the output voltage range to avoid overshoot and oscillation. In this study, an artificial neural network (ANN) has been used for tuning output voltage of the transformer-rectifier units. The algorithm based on ANN was implemented on a microcontroller. The ANN controlled transformer-rectifier unit has been tested for two different conditions. When the performance of the ANN controlled transformer-rectifier unit was compared to the results of PID controller, the output voltage of transformer-rectifier unit controlled by ANN has no overshoot and oscillation.

POWER FACTOR CORRECTION USING SINGLE PHASE BIDIRECTIONAL-HYBRID RECTIFIER

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Keywords; Power factor correction, single phase hybrid rectifier.

This paper presents a single-phase bidirectional hybrid rectifier topology for power factor correction (PFC) suitable for medium and high power applications. The topology is composed of a diode bridge rectifier and a boost type PWM rectifier. Using appropriate control technique the total power can be shared between two rectifiers. The proposed rectifier is capable of providing sinusoidal input current with low harmonic distortion compared to the conventional boost type PFC converter and dc output voltage regulation. The rectifier topology, principle of operation, control method and simulation results are described in the paper.

USING OF GENERALIZATION TELLEGEN'S PRINCIPLE FOR SYSTEM STRUCTURE RECONSTRUCTION PROBLEM

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Keywords: Chaos, State space , Tellegen's principle

In this paper a new approach based on a generalized form of the classical Tellegen's principle, providing an equivalence class of physically as well as mathematically correct solutions is developed and some well-known, as well as new results are shown to be straightforward consequences of the derived structure. Some connections of dissipativity, conservativity, state and parameter minimality, instability and chaos with system representation structures are investigated from this point of view. Analytical results are illustrated by a number of typical examples and visualized by simulations. Tellegen's principle belongs to few general theoretical approaches that are possible apply also in non-linear and time-varying situations, too.

THE ANALYSIS OF DYNAMICS OF DEVICES OF MODULATION OF INFRA-RED RADIATION

VAGIF MAHARRAMOV, NATIG THAVADOV, GULUSTAN KHALILOVA

In an ideal, movement of a Secondary Mirror (SM) of Infra-Red Telescopes (IRT) should correspond to the form of pulse the modulation frequency f_{mod} and angular amplitudes θ, which are connected with the requirements of infra-red area. Which is impossible to reach physically, as the similar movement means infinite speed at the moment of transition.

SOME PRINCIPLES FOR CREATING NOISE STABILITY SYSTEMS FOR RECEPTION OF SPACE INFRA-RED RADIATION

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Keywords: noise stability systems, optical system, space, infra-red radiation

The photometric equipment working in an infra-red range, allows solving a line of the important applied tasks connected to researching of galactic and extragalactic objects, control of space and research of earthly resources. Thus, the development of new noise stability system of reception infra-red - signals of space objects has not only scientific but also a huge economic meaning. The present work is devoted to the description of some possible (probable) devices allowing the decision of the above-stated scientific and technical problems.

SOME ASPECTS CONCERNING THE INFRARED RADIATION TEMPERATURE MEASUREMENT WITH OPTICAL FIBRE SENSORS

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Keywords: infrared radiation measurement, temperature measurement, optical fibre sensor

The temperature in dangerous warehouse where deposit is flammable or explosive is difficult to be measured. The paper analyses the theory of infrared radiation measurement at low temperature and presents a new type of measurement system, in which, the radiation energy of deposit is focused on the optical fibre sensor. The equipment for the IR radiation measurement and the structure of the optical fibre sensor are discussed.

SYSTEM IDENTIFICATION USING A PREFILTERING BANK WITH WAVELET IMPULSE RESPONSES

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Keywords: system identification, filter bank, adaptive filter, RLS, wavelet

This paper proposes a scheme for decreasing the number of parameters identified by adaptive filters with finite impulse response. The target is to decrease the computational complexity. A filter bank is used to decompose the input signal into several components, which are then used as an input sequence for an adaptive algorithm. Two sets of functions are used for the impulse responses of the filter bank: Daubechies wavelet and reverse biorthogonal spline wavelet functions. The cases are analyzed from identification error, tracking capability, identified impulse response and obtained quality versus needed computational complexity points of view.

