قسم الهندسة الكهربائية
Electrical Engineering Dept

جامعة الملك سعود
King Saud University

Electrical Engineering Department
Collage of Engineering
King Saud University
Riyadh, KSA

Seminars held in 2015

RFTONICS
KACST-TIC in Radio Frequency & Photonics for the e-Society

قسم الهندسة الكهربائية
Electrical Engineering Dept

KACST-TIC in Radio Frequency & Photonics for the e-Society (RFTONICS) and Electrical Engineering Department are pleased to invite you to attend a talk entitled:

Millimeter wave Antenna Design and Technologies.

by

Pr. Mohamed Himdi

Professor at Rennes 1 University – France

Date: Tuesday, May 12, 2015 (23 Rajab 1436 H.)
Time: 12:30 – 1:30 pm
Venue: Electrical Engineering Dept. Conference Room

ABSTRACT

Today, the wireless communications systems have become an integral part of daily life and continue to evolve in providing better quality and user experience. One of the recent emerging wireless technologies is millimeter wave (mm-wave) technology. It is important to note that mm-wave technology has been known for many decades, but has mainly been deployed for military applications. Over the past 10 years, advances in process technologies and low-cost integration solutions have made mm-wave a technology to watch and begun to attract a great deal of interest from academia, industry, and standardization bodies.

One major reason for the recent interest in mm-wave technology is the huge unlicensed bandwidths, around 7 GHz of continuous bandwidth is available in many countries worldwide and at many available MM-wave bands (V, E_band…). This massive spectral space enables densely situated, noninterfering wireless networks to be used in the most bandwidth-starving applications of the future, in all kinds of short-range (<1 km) wireless communication. This huge bandwidth represents great potential in terms of capacity and flexibility, making mm-wave technology particularly attractive for gigabit wireless applications.

Generally, specified requirements for antennas used in mm-wave systems concern gain, radiation efficiency, operating bandwidth, technological reliability, cost, and compatibility with other RF module. Significant efforts have been made during the past few years for designing and implementing efficient miniaturized antennas for mobiles or radio communications equipment. With the rapid development of advanced millimeter wave systems and applications, highly efficient antennas and RF circuits are required.

The talk is dedicated to millimeter wave antennas and describes the main features and specificities of millimeter wave frequency range such as: technological and realization difficulties, antenna measurements, need to characterize the dielectric materials and consequences on the antenna performance, etc. Other types of mm-wave antennas and

arrays will be presented than the printed antennas, 3D antenna technologies, including lenses, reflectors, leaky-waves, etc. Finally, major civil, military, automotive and medical applications of mm-wave antennas will be presented.

Speaker Bio:

Prof Dr. Mohamed Himdi
Professor at the Rennes 1 University, France

Dr. Himidi obtained his PhD from the University of Rennes 1 (France) in 1990 in signal processing and telecommunications. He was the head of high frequency and antenna department at IETR (Institut d'Electronique et Telecommunications de Rennes) from 2003 to 2010. His research activities concern the passive and active millimeter-wave antennas. His research interests also theoretical and applied computational electromagnetics, development of new architectures of printed antenna arrays and new 3-D antenna technologies. He is the author and co-author of 83 journal papers and more than 200 papers in conference proceedings. He has received 31 patents in the area of antennas. He is also author/co-author of five book chapters.

He participates actively on European Antenna Centre Excellence (ACE) in millimeter and integrate antennas activities. Co-Organizer each two years of ESOA Courses “MM-wave antenna design and technologies” in Rennes.

He received the 1992 ISAP conference Young researcher Scientist Fellowship (Japan) and, 1995, an award from the International Union of Radio Scientists (Russia). He was Laureate of the second national competition for the creation of company in innovative technologies in 2000 (Ministry of Industry and Education, France). He was supervisor of Sebastien Palud “PhD DGA Award” in 2009 and Lilia Manac’h "Silver Award for Young Scientist Awards" at IUMRS-ICEM2012 conferences in Japan.

Recently he received the JEC-AWARD-2015 “Telecommunications Category for “Pure composite material antenna embedded into a motorhome roof for the Digital Terrestrial Television reception”, in March 2015 at Paris.

