Introduction to the special issue on selected papers from the ELECO'2017 conference

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Welcome to the special Issue of ELECO'2017 Conference! This conference is the 10th International Conference on Electrical and Electronics Engineering held on November 30–December 2, 2017 in Bursa-Turkey. Bursa was an important city during West Roman Empire Period that covers the first millennium, as well as the Ottoman Empire Period, which covers the most of the second millennium.

ELECO conferences have in fact a long history. It goes back to year 1986, initially organized as an ELMEKSEM Electromechanical Conference by the Chamber of Electrical Engineering-Turkey Bursa Section, repeated in 1988 and 1993 and 1997 and in 1998 and modified and named 5th Computer-Telecommunications Conference. The conference series remained as local conferences until 1999. In 1999 both conferences are united to ELECO and it is decided to organize them at an international level in odd numbered years and as a national conference in even numbered years. The abbreviation ELECO is used for both of them. ELECO'99 is thus the first International Electrical and Electronics Engineering Conference held in Bursa and ELECO'2017 is the 10th. ELECO aims to bring together researchers from many countries, serves as a forum for electrical, electronics engineers and scientists in academia and industry to present their works and to share their experiences in the area of electrical and electronics engineering.

ELECO'2017 is jointly organized by Uludag University-Bursa, Istanbul Technical University and Chamber of Electrical Engineers Bursa Section. IEEE Turkey Section and Technological Research Council of Turkey were Co-sponsors of ELECO of ELECO'2017. ELECO international conferences are traditional biennial events in Bursa.

Topics of interest of ELECO include a wide variety of subjects ranging from electronic circuits and systems, signal processing, electrical machines, power systems, high voltage techniques, communication, control and robotics, mechatronics and biomedical electronics. ELECO'2017 was the largest ELECO conference ever held. Coming from 24 different countries and from five continents, 430 papers were submitted to ELECO'2017 and 217 reviewers from 20 different countries evaluated these valuable papers on Electrical and Electronic Engineering topics.

Special thanks to our invited speakers Prof. Mohammed Ismail, Prof. Christos Christopoulos, Prof. R. Nejat Tuncay and Prof. Ahmed Elwakil for their contributions.

Selected papers from previous international ELECO Conferences were invited to be published in extended form in special ELECO issues of international journals, under peer review. Five special ELECO issues appeared in the journal Analog Integrated Circuits and Signal Processing containing selected papers from ELECO 2001, ELECO 2007, ELECO 2011, ELECO 2013 and ELECO 2015. Furthermore, four special ELECO issues appeared in the

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journal TJEECS: Turkish Journal of Electrical Engineering and Computer Sciences, where selected papers from ELECO 2003, 2005, 2007 and 2009 were published in extended form, respectively. Except Analog Integrated Circuits and Signal Processing Istanbul University, Journal of Electrical and Electronics Eng, (IUJEEE) is also publishing extended versions of ELECO'2017 papers.

This Special Issue consists of ten selected papers from ELECO 2017 chosen among thirteen recipients of the call for the extended versions. All papers for the special issue undergo the usual peer review process.

The first paper is entitled:

A Class of MOSFET-C Multifunction Filters

This paper presents a group of current-mode MOSFET-C multifunction filters. MOS transistors operating in saturation region are used instead of the passive resistors, therefore key filter parameters are all electronically controllable. The main properties of eight multifunction filters are catalogued in tabular form and the presented filters are simulated in spectre simulation software in Cadence design environment using 90 nm UMC CMOS process parameters.

The second paper is entitled:

Current Inverting Metamutator, its Implementation with a New Single Active Device and Applications

In this paper a new kind of metamutator, called “Current Inverting Metamutator” its realizations using different types of active blocks and some of its applications are presented. The proposed circuits can realize all standard filters without passive component matching conditions. Moreover a novel realization of metamutator with one active device, Additive and Differential IC (AD-IC) is proposed and implemented with only twelve transistors. Some advantages of the metamutator with AD-IC is demonstrated.

The third paper is entitled:

Design of a constant-bandwidth variable-gain amplifier for LTE receivers

This work presents a constant-bandwidth variable-gain amplifier is presented for long-term evolution receivers. The presented VGA's description is given with a newly proposed exponential-current generator. The simulations are performed using the TSMC 180 nm process technology with Cadence Analog Virtuoso. The overall power consumption of the circuit is 9.1 mW under a 1.8 V power supply.

The fourth paper is entitled:

Time-Dependent Dielectric Breakdown (TDDB) Reliability Analysis of CMOS Analog and Radio Frequency (RF) Circuits

In this paper, a methodology to analyze the time dependent dielectric breakdown reliability of CMOS analog and radio frequency circuits has been proposed and applied to common circuit building blocks. The trends have been explained on the basis of the circuit block topology and device physics.

The fifth paper is entitled:

A new current mode CMOS variable gain amplifier using a new pseudo-exponential function

In this paper, a new pseudo-exponential function is described and a new CMOS exponential-control variable gain amplifier based on the new function is introduced. Post layout results show that the circuit has a bandwidth of 164 MHz and a gain range of 32.5 dB between -21 and $+11.5$ dB.

The sixth paper is entitled:

MOS-Only Polyphase Filter With Small Chip Area

This paper presents a systematic approach for the realization of the MOS only complex polyphase filters which occupy small chip area. Substantial reduction in the filter chip area is achieved without using bulky on chip capacitors. Post-layout simulation results using SPECTRE in CADENCE design environment are provided to verify feasibility of the proposed complex filter.