NOISE SOURCES IN A CMOS IMAGER WITH A 3T PIXEL AND DOUBLE SAMPLING

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In a mega-pixel CMOS imager with a double sample technique noise is generated at different levels of hierarchy. This paper is focused on the analysis of noise generated in pixels and columns of pixels and in particular on thermal noise and fixed pattern noise as main contributors in the degradation of the signal to noise ratio.

DETECTION SYSTEM OF THE GASEOUS FISSION PRODUCTS WITHIN A CANDU NUCLEAR POWER PLANT

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Keywords: gamma spectrometry, radioisotope, gross gamma rate, photopeak, failed fuel, noble gases

In this paper is presented an analogical system for the detection of failed nuclear fuel within a CANDU nuclear power plant (CANadian Deuterium Uranium). The system belongs to the group of auxiliary safety systems of a nuclear power plant. Based on the information obtained from this system – Gaseous Fission Products Monitor (GFP-Monitor) - the operator can propose starting of the localization and replacing procedures of the defective fuel rod or, in the case of a major fault, even the shutdown of the nuclear power plant.

IMPLEMENTATION OF A MOVING SYSTEM IN A LABYRINTH

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Keywords: system, control programs, implementation

In the present paper, in didactic purpose, the implementation of a moving system in a labyrinth is proposed, which simulates the functioning and the importance of controlling a real technological process with the help of the industrial robots.

A MULTICHANNEL PULSE ACQUISITION SYSTEM FOR REACTOR DOSIMETRY DATA

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Keywords: Digital recursive filter: adaptive methods

Simultaneous measurements of many dosimetry parameters require a complex instrumentation equipment, computers and interfaces. Dead time for normal scale selection and for reading or writings of every channel can be as long as active measuring time; response time for very large frequency variation(ex. from 10^{-3} to 10^{6} Hz) can be very long. To solve this problem we have been designed a pulse counter sampling system and an expert operating system based a Pentium IV PC computer and a 10 channel Timer/Counter Card. The system improve the hardware performances by an expert program for early rate change detection and rate prediction. The system was designed for high accuracy measuring on 40 simmultaneous channels from field radiation detectors like ionization chambers, fission chambers and photomultipliers. The operating system is using an auto-organizing data memory both for computing the current value and for the long-term administration of data, so that only the status and significant values of the inputs are recorded.

THEORETICAL AND PRACTICAL ASPECTS OF CURRENT MODE RC OSCILLATORS

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This paper addresses a group of constructive elements with which, (through adequate combinations) one can generate current mode RC oscillator transfer functions. Obviously this elements set is not unique. From the multitude of possible solutions only the solutions that accommodate the below conditions stand out:
- the active elements can be easily produced in monolithic technology,
- each oscillator must have two resistors or two capacitors connected to the mass.
The latter requirement is very important for the oscillators with variable frequency.

SIMULATION OF A HILBERT TRANSFORM OPTICAL CORRELATOR

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Keywords: optical correlator, Hilbert transform, Matlab simulation

In this paper we present a Hilbert transform optical correlator simulation we have performed. This type of correlator belongs to the class of the optical correlators in coherent light and with adaptive filter (also known as 4f correlators). After performing the simulation, we can see the easiness with which the peaks of correlation can be seen and thus we consider that this type of optical correlator is suitable in various applications in the field of optical pattern recognition.

SIMULATION OF AN OPTICAL CORRELATOR USED FOR THE SECURIZATION OF THE ACCESS IN BUILDINGS

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Keywords: optical correlator, joint transform, optical security verification, securized building, Matlab simulation

One of the most frequently used applications of the optical correlators in the latest years refers to the securization of the access in buildings. A lot of techniques and methods to enhance the performance of the correlators have been proposed, in order to make the possibility of thefts and counterfeits less and less likely. In this paper we performed the simulation of such a device, certifying thus the results obtained by means of experimental measurements and confirming the excellent performance of this type of optical correlator.