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Electrical Engineering Dept

KACST-TIC in Radio Frequency & Photonics for the e-Society (RFTONICS) and Electrical Engineering Department are pleased to invite you to attend a talk entitled:

SMART RFIC: MILLIMETER-WAVE GIGABIT TRANSCEIVERS WITH DIGITALLY ENABLED BUILT-IN SELF-CALIBRATION AND AUTO-SWITCHING FUNCTIONS.

by

Dr. TIAN-WEI HUANG

Professor, National Taiwan University – Taiwan

Date: Wednesday, April 29, 2015 (10/07/1436H)
Time: 12:30 – 1:30 pm
Venue: Electrical Engineering Dept. Conference Room

ABSTRACT

In our daily life, we have smart phones, smart TVs, or even auto-pilot smart cars in the future. In our engineer career, we have smart antenna, smart baseband chips, but we still need auto-calibration smart RFICs. Especially for millimeter-wave RFICs with Giga-hertz bandwidth, the narrow-band baseband calibration cannot compensate the broadband AM/AM or AM/PM non-ideal properties.

For future multi-band multi-standard radio, auto-band-switching is an essential function to optimize RF performance and to simplify the system control interface. A Miller-divider-type frequency sensor can be used to detect the frequency of input signal and perform auto-band-switching inside RFIC without any system control bits. For parametric sensitive 3rd-order nonlinearity, we need parametric-insensitive calibration methods to compensate the non-ideal behavior within RFIC. For millimeter-wave phase array system, the phase error comes from not only phase shifters but also other functional blocks, like variable gain amplifier (VGA), during phase shifting and gain compensation. We need a phase-error calibration method to compensate the phase error from all RFIC blocks.

Tian-Wei Huang (S'91–M'98–SM'02) was born in Taipei, Taiwan, in 1965. He received the B.S. degree in electrical engineering from National Cheng Kung University, Tainan, Taiwan, in 1987, and the M.S. and Ph.D. degrees in electrical engineering from the University of California at Los Angeles (UCLA), in 1990 and 1993, respectively.

In December 1993, he joined TRW (now is Northrop Grumman), where he designed millimeter-wave and microwave GaAs/InP RFICs for

satellite applications. From 1998, he was engaged in research on 28-GHz transmitter design and power amplifier packaging for LMDS systems at Lucent Technologies, San Jose, USA. From 1999 to 2002, he was with Cisco Systems, where he developed the high-speed cable modem head-end and Wi-Fi system test.

In August 2002, he joined the faculty of National Taiwan University, Taipei, Taiwan. Prof. Huang was the recipient of IEEE 2009 Transaction on Advanced Packaging Best Paper Award. Currently, he is the TPC member of IEEE RFIC symposium. He is also a voting member of IEEE 802.11 Wi-Fi gigabit wireless standards. His research interests include millimeter-wave RF-CMOS design, and 5G millimeter-wave and Wi-Fi gigabit links.

Electrical Engineering Department
and Visiting Professor Program (VPP)
King Saud University
Riyadh, KSA

Invites you all to attend a Technical Lecture on

Power Processing in Photovoltaic Applications by Means of Cascaded Voltage Step-up Canonical Elements

Wednesday, April 1, 2015 (12/06/1436H)
Time: 12:30 pm - 1:30 pm
Venue: Room 2C114, EE Department Meeting Room

Abstract:

In PV applications, the voltage available from the PV panel source has to be boosted from a low DC value to either a much higher DC level or to an AC voltage with a particular amplitude and frequency. This approach finds application in many areas like rural, isolated microgrids using Distributed Energy Sources (DES). In this talk, cascaded boost converters based on canonical elements under Sliding Mode Control (SMC) will be used as a solution for the high gain conversion ratio in PV applications. The three basic canonical elements for power processing are the DC-transformer, the DC-gyrator and the Loss Free resistor (LFR). Two cascaded boost converters will be synthesized based on suitable sliding surfaces demonstrating that the two cascaded LFRs is the best candidate for these kinds of applications in terms of dynamic performance and stability. The two cascaded LFRs are then applied for impedance matching between a PV generator and a DC voltage bus of 380 V while performing. Maximum Power Point Tracker (MPPT). Ideal reduced-order sliding-mode dynamics model are derived from the full-order switched model taking into account the sliding constraints, the nonlinear characteristic of the PV module and the dynamics of the MPPT controller. A comparison with other alternative converters for high gain conversion ratio will be carried out. The Z-source converter and the high step-up converter based on coupled-inductor are selected in order to make this comparison.
The speaker will also introduce his research center and activities at University Rovira i Virgili, Tarragona, Spain

Note: All are welcome and refreshments will be served.

