Guest Editorial: Introduction to the Special Issue on Selected Papers from the ELECO'2005 Conference

Welcome to the Special Issue on Selected Papers from the ELECO'2005 Conference! This conference is the fourth International Conference on Electrical and Electronics Engineering, held on 7-11 December 2005 in Bursa, Turkey. The history of ELECO conferences goes back to 1986, initially organized as an ELMEKSEM Electromechanical Conference by the Chamber of Electrical Engineering Turkey (EMO) Bursa Section, and repeated in 1988, 1993 and 1997. A further national conference series organized by the same institution was the Computer-Telecommunications Conferences. The fifth conference of this series was held in 1998. Until 1999 the conference series remained local, but in 1999 both conferences were united into ELECO and organized as an international Conference. ELECO'99 is thus the first International Electrical and Electronics Engineering Conference held in Bursa.

It was decided to continue to organize the conferences at an international level in odd numbered years and as a national conference in even numbered years. ELECO'2005 is therefore the fourth one at the international level. Participants from different countries have presented valuable papers on Electrical and Electronics Engineering topics. ELECO'2005 is jointly organized by Uludağ University Bursa, İstanbul Technical University (İTU) and the Chamber of Turkish Electrical Engineers (EMO) Bursa Section. IEEE Circuits and Systems Society Turkey Chapter was the Technical Co-Sponsor of ELECO'2005.

From the scope of the Technical Program it was probably the largest Electrical and Electronics Engineering conference ever held in Turkey. The wide scope of the conference covers topics such as electric power systems, electrical machines and drives, power electronics, high voltage techniques, electrical materials, electronics, circuits and systems, signal processing, electromagnetics, antennas and propagation, microwave theory, communication systems, mechatronics, control theory, control applications, automation systems, robotics and intelligent control systems.

Selected papers from ELECO Conferences were invited in extended form for publishing in special ELECO issues of international peer-reviewed journals. The first Special Issue appeared in 2004 as the ELECO Special Issue of the Journal Analog Integrated Circuits and Signal Processing (Volume 39, Issue 2, 2004), where eight selected papers from the ELECO'2001 Conference were published. The Guest Editors were Oğuzhan Çiçekoğlu and Hakan Kuntman.

The second Special Issue appeared in 2005 as the ELECO Special Issue of the Journal ELEKTRIK: Turkish Journal of Electrical Engineering and Computer Sciences (Volume 13, Number 1, 2005), containing 13 selected papers from the ELECO'2003 Conference.

This is the third ELECO Special Issue consisting of nine extended papers selected from the Conference ELECO'2005.

The paper by Balwant Godara and Alain Fabre entitled "State of the Art for Differential Circuits in Wireless Communications Transceivers: A New Wideband Active Balun in SiGe-BiCMOS Technology" was presented in ELECO'2005 as an invited paper. The aim of this paper is three-fold: firstly, to provide a comprehensive overview of the use of differential circuits for analogue signal processing in wireless transceivers; secondly, to describe in detail single-ended signal to differential conversion and the corresponding theory of such devices, their characterisation, various methods of implementation and comparative analyses of their performance; and, finally, to propose a new transistor-based solution for wideband baluns.

The paper by Milan Stork is entitled "Digital Fractional Frequency Synthesizer Based on Counters". This paper describes the architecture of a new pure digital frequency synthesizer based on pulse generators, counters and a register. The presented synthesizer is suitable for the design of VLSI architectures or for programmable Large-Scale Integration circuits.

The paper by Ali Kırcay and Uğur Çam is entitled "State-Space Synthesis of Current-Mode First-Order Log-Domain Filters". This paper proposes current-mode first order log-domain filters, which are systematically derived using the state-space synthesis procedure. First-order lowpass, highpass, and allpass responses were obtained with different circuit types. The filter circuits have very simple structures, since they use only BJTs and a grounded capacitor. They can be electronically tuned by changing an external current.

The paper by Fırat Kaçar, Ayten Kuntman and Hakan Kuntman is entitled "Statistical Model of Hot-Carrier Degradation and Lifetime Prediction for P-MOS Transistors". In this paper the degradation in the drain current and threshold voltage of P-MOS transistors are observed by operating the device under voltage stress conditions. Using the observation results the effect of hot-carriers was investigated statistically and a new statistical method for modeling was proposed to be an alternative to those given in the literature.

The paper by Serkan Topaloglu, Jörn Driesen, Werner Prost and Franz Josef Tegude is entitled "The Effect of Collector Doping on InP-Based Double Heterojunction Bipolar Transistors". In this study, high current effects on DHBT performance are investigated. Three DHBTs (Double Heterojunction Bipolar Transistors) with different collector doping densities are grown and processed. The DC and RF measurements have been performed to evaluate the influence of collector doping and related Kirk effect on HBT performance.

The paper by Engin Kurt and Osman Palamutçuoğulları is entitled "An Adaptive Feedforward Amplifier Application for 5.8 GHz". In this study, a 5.8 GHz power amplifier is linearized by an adaptive feedforward technique. A DSP based control scheme is applied to reduce the intermodulation distortion of this amplifier. A two-tone test is used to verify the design.

The paper by Nurhan Türker, Filiz Güneş and Tülay Yıldırım is entitled "Artificial Neural Design of Microstrip Antennas". In this work, a general design procedure is suggested for microstrip antennas using artificial neural networks and this is demonstrated using the rectangular patch geometry.

The paper by Vladimiro Miranda is entitled "Wind Power, Distributed Generation: New Challenges, New Solutions". It was presented in ELECO'2005 as an invited paper. This paper discusses some issues related with the growing importance of wind power and in modern power systems and some challenges raised by the emergence of distributed generation, and how computational intelligence and other modern techniques have been able to provide valuable results in solving the new problems.

The paper by Mehmet Turan Söylemez, Süleyman Açıkbaş and Adnan Kaypmaz is entitled "Controlling Rail Potential of DC Supplied Rail Traction Systems". In this paper, the authors discuss how to reduce the rail voltages on a DC power traction power system that uses a totally floating earth scheme.

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Guest Editor of the Special Issue
on Selected Papers from ELECO'2005