NORTH ATLANTIC UNIVERSITY UNION

Editor

Eleonora Catsigeras

Latest Trends in Circuits, Automatic Control and Signal Processing

Proceedings of the 3rd International conference on Circuits, Systems, Control, Signals (CSCS '12)

Barcelona, Spain, October 17-19, 2012

co-organized by

WSEAS

Recent Advances in Electrical Engineering Series | 8

Latest Trends in Circuits, Automatic Control and Signal Processing

LATEST TRENDS in CIRCUITS, AUTOMATIC CONTROL and SIGNAL PROCESSING

Proceedings of the 3rd International conference on Circuits, Systems, Control, Signals (CSCS '12)

Barcelona, Spain
October 17-19, 2012

Recent Advances in Electrical Engineering Series | 8

Published by WSEAS Press
www.wseas.org

ISSN: 1790-5117
ISBN: 978-1-61804-131-9

LATEST TRENDS in CIRCUITS, AUTOMATIC CONTROL and SIGNAL PROCESSING

Proceedings of the 3rd International conference on Circuits, Systems, Control, Signals (CSCS '12)

Barcelona, Spain
October 17-19, 2012

Published by WSEAS Press
www.wseas.org

All papers of the present volume were peer reviewed by no less that two independent reviewers. Acceptance was granted when both reviewers' recommendations were positive.

ISSN: 1790-5117
ISBN: 978-1-61804-131-9

North Atlantic University Union

LATEST TRENDS in CIRCUITS, AUTOMATIC CONTROL and SIGNAL PROCESSING

Proceedings of the 3rd International conference on Circuits, Systems, Control, Signals (CSCS '12)

Barcelona, Spain
October 17-19, 2012

Alejandro Fuentes-Penna
Kevin Kam Fung Yuen
Muhammet Koksal
Seong-Eun Yoo
Alvaro Santos
Eleonora Catsigeras
Amirhossein Fereidountabar
Lesley Farmer
Claudiu Mereuta
Shahram Javadi
Ivan Pogarcic
Shady Hamdy Farahat
Andreas Veglis
Antoanela Naaji
Christos Volos
Dzenana Donko
John Antonopoulos
Wan Hussain Wan Ishak
Mirela-Catrinel Voicu
Montri Phothisonothai
Yang Zhang

Table of Contents

ISBN: 978-1-61804-131-9

ISBN: 978-1-61804-131-9

ISBN: 978-1-61804-131-9

ISBN: 978-1-61804-131-9

Plenary Lecture 1

Challenges of Contemporary Educational Technologies in Engineering and Networking Disciplines

Professor Savitri Bevinakoppa
Melbourne Institute of Technology (MIT)
Australia
E-mail: sbevinakoppa@mit.edu.au

Abstract: Education is constantly changing and becoming technology oriented. Recent trend in students' learning is based on the use of contemporary technology. There is a need for educational transformation using these technologies, as a result of students having their own learning styles depending on their perception, attitude, knowledge and role of constructing levels.
This talk emphasizes performance analysis of enterprise networks in an educational environment. It reviews contemporary technologies and challenges such technologies as applied in engineering and computer networking disciplines. Emerging technologies include e-learning, podcasts, video-casts, social media, etc. Main components of e-learning include; rich media, the Internet, mobile phones, iPods, and laptops. Use of social media for peer to peer learning offers new opportunities for students to share knowledge. Social media such as Facebook, YouTube and Twitter are used extensively to enhance the core skills of reading and numeracy as well as social development and self confidence.
To teach fundamental and theoretical aspects of engineering or computer networking units, enhanced units should include visual (videocast) and audio material, interactive simulations, e-labs, quizzes/tests, and lecture slides with audio (podcast). Simulation is an optimum tool to be used for understanding its practical aspects. One of the cost effective laboratory currently used is remote laboratory (e-lab). E-lab is essential to design, plan, and simulate prototype remotely.
Challenges of supporting (an online based) e-learning is interactivity, network speed, security, appropriate use and management of technologies, wireless and mobile connectivity, high workload for staff, professional development, engaging learners, online management of e-lab, large investment in ICT infrastructure etc.
This talk covers some of these challenges.

Brief Biography of the Speaker:
Associate Professor Savitri Bevinakoppa completed her Bachelor of Engineering (Electronics and Communication) in 1989 and Doctor of Philosophy (PhD) at Victoria University, Melbourne in 1996, writing her thesis on "Still Image Compression on Parallel Computer Architectures". Savitri has more than 22 years of teaching and research experience in Engineering and Information Technology (IT) disciplines. She has worked in the IT industry as a manager for more than 10 years. She has demonstrated continuing scholarly and professional involvement in both learning and teaching and research by publishing a number of books and research papers nationally and internationally. She has obtained several industry grants and supervised many research students and research associates. She has chaired a number of conferences in multi-disciplinary areas and edited their proceedings. Currently she is working as a Deputy Director of IT Programs at Melbourne Institute of Technology, Melbourne, Australia.

ISBN: 978-1-61804-131-9

Plenary Lecture 2

Intermittency Reinjection Probability Function with and without Noise Effects

Professor Sergio A. Elaskar
Universidad Nacional de Cordoba and CONICET
Argentina
E-mail: selaskar@efn.uncor.edu

Abstract: Intermittency is an occurrence of a signal that alternates chaotic burst between quasi-regular periods called laminar phases. It has been studied that number of chaotic burst increases with an external parameter, then intermittency phenomenon is a continuous route from regular to chaotic motions. There are several topics in physics, biology and economy where the intermittency phenomenon appears. The correct evaluation of the intermittency phenomenon contributes to a better prediction and a proper description of these topics. Here is introduced a new technique to obtain the reinjection probability function for type I, II and III intermittency. The new reinjection probability function is more general and it includes the constant reinjection probability function as a particular case. The probabilities of the laminar length, the average laminar lengths and the characteristic relations are determined considering with and without lower bound of the reinjection in agreement with numerical simulations. Finally, it is analyzed the noise effect in intermittency. A method to obtain the noisy reinjection probability density is developed, which basically consists in extending the procedure used to derive the noiseless reinjection probability density. The analytical results show a good agreement with numerical simulations and for large values of the instability parameter, the characteristic relations approach the associated ones to the noiseless intermittency; however, for low values of the instability parameter, the characteristic relations reach a saturation level depending on the noise reinjection function.