Speaker:

Dr. Abdelali El Aroudi, Technical School of Universitat Rovira i Virgili (URV), Tarragona, Spain

Abdelali El Aroudi was born in 1973. He received the graduate degree in Physical Science from Faculté des Sciences, Université Abdelmalek Essaadi, Tetouan, Morocco, in 1995, and the Ph.D. degree (with honors) from Universitat Politècnica de Catalunya, Barcelona, Spain in 2000.
During the period 1999-2001 he was a Visiting Professor at the Department of Electronics, Electrical Engineering and Automatic Control, Technical School of Universitat Rovira i Virgili (URV), Tarragona, Spain, where he became an associate professor in 2001 and a full-time tenure Associate Professor in 2005. From September 2007 to January 2008, he was holding a visiting scholarship at the Department of Mathematics and Statistics, Universidad Nacional de Colombia, Manizales, conducting research on modelling of Power Electronics circuits for Energy Management. His research interests are in the field of structure and control of power conditioning systems for autonomous systems, power factor correction, stability problems, nonlinear phenomena, chaotic dynamics, bifurcations and control of switching converters. He has co-authored with co-workers from different universities in Europe, Asia, Africa and America more than 150 international scientific publications and 1 book chapter. He has given different invited lectures in Europe, Africa, Latin America and Asia. He is the 2013-2015 Secretary of the IEEE Circuits and Systems Society Technical Committee of Power and Energy Circuit and Systems (PECAS). He is the co-editor of a special issue on: Design of Energy-Efficient Distributed Power Generation Systems. He is serving as an Associate Editor of the IEE IET Power Electronics (2014-2017), Journal of Modelling and Simulations (2012-to date), associate editor of International Journal of Renewable and Sustainable Energy (2014-2017). He has supervised 5 PhD thesis completed, 1 on-going PhD student, 10 MSc's thesis students completed. His publications have near 1000 citations and an h-index of 20 according to Google Scholar.

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Electrical Engineering Department,
College of Engineering,
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Invites you all to attend a Technical Lecture on

Platform Based Design with Software Defined Radio

Monday, March 16, 2015 (25/05/1436H)
Time: 12:30 pm - 1:30 pm
Venue: Room 2C114, EE Department Meeting Room

Abstract:

Wireless consumers' insatiable demand for bandwidth has spurred unprecedented levels of investment from public and private sectors to explore new ways to increase network capacity and meet escalating demand. Industry analysts predict demand will outpace capacity; it's simply a matter of when. Wireless researchers continue to present ideas to address capacity challenges and explore network topologies that not only tackle capacity concerns but also offer features and functions never thought possible. Transitioning from concept, which is largely a software exercise, to a working prototype with real signals and waveforms requires extensive investments in time and money, and has been an impediment to the adoption of new technologies and capabilities. Design approaches that embrace software reconfigurability with an accelerated path to prototyping can expedite the design, exploration, and deployment of these technologies in new and exciting ways.

Speaker:

Farris Alhorr
Senior Business Development Manager – MENA
National Instruments

Speaker Bio: Farris Alhorr is an RF specialist and Senior Business Development Manager at National Instruments for the Middle East and North Africa Region (MENA). Farris has more than 9 years of industry experience focusing on RF test and measurement instruments, wireless system design, and over the air (OTA) wireless testing. He worked as an RF systems consultant for 5 years and was heavily involved in the CTIA MIMO OTA subgroup. His major CTIA contributions include a patented method on how to make OTA measurements for wireless devices in a reverberation chamber. Besides his technical expertise, Farris worked as a product line manager for the NI Software Defined Radio (SDR) platforms with a focus on government, industrial, and academic research applications. He successfully launched two new NI USRP SDRs, and has given multiple seminars on SDR and LabVIEW in multiple IEEE conferences. Farris holds a Master of Business Administration from The University of Texas at Austin and Master of Electrical Engineering from Texas Tech University.