SUPERCAPACITORS : MANUFACTURING TECHNOLOGY, PERFORMANCE AND APPLICATIONS

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Keywords: ultracapacitor, electrochemical double layer capacitor, energy storage, activated carbon

A short review of supercapacitors manufacturing technology, their performance and applications is presented in this paper. Commercial supercapacitor cells based on organic electrolyte, available at this time reach capacitance values as high as 5000 F. Activated carbon is the material mostly used for electrodes in commercial devices. The specific energy of 5-6 Wh/kg of available commercial cells is significantly lower than that of batteries but their specific power is higher reaching 2-3 kW/kg. Use of supercapacitors in conjunction with batteries enhances the efficiency of power systems

INFLUENCE OF REVERSE LEAKAGE CURRENT ON THE BREAKDOWN VOLTAGE OF COMMERCIAL HIGH VOLTAGE SILICON RECTIFIER DIODES

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Keywords: PN junction, semiconductor device, power device, avalanche multiplication

Typical reverse I-V electrical characteristics are presented for commercial high voltage silicon diodes at room and high junction temperature. Most of reverse leakage current flows at the interface between silicon and the passivant dielectric material from the PN junction periphery. Linear voltage dependence of reverse current is manifested. Deviation from this linear variation at higher applied voltage and high temperature is caused by changes and local non-uniformity at the interface. Non –uniform flow of the leakage current is possible and a sharp breakdown starting from the linear region at high temperature usually is not encountered for most of commercial diodes.

COMPARISON BETWEEN TWO KALMAN FILTER VARIANTS: EKF AND UKF

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Keywords: Kalman filtering, EKF, UKF

An alternative approach to Extended Kalman Filter (EKF) has emerged over the last few years, namely the unscented Kalman filter (UKF). This filter claims both higher accuracy and robustness for nonlinear models. This paper investigates the accuracy for nonlinear measurement models in particular by comparing the performance of EKF and UKF for two tracking models having nonlinear measurements.

EXPERT SYSTEMS & ARTIFICIAL INTELLIGENCE

PNEUMATIC SYSTEM FORCE CONTROL BY THE HYBRID ADAPTIVE NEURO-FUZZY MODEL REFERENCE CONTROL

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Keywords: Neuro-fuzzy, ANFMRC, Pneumatic, algorithm,

The dynamic model of a force control system depends on the actuator and the manipulated object. It is difficult to identify the actual dynamics of the system, because the object dynamics are unknown and frequently change. In this paper, the effectiveness of hybrid adaptive neuro-fuzzy model reference is investigated. The concept of multimode switching is applied to activate an adaptive neuro-fuzzy model reference controller. ANFMRC is applied in medium and small error ranges to perform a good response. Simulation of a force controlled pneumatic system is investigated to evaluate the efficiency of the algorithm.

FUZZY-NEURO CONTROL OF FLEXIBLE MANIPULATOR USING FEEDBACK ERROR LEARNING MODE

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Keywords: Hybrid Control, Fuzzy neuro network, Feedback error learning, Flexible Manipulator

This paper, describes a hybrid control method for controlling a flexible manipulator with payload. Dynamic equation of the system has been obtained by Lagrange's method. The controller consists of two parts, a classical PID and a Fuzzy Neuro Network (FNN) controller. Feedback-error-learning (FEL) was initially proposed as a learning approach for forming a feedforward controller that uses the output of feedback controller as the error for training a neural network algorithm. Simulation for the classical controller is done separately and is compared with the consequences of hybrid controller simulation. In the proposed control scheme the FNN adapts well to these changed conditions in a relatively fast manner. The network structure is trained during control process and it is not necessary trained off-line process.

