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Ryszard S. Choras

Recent Advances in Circuits, Systems, Signal Processing and Communications

Proceedings of the 8th WSEAS International Conference on Circuits, Systems, Signal and Telecommunications (CSST '14)

Tenerife, Spain, January 10-12, 2014

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Preface

This year the 8th WSEAS International Conference on Circuits, Systems, Signal and Telecommunications (CSST '14) was held in Tenerife, Spain, January 10-12, 2014. The conference provided a platform to discuss network theory and applications, microelectronics, optoelectronic devices, nonlinear circuits, sensors, systems theory, control systems, remote sensing, hierarchical control, hybrid systems, signal processing systems for control, nonlinear signals and systems, signal reconstruction, pattern recognition, antennas and radars, applied electromagnetics, optical fiber systems etc with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be sent to international indexes. They will be also available in the E-Library of the WSEAS. Extended versions of the best papers will be promoted to many Journals for further evaluation.

Conferences such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

Electrophysical and Optical Investigation of Cd1-XMnXTe Epitaxial Thin Films

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Abstract: In recent years small-size semiconductor materials have become an extensive research object of scientists all over the world. Small-size semiconductors of new generation are successfully applied in microelectronics, spintronics, optoelectronics, integral optics, astrophysics, medicine and other fields. One of these semiconductor materials is Cd1-xMnxTe SMS epitaxial thin films which are considered to be very perspective and unique for making optical isolators, solar cells as well as infrared, gamma, x-ray and magnetic field detectors. Cd1-xMnxTe SMS epitaxial thin layers have been studied less in comparison with other semiconductors, therefore obtain of their perfect samples with high crystal perfection, clean and glossy surface, study of surface morphology and crystal structure and research of its application perspectives in device-making is one of the scientific problems and of great importance. It should be mentioned that, the feature that makes these materials unique is their wide band-gap and being highly photosensitive at room temperature, so that it enables the devices to be produced on their base, to work in short wave range and at room temperature. In this work Cd1-xMnxTe (0,01≤x≤0,05) epitaxial thin films have been grown on different substrates in a vacuum 10-5Pa by molecular beam condensation method. It have been studied their crystal structure and surface morphology. The electrophysical and optical parameters of Cd1-xMnxTe (0,01≤x≤0,05) epitaxial thin films have been investigated. It has been defined, that by increasing of Mn concentration maximum of photoconductivity shifted to short wavelength. The band gap width increases as the value of x increases in the content.

Brief Biography of the Speaker: M. Mehrabova graduated from the Department of Physics on the speciality “Physics of Solid States” of Baku State University, Azerbaijan in 1986. At the end of 1980s she worked in the Institute of Space Researches as an engineer and post graduate student (1988-1991). In 1992 she got degree of Ph.D in physics-mathematics, in 2011 associate professor, then professor of International Ecoenergy Academy and Academician of the International Academy of Ecology and Life Protection Sciences (Russia). Now she works in the Institute of Radiation Problems as head of “International Projects and Information Department” and head of the “Radiation physics of nanosized semiconductor materials” qroup. Her scientific activity includes Physics of Solid States, Physics of Semiconductors, Radiative study of Materials, Radioecology, Biophysics and so on. M.Mehrabova first calculated the energy spectrum and the electron wave function for Pb1-xMnxTe and Cd1-xMnxTe SMS and their size-quantized thin films and studied Faraday effect on the base of the obtained results. She studied theoretically the processes of generation of local levels in the electronic structure of A3B6 lamellar crystals under the effect of ionizing radiation and their elimination. In order to provide the effectiveness of operating mode of the photodetectors made on the base of those semiconductors she studied the problems of selecting optimal values of their parameters taking into consideration their photoelectrical properties. She calculated the threshold energy, bias energy, the cross-section of electron scattering and the number of primary defects during radiation effect on those semiconductors. She is author of about 100 papers published in international journals and conference proceedings. She study the influence of ionizing and non-ionizing radiation on animals, plants, human-beings and crystals. She works on the problem of making radiation- and photodetectors, solar cells. She works now in some projects which deal with ecology problems, radiation physics and clean energy. M.Mehrabova was the winner of the International Project of “Young Scientists of Azerbaijan” in 2003 and was awarded by International Diploma of “Young Scientists of XXI century”. She received STCU certificate of chief specialist on technology commercialization in 2008. Her materials on innovative technologies of IRP ANAS were printed in International Journals such as “Materials and Coatings for Extreme Environments”, “Science Opportunities in Azerbaijan” published on the initiative of STCU in 2009. M.Mehrabova is the member of “Technology Transfer Center” of ANAS.
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Plenary Lecture 2