Brief Biography of the Speaker:
Sergio Elaskar is Mechanical and Aeronautical Engineer (1990) and Doctor in Engineering Sciences at the National University of Cordoba (1997). He has done post-doctoral studies at the National University of Cordoba (1998-2000), the Aeronautical University Institute (2001-2002) and the Polytechnic University of Madrid (2003-2004). He is currently Full Professor and Director of the Aerospace Master at the National University of Cordoba, Independent Researcher of the National Council of Science and Technology of Argentina (CONICET) and Researcher Category I of the Education Ministry of Argentina. He is author of more than 150 refereed publications in journals, conferences and books.

ISBN: 978-1-61804-131-9

Plenary Lecture 3

Faults Analysis of on Hips and Knees of Humans using Proposed Neural Networks

Professor Sahin Yildirim
Mechatronic Engineering Department
Erciyes University
TURKEY
E-mail: sahiny@erciyes.edu.tr

Abstract: Due to recent heart attacks on humans; it is necessary to predict heart graphs of humans; during running positions. On the other hand hip and knee joints should be analysed to predict walking and running conditions. Therefore; in this experimental works; hip, knee and heart attacks are analysed in experimentally. After experimental measurement; a proposed neural network is employed to predict; hip, knee and heart attack behaviour of humans with walking and running stages. The vibration analyses of the human hip and knee joint have been examined by using artificial neural networks. The aim of this investigation is to obtain the robust and adaptive neural network predictor of the human hip and knee joint fro two different walking conditions. The proposed neural network predictor is robust stable to analyze the vibration parameters of the human hip and knee joint. Therefore, the proposed fault detection based neural analyzer is suitable for the solution of other prediction problems.

Brief Biography of the Speaker:
Dr. YILDIRIM received his Dip. Eng. Degree and MSc Degree from Erciyes University, KAYSERİ, TURKEY in Mechanical Engineering. He received his PhD degree from CARDIFF UNIVERSITY UK. His research interests include: Artificial Neural Networks, System Dynamics and Control, Robot Control, Mechanical Vibrations, Suspension Systems. He has authored or co- authored over 120 refereed journal and conference proceeding papers, and invited book chapters in the above areas. Dr. YILDIRIM has chaired sessions at several international conferences. He is a frequent paper reviewer for several journals, including Mechanism and Machine Theory and IEEE Industrial Electronics, Mechatronics. He was a member of IEEE. He has held visiting Dr-ship in Cardiff University,2001 and Debrecen University, Hungary 2009.

ISBN: 978-1-61804-131-9

Plenary Lecture 4

One New Approach for Synthesis of Nonlinear Dynamic Systems Based on State Space Energy Approach

Professor Milan Stork
Department of Applied Electronics and Telecommunications
and
RICE - Regional Innovation Centre for Electrical Engineering
University of West Bohemia Plzen
Czech Republic
E-mail: stork@kae.zcu.cz

Abstract: Most systems today have been developed under the linearity assumption and are carried out using electronic devices that are essentially linear. Thus in many cases inherently nonlinear devices have to be linearized in order to achieve a certain degree of the resulting linear system performance. Another possibility is nonlinear approach. The synthesis of nonlinear dynamic systems is of outstanding importance for numerous engineering applications. The techniques that are proposed in this lecture are based on state space energy approach. Presented study deals with energy, stability and related structural properties of a relatively broad class of finite dimensional strictly causal systems, which can be described in the state-space representation form. Dissipativity, instability, asymptotic stability as well as stability in the sense of Lyapunov is analyzed by a new approach based on an abstract state energy concept. We present also a one new method for synthesizing nonlinear dynamic circuits. One advantage of our approach is that we can directly synthesize nonlinear circuits from some ordinary differential equations. Presented circuit is able to generate the conservative chaotic attractors. This system can be used e.g. for secure communication, modulation etc. On the beginning we start with a simple motivation example of a nonlinear system described by the 3rd – order differential equation. We continue by adding linear parts of different order. Finally, the robust chaos-generating systems of arbitrary finite order with possibility of system order switching are shown. The designed systems were simulated and partly constructed in digital versions. Results of simulation and measuring are also presented.

Brief Biography of the Speaker:
Milan Stork received the M.Sc. degree in electrical engineering from the Technical University of Plzen, Czech Republic at the department of Applied electronics in 1974. He specialized in electronics systems and control in research institute in Prague. Since 1977 he worked as lecturer on University of West Bohemia in Plzen. He received Ph.D. degree in automatic control systems at the Czech Technical University in Prague in 1985. In 1997, he became as Associate Professor. From 2007 he is full professor at the Department of Applied Electronics and Telecommunication, faculty of electrical engineering on University of West Bohemia in Plzen, Czech Republic. He has numerous journal and conference publications. He is member of editorial board magazine "Physician and Technology". His research interest includes analog/digital linear, nonlinear and chaotic systems, control systems, signal processing and biomedical engineering, especially cardiopulmonary exercise systems. From 2011 he also works in research centre: Regional Innovation Centre for Electrical Engineering (RICE).

ISBN: 978-1-61804-131-9

Authors Index

ISBN: 978-1-61804-131-9