DC MOTOR SPEED CONTROL USING FUZZY NEURAL NETWORK

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Keywords: Neuro-fuzzy systems, Learning, Lyapunov's direct method, Stability analysis

Abstract, In this paper, fuzzy neural network (FNN) is used for speed control of the DC motors. It is different from the conventional FNN in its structure and learning algorithm. Firstly, it utilizes the input and output layer to on-line fine-tune scaling factors. It can also use the hidden layers to realize the fuzzification, fuzzy inference, defuzzification and tune parameters such as membership functions, fuzzy control rules dynamically. Secondly, a new combining learning algorithm (CL) which combines the gradient-based error back-propagation algorithm (EBP) with similar Newton (SN) algorithm is proposed in order to improve the convergence speed and release computational burden during the learning process. It is seen that FNN can effectively control the DC motor speed, independent of the load conditions.

INTELLIGENT INTEGRATED CONTROL FOR THE POWER FLOWS OF THE SOURCES AND STORAGE DEVICES USED ON AN ENERGY GENERATION SYSTEM

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Keywords: Energy Generation System, fuel cell, battery, ultracapacitor, power converter, boundary control, fuzzy rules.

This paper presents an new integrated control of the power flows into an Energy Generation System (EGS) under load pulse using fuzzy controller. The fuzzy rules are obtained by mixing and correction of the control rules bases for the two separated EGS power flows: between fuel cell and batteries stack and between ultracapacitor stack and batteries stack, respectively. The simulation results show that the EGS behavior can be good using only three transducers and a fuzzy controller with a well designed 3D control surface. The input control variables are: fuel cell current, ultracapacitors stack voltage and batteries stack voltage. The used EGS Simulink models and some design considerations are presented, too.

GEOMETRICAL FORM RECOGNITION USING NEURAL NETWORK

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Keywords: Neural Network, One-Step-Secant, MSE.

The purpose of this paper is the recognition of geometrical shapes: rectangle and geom. ellipse by using the “one-step-secant” algorithm of neural network. The first step is to build up a neural network with two layers and two input vectors. The first layer has twenty neurons, while the second one includes only two neurons. The second step is to create a training base and a test base through generating “rand” function. Each base contains one hundred shapes: fifty rectangles and fifty geom. ellipses. The third step is testing the network by using a performance function (MSE=Mean Squared Error) and “one-step-secant” algorithm.

A COMPARATIVE STUDY CONCERNING THE INFLUENCE OF RBF NEURAL NETWORKS CENTERS SELECTION ON CLASSIFICATION PERFORMANCES

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Keywords: RBF neural networks, centers selection, genetic algorithm, classification performances

This paper presents in a short form some theoretical and experimental results of a comparative study concerning the influence of RBF networks centers selection on classification performances (good recognition score, training time etc.). It knows that the performances of the RBF neural networks depend a lot by the positioning mode of the radial functions centers and in the special literature three standard procedures (random, supervised and clustering techniques) are indicated. Speculating the affiliation of the genetic algorithms on the global searching techniques class, with very good performances in the complex optimization problems solving, it is absolutely justified the positioning trial of the RBF neural networks centers with help of the specific evolutionist calculus procedures.

COMPUTATIONAL INTELLIGENCE APPLIED IN POWER CONTROL SYSTEMS
FUZZY DESIGN IN A DC POWER CONTROL SYSTEM
NEURO- FUZZY DESIGN IN A DC POWER CONTROL SYSTEM

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Keywords: high-precision DC speed control system, Buck and forward converters, duty-cycle compensation controller, fuzzy logic design, neuro-fuzzy design.

The paper compares fuzzy and neuro-fuzzy designs of a duty-cycle compensation controller used to linearize the nonlinear external characteristics family of a step-down (Buck) or forward DC-DC converter that supplies DC motors. This controller is additionally introduced in high precision speed control systems. Comparison reveals the advantages of neuro-fuzzy controllers upon fuzzy controllers. A discussion on real-time implementation is also taken under consideration.