Circuit Modeling of Schrödinger Equations for CAD of Hybrid Electronic-Quantum Integrations

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Abstract: The evolution of electronic circuits, according to the Moor's law, tends to the high-dense integrations with the components of the size comparable to the de' Broglie wavelength. It is supposed that the electronics of future will integrate the classical micro-, nano-, and quantum elements, and the overall number of these integrated components may reach several hundreds of millions per chip. The development of new software tools for these integrations is a very difficult task, and it is supposed that the best way is the enhancement of the traditional computer aided design (CAD) tools by some means allowing the treatment of quantum-mechanical equations by fast circuit simulators. In this Lecture, the Author, who has worked in this area since 2001, intends to give a review on the circuit modeling of quantum equations since the first works of G. Kron to the recent results of his team on the integration techniques of these equivalent circuits into the electronic simulators.

Brief Biography of the Speaker: Guennadi A. Kouzaev received the Ph.D. degree from the Institute of Radioengineering and Electronics, the USSR Academy of Sciences, Moscow, in 1986 in Physics and Mathematics, and the Doctor of Sciences degree from the Moscow State Institute of Electronics and Mathematics (Techn. University) in 1997, in Microwaves. He has gained his research experience from the Space and Electronics industries and the Universities of Russia and Canada. Currently, he is Professor with the Department of Electronics and Telecommunications, Norwegian University of Science and Technology-NTNU, Trondheim.
His research interests are in Quantum Electronics, Electromagnetics, Microwave & Millimeter-wave Techniques, and Computer Engineering. He has authored or co-authored more than 160 papers, abstracts, and patents, and a Springer book. He has been a conference reviewer or a member of program committees of many international conferences supported by the IEEE, SPIE, Euroment, WSEAS, NAUN, EDAS, etc. He is a member of several editorial boards of scientific journals. Professor Kouzaev is with the IEEE and the Faculty Row (USA). He is a Russian Government Prize Winner (1997) and a Winner of the Soviet Union Prize for Young Scientists (1990) awarded for his contributions to the developments of the first 3-D microwave integrations and for invention of the space-time topologically modulated electromagnetic signals and topological computing.

Plenary Lecture 3

Multi-Agency Cooperation in Cross-Border Operations

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Abstract: Multi-Agency Cooperation In Cross-border Operations (MACICO) is the Celtic-Plus project with 9 partners from Finland, France and Spain; duration Dec 2011 – May 2014.It develops a concept for interworking for security organisations in their daily activity. It deals with cooperation of security organisations that do not use (in their day-to-day job) the same radio network, but in some missions could take benefit from a sharing of their respective infrastructure. Use cases such as pursuit of criminals across a border, close support of vehicles going through a border, and disaster relief operations require security organisations from both countries to communicate together and to continue to communicate with their control room. The plenary lecture presents the scope and results of the MACICO research project achieved so far.