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Electrical Engineering Dept

KACST-TIC in Radio Frequency & Photonics for the e-Society (RFTONICS) and Electrical Engineering Department are pleased to invite you to attend a talk entitled:

Pattern Classifiers and Methods of Reinforcement

by

DR. CHING Y. SUEN
Professor, Concordia University – Canada

Date: Wednesday, March 4, 2015 (13/05/1436H)
Time: 12:30 – 1:30 pm
Venue: Electrical Engineering Dept. Conference Room

ABSTRACT

Pattern recognition has become a very active field in the past decades. Applications are far and wide, e.g. handwriting recognition, face recognition, fingerprint recognition, iris recognition, and many other recognition tasks. Basic principles of pattern recognition, including digitization, pre-processing, feature selection and extraction, clustering analysis, and classification processes, Different types of classifiers have been explored, e.g. neural networks, tree classifiers, support vectors, and so on. To improve the recognition rates, multiple classifiers are often explored. This seminar covers different types of classifiers, including geometric and structural types, neural networks, and ensemble of hybrid classifiers. Several effective ways of combining classifiers will be presented with real-life examples and research results.

DR. CHING Y. SUEN is the Director of CENPARMI, Centre for Pattern Recognition & Machine Intelligence, at Concordia University, Montreal, Canada. Currently, and was the distinguished Concordia Research Chair position in AI and Pattern Recognition for 14 years. He received his M.Sc. from the University of Hong Kong, and a Ph.D. from the University of British Columbia, both in Electrical Engineering. After that, he joined the Department of Computer Science and Software Engineering at Concordia University where he became Professor in 1979 and later served as Chairman and as Associate Dean of Research for the Faculty of Engineering and Computer Science. He has guided/hosted 85 long-term visiting scientists and professors, and has supervised 30 doctoral and 54 master's graduates. Prof. Suen has published 12 books and more than 500 papers on subjects ranging from handwriting recognition to computer vision, to expert systems and computational linguistics. His publications have been widely quoted and used by both academic and industrial practitioners. CENPARMI databases are widely used by other researchers in the field. Some of the research results have been turned into commercial products. Presently he is the Editor-in-Chief of the prestigious journal "Pattern Recognition" and an Advisory Editor of the International Journal of Image and Graphics, an Associate Editor of the International Journal of Pattern Recognition and AI, Signal, Image and Video Processing, and the journal of Expert Systems with Applications. He has also been an Associate Editor of 5 other journals. In addition, he is also the founder of "The International Journal of Computer Processing of Oriental Languages" and served as its first Editor-in-Chief for 10 years. Dr. Suen has been a member of the Advisory Board for IAPR (Int. Assoc. for Pattern Recognition) and the Advisory Committee for ICPR conferences). He is a fellow of the IEEE, IAPR, and the Academy of Sciences of the Royal Society of Canada, and he has served several professional societies as President, Vice-President, or Governor. He is also the Founder and Chair of several conference series, including ICDAR (Int. Conf. on Document Analysis and Recognition) and ICDAR awards, ICFHR (formerly known as IWFHR Int. Workshop on Frontiers in Handwriting Recognition), and VI (Visual Interface). He was the General Chair of numerous international conferences, including the 1st and the 11th International Conferences on Frontiers in Handwriting Recognition, held in 1990 and 2008 respectively, in Montreal; the International Conference on Document Analysis and Recognition, held in 1995, in Montreal; the International Conference on Pattern Recognition, held in 2002, in Quebec City, and others. Prof. Suen has given 198 seminars at major computer companies and various government and academic institutions. He has been the principal investigator of 25 industrial and governmental research contracts. Dr. Suen is a recipient of numerous prestigious achievements and teaching awards, including: the ITAC/NSERC National Award from the Information Technology Association of Canada and the Natural Sciences and Engineering Research Council of Canada in 1992; the Concordia "Research Fellow" award in 1998; the IAPR ICDAR Award in 2005; the ENCS Lifetime Research Achievement and Citation Awards in 2008., Gold Medal from the University of Bari in Italy, and others.

Electrical Engineering Department and Saudi Aramco Chair in Electrical Power
College of Engineering,
King Saud University,
Riyadh, KSA.

Invites you all to attend a Technical Lecture on

Stochastic Process-Based Harmonic Current Generation for Harmonic Assessment in the Planning Studies for Wind Power Plants

Wednesday, 4th February, 2015 (15/04/1436H)
Time: 11:00 am - 12:00 pm
Venue: Room 2C114, EE Department Meeting Room

Abstract:

This invited speaker will introduce Yonsei University, Seoul, Korea and briefly discuss past and on-going research projects, including modeling and control of modular multilevel converters (MMC) for HVDC, measurement-based dynamic load modeling, synchro-phasor based monitoring, analysis and protection, hybrid energy storage system, emerging power quality concerns, etc. The lecture will then focus on research about the operating region of modular multilevel converter (MMC) which is limited by the maximum allowable voltage ripple of cells. Injection of the controlled second-order harmonic into the circulating current can extend the operating region of MMC. This research investigates the maximum allowable second-order harmonic circulating current for extending the operating region reliably and efficiently. It also examines the MMC energy requirements in line with the maximum excess energy capability for two cases; i.e. (1) the original operating region and (2) the extended operating region. Finally, it will elaborate active and reactive power capability of MMC for each case by P-Q diagrams for contingent operating conditions with faulty or disabled submodules. Understanding unique shape and change of P-Q capability with credible submodule failure contingency should be crucial for planning MMC-HVDC lines, and determining the energy requirements and the level of redundancy in submodules properly in order to achieve the envisioned benefits of the new HVDC. The efficacy and accuracy of the research findings are validated for MMCHVDC system using PSCAD/EMTDC.

Note: All are welcome and refreshments will be served.

Speaker:

Dr. Kyeon Hur,
Yonsei University, Seoul, South Korea

Dr. Kyeon Hur received his B.S. and M.S. degrees in electrical engineering from Yonsei University, Seoul, Korea in 1996 and 1998, respectively and the Ph.D. degree in electrical and computer engineering from The University of Texas at Austin, USA in 2007.

He has been involved in R&D with Samsung Electronics, Suwon, Korea, between 1998 and 2003 where he designed control and user-interface algorithms, and power-electronic circuits for advanced AC drives. His industrial experience also includes the Electric Reliability Council of Texas (ERCOT), Taylor, TX, USA as a Grid Operations Engineer between 2007 and 2008 where he supported grid operations by conducting power flow, voltage and transient stability analyses and managing EMS applications including State Estimator, RTCA and DTCR. He was also with the Electric Power Research Institute (EPRI), Palo Alto, CA, USA and conducted and managed research projects in Grid Operations and Planning from 2008 to 2010, regarding phasor measurement unit (PMU)-based protection and control, reactive power management and control, statistical conductor ratings, load modeling and flexible ac transmission systems/high voltage direct current (FACTS/HVDC).

He has rejoined Yonsei University since 2010 and leads a smart-grid research group. His current research interests include FACTS/HVDC, PMU-based analysis and control, integration of variable generation and controllable load, superconducting power applications, and power quality. He is a senior member of IEEE and active in IEEE PES and Cigre Working Groups on HVDC and Power Quality.

Electrical Engineering Department and Saudi Aramco Chair in Electrical Power
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Invites you all to attend a Technical Lecture on

Operating Region of Modular Multilevel Converter for HVDC with Controlled Second-order Harmonic Circulating Current: Elaborating P-Q Capability

Wednesday, 4th February, 2015 (15/04/1436H)
Time: 10:00 am - 11:00 am
Venue: Room 2C114, EE Department Meeting Room

Abstract:

The operating region of modular multilevel converter (MMC) is limited by the maximum allowable voltage ripple of cells, which is associated with the arm energy variation. Injecting the controlled second-order harmonic component into the circulating current can reduce energy variation of arm and thus extend the operating region of MMC. Care must be taken, however that the second-order harmonic circulating current affects the arm current and inappropriately injected harmonic current may cause the arm current polarity undesirably. Therefore, we first investigate and propose the maximum allowable second-order harmonic circulating current for extending the operating region reliably and efficiently. We further examine the MMC energy requirements in line with the maximum excess energy capability for two cases, running with (1) the original operating region and (2) the extended operating region. Finally, we elaborate active and reactive power capability of MMC for each case and illustrate the P-Q diagrams for contingent operating conditions with faulty or disabled submodules. Understanding unique shape and change of P-Q capability with credible submodule failure contingency should be crucial for planning MMC-HVDC lines, and determining the energy requirements and the level of redundancy in submodules properly in order to achieve the envisioned benefits of the new HVDC. The efficacy and accuracy of the research findings are validated for MMCHVDC system using PSCAD/EMTDC.

Note: All are welcome and refreshments will be served.

Speaker:

Dr. Kyeon Hur,
Yonsei University, Seoul, South Korea

Dr. Kyeon Hur received his B.S. and M.S. degrees in electrical engineering from Yonsei University, Seoul, Korea in 1996 and 1998, respectively and the Ph.D. degree in electrical and computer engineering from The University of Texas at Austin, USA in 2007.

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