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MAXIMUM LIKELIHOOD ESTIMATION FOR THE ICA MODEL

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Keywords: ICA, BSS, Likelihood

One common interpretation of ICA (Independent Component Analysis) is as a maximum likelihood (ML) method for estimating the optimal unmixing matrix. Maximum likelihood estimation (MLE) is a standard statistical tool for finding parameter values (the unmixing matrix W) that provide the best fit of some data (the extracted signals y) to a given a model (the assumed joint pdf of source signals).

MICROWAVES - TECHNIQUES AND TECHNOLOGIES & EMC

IMPLEMENTATION OF AN EFFICIENT HYBRID METHOD FOR THE ANALYSIS OF INTERFERENCE IN HIGH FREQUENCY CIRCUITS

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Keywords: Transmission Line Method , EMC

A new Method for Analysis of interference in high frequency has been used for evaluation of the interference of two loop antennas. The method is based on the Transmission Line Matrix (TLM) method augmented with a time-domain integral equation formulation to account for the radiation of equivalent sources and to evaluate the interfering electromagnetic fields.

A comparison between This method which is referred as the IRIS method (Interference and Radiation of Internal surfaces) and Different Approaches for the Analysis of Interference has been performed .

The result of classical TLM analysis and the IRIS method analysis for Interfering of loop antennas has been represented.

MICROWAVE DEVICES WITH METAMATERIALS

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Keywords: metamaterials, negative refraction index, microwave devices

In this paper the general theoretical properties of the new metamaterials with negative refraction index ("left-handed media" LH, or "composite right-left handed media", CRLH) are presented. Then are discussed the possibilities of using the different types of recently developed metamaterials in the design of new microwave devices, with improved performances, or even with completely new, unusual properties. The paper presents some ideas and results in designing such microwave devices with metamaterials, and the perspectives for future developments.

MICROWAVE POWER DIVIDER BASED ON METAMATERIALS

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Keywords: Metamaterials, Transmission line, Numerical modeling, Left-handed materials, power divider

A power divider is an indispensable component commonly used to split an input signal into two output signals in RF, microwave or millimeter communications, microwave antenna distribution circuits, and satellite communication. A new power divider, composed of metamaterials is proposed. The properties of the power divider are investigated theoretically. By adjusting the parameters, the power divider shows perfectly symmetric power division. The phenomena are demonstrated by simulation results. Being compact in size and low-cost, the proposed power divider is very suitable for microwave and millimeter wave integrated circuits where size, weight, simplicity, low insertion loss, and symmetric power division are critical design factors.

RESONATING ANTENNA AND COUPLED-LINE DIRECTIONAL COUPLER BASED ON METAMATERIALS APPROACH

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Keywords: Metamaterials, Microwave antennas, Coplanar waveguides, Composite right/left-handed transmission lines

The aim of this paper is to present results obtained in modeling and technological realization for a CPW (CoPlanar Waveguide) zeroth-order resonating antenna and a coupled-line directional coupler, based on CRLH (Composite Right/Left-Handed) transmission line. The CRLH consists of series connected CPW interdigital capacitors and parallel connected CPW transmission lines. The both circuits were fabricated on silicon substrate in order to a subsequent integration in a more complex circuit. Some experimental results are also presented.

MICROSTRIP CROSS-COUPLED BANDPASS FILTERS WITH APERTURE COUPLINGS

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Keywords: bandpass filter, microstrip resonator, cross-couplings

In this paper some novel types of microwave bandpass filters using aperture couplings are investigated. It is shown that aperture couplings can represent an efficient mean to control the couplings between two microstrip resonators. The filters are designed after a study of the coupling coefficients, extracted through full-wave electromagnetic-field simulation. To validate the design method, two different four-order prototypes are fabricated and tested, at 2.4GHz. Both theoretical and experimental results are presented.

DESIGN OF MICROWAVE PLANAR BANDPASS FILTERS USING COUPLED SLOT RESONATORS

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Keywords: filter, defected ground, slot resonator

In this paper a study of some planar microwave bandpass filters composed of slot resonators, etched in the ground plane, is presented. Different kinds of couplings between two resonators are investigated: electric coupling, magnetic coupling and two types of mixed couplings. The values of the coupling coefficients are extracted from simulation results obtained with a full-wave electromagnetic-field simulation software. On the basis of this study, some second-order planar microwave bandpass Chebyshev filters are designed and verified by simulation, and a prototype is fabricated and measured at 2.4GHz. Its performances are in good agreement with the requirements, validating this way the design method.