Brief Biography of the Speaker: Dr. Jyri K. Rajamaki received his M.Sc. degree in electrical engineering from Helsinki University of Technology (HUT), Finland in 1991, and Lic.Sc. and D.Sc. degrees in electrical and communications engineering from HUT in 2000 and 2002 respectively. From 1986 he works for Telecom Finland. From 1996 he was with the Safety Technology Authority of Finland where his main assignment was to make the Finnish market ready for the European EMC Directive. Since 2006 he has been with Laurea University of Applied Sciences, Espoo, Finland, where he serves as a head of Laurea's Data Networks Laboratory. Dr.Rajamaki had 17 years experienced in electro technical standardization, e.g. being 7 years the Secretary of Finnish national committee on EMC, and 10 years the Chairman of Finnish Advisory Committee on EMC. He has been a member of several EC working groups, e.g. EMC-ADCO, EMC Working Party. His research interests are electromagnetic compatibility (EMC) as well as ICT systems for private and public safety and security services. He has been scientist in charge for several research projects funded by EURESCOM, CELTIC or the Finnish Funding Agency for Technology and Innovation. E.g., he has been the Scientific Supervisor and Director of the following research projects: SATERISK (focusing on risks and challenges of satellite tracking in cross-border operations), Rescuing Intelligence and Electronic Core Applications RIESCA (risks analysis of essential CIIP systems and a method to minimize risks in new system), MACICO (develops a concept for interworking of security organisations dealing with cooperation of security organisations that do not use the same radio network in their day-to-day job, but in some missions could benefit from infrastructure sharing) and Mobile Object Bus Interaction MOBI (enhances ICT integration of emergency vehicles and creates a base for an emergency vehicle concept suitable for export.) He has authoredmore than 80 papers published in international journals and conference proceedings.

Plenary Lecture 4

Analysis of the Disturbance Decoupling Problem for Singular Switched Linear Systems Via Feedback and Output Injection

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Abstract: In last years disturbance decoupling problem with different features as inaccessible, measurable, or previewed disturbances, have become an object of research. This paper contains a geometric approach to disturbance decoupling problem with stability via feedback and output injection for singular switched linear systems, is presented and a solvability condition for the problem are proved by using the concepts of simultaneous {(Ei, Ai, Bi),i=1,2,...,l}-invariant subspaces for switched systems.

Brief Biography of the Speaker: Professor Dr. Maria Isabel Garcia-Planas joined the Department of Applied Mathematics at the “Universitat Politecnica de Catalunya” Barcelona, Spain in 1981. Her work had been centered on Linear Algebra, Systems and Control Theory. She has authored over a hundred papers and serves on the referee on several scientific journals. She has been plenary Speaker in several WSEAS International Multi-Conferences as well to Euroment.

Plenary Lecture 5

Invertebrate Robots: The Next Generation

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Abstract: Traditional robots are built from rigid components, with local movement possible at only a small fraction of the structure (joints between links). While this approach is ideal for high precision industrial automation, current and future applications for robots require greater structural adaptability, and a softer environmental interface. This lecture will review the state of the art in the emerging area of soft and “invertebrate” robots. In particular, recent efforts in the development of biologically inspired manipulators and mobile robots will be presented and discussed. The state of the art in the design and development continuous backbone “continuum” robots will be reviewed. Instances where insight from invertebrate structures in biology and their behaviors have influenced that of their robot counterparts will be emphasized. Current and potential future novel applications for the technology will be covered.

Brief Biography of the Speaker: Ian D. Walker received the B.Sc. Degree (First Class Honours) in Mathematics from the University of Hull, England, in 1983 and the M.S. and Ph.D. Degrees in Electrical and Computer Engineering from the University of Texas at Austin in 1985 and 1989, respectively. He then joined the faculty in Electrical and Computer Engineering at Rice University, where he was an Assistant Professor from 1989 to 1995, and a tenured Associate Professor from 1995 to 1997. In the fall of 1997, he moved to the Department of Electrical and Computer Engineering at Clemson University, where he became a full Professor in 2001.
Professor Walker is a Fellow of the IEEE and a Senior Member of the AIAA. He served as Vice President for Financial Activities for the IEEE Robotics and Automation Society from 2006-2009, and from 2006-2008 served as Chair of the AIAA Technical Committee on Space Automation and Robotics. He has served on the Editorial Boards of the IEEE Transactions on Robotics, the IEEE Transactions on Robotics and Automation, the International Journal of Robotics and Automation, Soft Robotics, the IEEE Robotics and Automation Magazine, and the International Journal of Environmentally Conscious Design and Manufacturing. Professor Walker's research centers on robotics, particularly novel manipulators and manipulation. His group is conducting basic research in the construction, modeling, and application of biologically inspired "trunk, tentacle, and worm" robots.