The seventh paper is entitled:

The Effects of the Peaking Currents on the Performance of the Doherty Power Amplifier: An Analytical and Experimental Study

Considering that the ratio of the peaking and main amplifier transconductances is a crucial parameter in the design of Doherty power amplifiers, an analytical method to specify the optimum value of this ratio is proposed. The method is validated both through simulations based on circuit-level model of the Doherty power amplifier and the experiments using a 100 W dual driven symmetrical LDMOS Doherty power amplifier manufactured.

The eighth paper is entitled:

A novel Serial Link Transceiver, using a new combination of MPPM and PAM schemes

In this paper, an efficient modulation technique, which was a new combination of multi-pulse position modulation and pulse amplitude modulation methods, was introduced. Moreover a new transceiver is proposed. The whole power dissipation of the proposed transceiver is only 101 mW.

The ninth paper is entitled:

A New Implementation of the Reconfigurable Analog Baseband Low Pass Filter with Cell-Based Variable Transconductance Amplifier

In this study, a new implementation of reconfigurable analog baseband low pass filter employing cell-based

variable transconductance amplifier is presented for multi-standard transceivers. The performance of the designed circuit is tested with TSMC 0.18 μm technology in CADENCE environment.

The tenth paper is entitled:

A Novel Low Power MOSFET-C Band Pass Filter For Low Frequency Applications With Subthreshold Models Based On Polynomial Regression

A novel current mode MOSFET-C filter is presented for a wide range of low frequency applications ranging from biomedical signal sensing up to speech processing region consuming only 2.3 μW with symmetrical supply voltages as low as 0.5 V. It is shown that the proposed filter attains a promising performance in comparison with the previously presented counterparts for low frequency applications.

The guest editors would like to thank the Editor-in-Chief, Mohammed Ismail for valuable supports, Ayshwarya Ganesan for the development of this Special Issue and the staff at Springer Academic Publishers for their assistance in producing this volume.

We hope you enjoy very much reading this special issue of Analog Integrated Circuits and Signal Processing.

GUEST EDITORS

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H. Hakan Kuntman received his B.Sc., M.Sc. and Ph.D. degrees from Istanbul Technical University in 1974, 1977 and 1982, respectively. In 1974 he joined the Electronics and Communication Engineering Department of Istanbul Technical University. Since 1993 he is a professor of electronics in the same department (retired, April 2016). His research interest includes design of electronic circuits, modeling of electron devices and electronic systems,

active filters, design of analog IC topologies. Dr. Kuntman has authored many publications on modelling and simulation of electron devices and electronic circuits for computer-aided design, analog VLSI design and active circuit design. He is the author or the co-author of 129 journal papers published or accepted for publishing in international journals, 179 conference papers presented or accepted for presentation in international conferences, 161 Turkish conference papers presented in national conferences and 10 books related to the above mentioned areas. He advised and completed the work of 16 Ph.D. students and 44 M.Sc students. Dr. Kuntman is a member of the Chamber of Turkish Electrical Engineers (EMO). From 2001 to 2004 he acted as the Head of the Electronics and Communication Engineering Department, from 2004 to 2010 he was the Dean of Electrical and Electronics Engineering Faculty of Istanbul Technical University. Furthermore, Dr. Kuntman is one of the founders of the ELECO

conferences and acted as the Conference Chairman several times, he is still the Chairman of ELECO'2018.

Oguzhan Cicekoglu received the B.Sc. and M.Sc. degrees from Bogazici University and the Ph.D. degree from Istanbul Technical University all in Electrical and Electronics Engineering in 1985, 1988 and 1996 respectively. He served as lecturer at the School of Advanced Vocational Studies Electronics Prog. of Bogazici University where he held various administrative positions between 1993 and 1999. He has also given lectures at the Turk-

ish Air Force Academy. He was with the Biomedical Engineering Institute of the Bogazici University between 1999 and 2001. Then he joined Electrical and Electronics Engineering Department of the same University where he later became a full professor. Between 2007 and 2010 he was the Dean of Engineering at Corlu Engineering Faculty of Namik Kemal University, Turkey. During his period, four new undergraduate programs and several M.Sc. level programs are started. Between 2013 and 2016 he was the founding Dean of Engineering Faculty at Turkish-German University, Istanbul-Turkey. During his period, several new undergraduate engineering programs were established. Oguzhan Cicekoglu served in organizing and technical committees of many national and international conferences. He was the guest co-editor of several previous Special Issues of the Analog Integrated Circuits and Signal Processing Journal. One of the publications he co-authored in IEEE Transactions on Circuits and Systems II-Analog and Digital Signal Processing was among the top cited papers listed in IEEE Circuits and Systems Society web page. He received the Research Excellence Award of Bogazici University Foundation in 2004. He served as the co-chair of Amplifiers and Comparators track in 50th IEEE Midwest-Newcas Joint Conference which is held in Montreal-Canada as a track chair in the 52th IEEE Midwest Symposium held in Cancun-Mexico. His current research interests include analog circuits, active filters, analog signal processing applications, current-mode and MOS only circuits. He is the author or co-author of about 200 papers published in scientific journals or conference proceedings and conducts review in numerous journals including Analog Integrated Circuits and Signal Processing, IEEE CAS-I, IEEE CAS-II, International Journal of Electronics, International Journal of Circuit Theory and Applications, IEE Proceedings Pt.G, ETRI Journal and several others. Oguzhan Cicekoglu is a member of the IEEE and is the Associate Editor of International Journal of Electronics.

Serdar Ozoguz was born in Istanbul, Turkey. He received his B.Sc. and M.Sc. in Electronics Engineering from Istanbul Technical University in 1991, 1993 and 2000 respectively. Since 2009, he is working as a full professor in Istanbul Technical University. He is currently a full professor in electronics, teaching graduate and undergraduate courses. He is also the co-author of 150 papers published in scientific reviews or conference

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