BULK ACOUSTIC WAVE RESONATORS EQUIVALENT ELECTRICAL CIRCUITS

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Keywords: bulk acoustic resonator, equivalent circuit

In this paper two equivalent electrical circuit models for bulk acoustic wave (BAW) resonators are presented, wide-band and narrow-band, respectively. Also, a mathematical algorithm that permits the calculations of the narrow-band circuit is shown. The resulting circuits have been validated using software simulations.

COMPACT BAND-PASS FILTERS USING NEW MICROSTRIP RESONATORS

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Keywords: microstrip resonators, band-pass filters,
GSM, GPRS, cross-couplings

New compact microstrip resonators for cost-effective planar filters are proposed in this paper. The four-pole and six-pole filters can be used for GSM / GPRS base-stations. The negative additional coupling results in two attenuation poles on each side of the filter pass-band.

SMALL-SIZE CROSS-COUPLED MICROSTRIP FILTERS FOR UMTS APPLICATIONS

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Keywords: microwave filters, microstrip resonators, UMTS, cross-couplings

Compact cost-effective band-pass filters are proposed for UMTS base-stations. The cross-couplings provide a quasi-elliptic frequency response for an improved filter skirt. The measured filter responses are in good agreement with the simulated responses.

ELECTROMAGNETIC PROPAGATION FOR DIFFERENT MATERIAL PROPERTIES

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The electromagnetic propagation modeling for different material properties survey is based on the fact that the electromagnetic waves are reflected when they meet the separation surface of two environments with different properties (ε, μ, σ). The characteristics of the received signal depend both on the configuration and the properties of the ground penetration radar and on properties and characteristics of the explored environment, aspects pointed out in the radar range equation.

The underground exploration radar has a large utilization, both in the military domain (anti-personnel mines-APM and unexploded ordnance-UXO) and in the civil domain (constructions-the exploration of the concrete structures, of roads, bridges and airport runways; the urbanistic network – the detection of pipes and cables; archeology: the site exploration, pedology: the exploration and characterization of soils; hydrology- the map making of the phreatic water etc.). The ground penetration radar (GPR) represents a technique of non invasive investigation which can offer information about the position (depth) and the characteristics of an anomaly or the radar image of a buried object.

In this paper the propagation of the signal in the underground environment when using bistatic moving radar. The power of the received signal in the reception antenna depends on the radar cross section of the buried object and of the reflection coefficient. Starting from these considerations it is simulated the propagation of a radar signal emitted by the antenna towards a buried target with a given reflection surface, its reflection and the propagation towards the receiving antenna. The simulation is made in the Matlab environment by using recognized calculating formulas with pre established entry dates used for certain types of targets or propagation environments. With the help of this program there can be studied the influences towards the received signal produced by the variation of the noise factor and the electromagnetic parameters of the propagation environment and of the target and it is pointed out the parabola phenomenon due to the movement of the radar system in comparison with the target.

MICROWAVE PROPERTIES OF BZT DIELECTRIC RESONATORS

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Keywords: Barium zinc tantalate, microwaves, dielectric resonators

$Ba(Zn_{1/3}Ta_{2/3})O_3$ (BZT) dielectric materials were prepared by solid state reaction. The samples were sintered at temperatures in the range 1550 ÷ 1650 °C for 2 h. Morpho-structural characterization was performed by using SEM and XRD. An additional annealing at 1410 °C for 10 hours was performed in order to improve the dielectric parameters. The dielectric properties were measured in the microwave range (6 ÷ 7 GHz). The best parameters of BZT dielectric resonators were achieved for the samples sintered at 1650 °C with additional thermal treatment.

SOFTWARE AND COMPUTER APPLICATIONS

PARALLELIZING ALGORITHMS FOR THE PITCH DETECTION

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Keywords: GRID, distributed computing, speech processing, large databases

While the problem of pitch detection looks a simple one, it has nevertheless been the object of innumerous papers, without definitive detection algorithm. We have proposed a hierarchical method for reliable pitch detection in another paper; the method however requires extensive computations. Here, we present a method to parallelize the proposed algorithm for pitch detection and we analyze several issues related to the benefits and limits of distributed computation (GRID).

AN EFFICIENT NETWORK STRATEGY IN DEEP MINIMIZATIONS OF DETERMINISTIC AND NONDETERMINISTIC MULTIVALUED DECISIONAL SYSTEMS
– principles and comparative results –

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Keywords: decisional systems, multivalued minimization, network minimization

The work presents some of the original results obtained at the University of Pitesti in the field of minimizing binary and multivalued deterministic and nondeterministic decisional systems, by using a natural strategy in network minimization of binary and multivalued multiple output systems, or of multivalued single output systems. The advantages of the method are illustrated by four comparative examples, processed by our method, and by other methods. There is indirectly pointed out, by means of examples, the efficiency of the methods and algorithms in getting real minimized solutions in pure multivalued cases.

SHAPE MEMORY ALLOY INFLUENCE IN HOPPING ROBOT ARCHITECTURE

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Keywords: robotics, hopping robot, shape memory alloy, simulations

This paper explore the influences of Shape Memory Alloy (SMA) spring in hopping robots structure. In the first part of the paper, a short description of hopping robot and shape memory alloy applications potential is presented. The second part of the article investigates, using numerical simulations, the advantages of using SMA spring in hopping robot structure.

MAP ORIENTED OBJECT-RELATIONAL DATABASE MANAGEMENT SYSTEM KERNEL

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Keywords:image database management systems, kernel, geografic information systems, object oriented programming

This paper presents some specific aspects concerning Object-Relational Dimensional Databases. The Map Processing Kernel represent the software implementation of such a prototype which is useful in conjunction with a Client Application, which will access data stored in the Dimensional Database. Initially the kernel will process only 2D Dimensional Databases.

SELF-REPLICATION AND EVOLUTION IN CELLULAR AUTOMATA SYSTEMS

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Keywords: Cellular Automata, Self-Replication, Pattern Generation, Spatial Models

This paper presents an analysis concerning to the sequences produces by a bi-dimensional cellular automaton that, with simple rules, generates some very complex behavior. The model described here, implemented in the C# language, it is capable to self-replication after a number of steps of evolution, which intuitively mimics what we observe in the nature. We highlight the possibility to construct self-replication systems on such a simple mathematical model as a cellular automata space by introducing the mortality of individuals, their interaction, and their robustness to variations into the model.

COMPONENT-BASED SOFTWARE TECHNOLOGY

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Keywords: (10 pt), Component, CORBA, EJB, .NET

Component-based development allows developers to create more complex, high quality systems, because it provides better means of managing complexities and dependencies within an application. Components are more sophisticated software modules than objects and require fundamental changes in systems thinking, software processes, and technology utilization.

AN EFFICIENT GENERATIVE ALGORITHM DEVELOPED FOR THE MINIMIZATION OF MULTI-VALUED SPECIFICATIONS OF DECISIONAL SYSTEMS

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Keywords: multi-valued, combinational minimization, implicant vectors processing redundancy, generative method, evaluation, network minimization, deterministic and nondeterministic networks, discrimination principle, correlated and uncorrelated multivalued outputs

The study of decisional systems is a topic of interest to both hardware and software designers. In the logic synthesis community, the combinational minimization of decisional systems is the foundation for reducing costs of decisional system implementations, the results having a significant real-world impact. At the same time, the combinational minimization has imposed challenges since the beginning of the field; indeed, some central problems are trying to be solved only within the last few years, (network minimization of multi output, multivalent, deterministic and nondeterministic functions), while others remain open.
This paper presents an overview of multi-valued combinational minimization principles – some of them representing our contribution - used to design a new top-down combinational minimization method named COMIN. It includes an introduction to the relevant terminology and concepts of minimization and presents appropriate solutions for some related sub problems. The method uses a dynamic technique allowing parallel implementations.

SYSTEM SOFTWARE FOR AUTOMOTIVE IN TRAFFIC LOCALIZATION AND MONITORING

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Keywords: Automatic Vehicle Location (AVL), Global System for Mobile Communications (GSM), Global Positioning Systems (GPS), Internet Service Provider (ISP), Data Base Server, Syncronize Server, Client Syncronize.

The paper makes a general presentation of hardware and software structure of a system for the tracking by GPS of the automotive in traffic. The system designed and realized at the Pitesti University, Electronics and Computers Department.

The coverage diagram of this system is, practically, the coverage diagram of GSM and GPS services. The system work in real time, its delay been determined by the delay of GSM network and by the system processing time, but the maximal delay measured for a 300 Km coverage diagram was 5 seconds.

EVOLVABLE HARDWARE: FROM THEORY TO PRACTICAL IMPLEMENTATION

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Keywords: evolvable hardware, implementation, FPGA, hardware based genetic algorithm, reconfigurable circuit

In the last ten years the complexity of electronic and computer systems has increased dramatically. Biological systems are many orders of magnitude more complex than anything we can currently produce. Natural computing includes a number of research fields: evolutionary computing, neural computing, fuzzy computing, cellular computing, DNA computing, quantum computing, membrane computing and some others. These approaches are characterized not only by a special way in which the computation is performed but also by a special "hardware" platform where the computation is carried out. Along the concept of evolvable hardware, in this paper, we have presented practical implementation of hardware genetic algotithm and reconfigurable hardware structures.

FAILED FUEL LOCATION SYSTEM OPERATING IMPROVEMENTS BY SOFTWARE PACKAGE

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Keywords: CANDU reactors, failed fuel location system, programmable computer driven equipment, man/machine interface

The paper shows the operating improvements done by software package for the latest generation of the Failed Fuel Location System, designed and manufactured at the Institute for Nuclear Research Pitesti. The equipment can be used now in a safer manner by the operators, performing automatically all functions needed without human oversight. This equipment replaces an older one at the Cernavoda NP, Unit 1, and is delivered for the Unit 2. After a year of work at Unit 1 the software package has proven its ability to control the equipment as stated in design requirements.

IMPLEMENTATION OF TENT MAP IN REPROGRAMABLE HARDWARE STURCTURES

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Keywords: chaotic map, FPGA, implementation

In the last ten years the interest for chaos was increased due to the unlimited resources represented by the chaotic systems that can be used to assure secure and wide band communications. Chaotic systems are widely used to design analog and digital blocks for communication systems. In this paper we present some aspects regarding the hardware implementation of one well-known digital chaotic map that is used to achieve chaotic generators

NUMERICAL SIMULATOR FOR THE CANDU FUELING MACHINE OPERATORS' TRAINING

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Keywords: numerical simulator, CANDU Fueling Machine, training.

The paper presents the numerical simulator developed at the Institute for Nuclear Research Piteşti – a special PC program (software) dedicated for the training of the CANDU Fueling Machine Operators.

ENTERPRISE DATABASES DEVELOPMENT USING OPEN SOURCE SOFTWARE

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Keywords: enterprise database, middleware, opens source software

Today, in the enterprises, a very important problem is the software acquisition cost. In many cases the companies take different software product and after that they observe than these products become unnecessary in short time. A solution is usage Open Source Software because these products can be takes free (e.g. Internet download), tested, modified, improved and redistributed. This paper presents an example of these software implements for databases development in the enterprise.

FACE RECOGNITION USING EIGENIMAGES

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Keywords: Recognition, face, eigenimages, eigenface, images

The goal of this project is to implement a simple face recognition system, based on well studied and understood method. The method is both intuitive, simple to express in mathematical terms, and very flexible.