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organizes lectures on

A) How to Radiate Maximum Energy from an Antenna

Professor Tapan K. Sarkar
College of Engineering & Computer Science,
Syracuse University, USA
Past President, IEEE Antennas and Propagation Society

B) Analysis of the Improvement of Radiation Behavior for THz Devices

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Signal Theory and Communications Department,
Charles III University of Madrid, Madrid, Spain
Past President, IEEE Antennas and Propagation Society

Venue : Auditorium, IEM, Salt Lake, Kolkata
Day & Date : Thursday, April 13, 2017
Time : 3.00pm
How to Radiate Maximum Energy from an Antenna

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Abstract

In electrical engineering, we obtain maximum average power from a source with some internal impedance when the connected load impedance equals the complex conjugate of the internal source impedance. This is known by the maximum power transfer theorem. Applying this theorem means that the best we can do is to distribute the source power equally between the source internal impedance and the load impedance; i.e. the efficiency is 50%. Efficiency takes into account the ratio of the dissipated power in the load divided by the source power, on the other hand the maximum power transfer considers only the magnitude of the dissipated power. If we increase the resistance of the load more than the internal resistance of the source then we will achieve better efficiency, however the magnitude of the dissipated power will be less since the total resistance in the circuit increased. We will try to emphasize this fact in antenna problems and show that considering efficiency is more appropriate than considering maximum power transfer or for that matter the input impedance of an antenna in terms of the S-parameters. Analysis is performed on half wave dipole to show that maximum power transfer impedance matching is not the optimum solution in terms of efficiency.

Tapan K. Sarkar received the B.Tech. degree from the Indian Institute of Technology, Kharagpur, in 1969, the M.Sc.E. degree from the University of New Brunswick, Fredericton, NB, Canada, in 1971, and the M.S. and Ph.D. degrees from Syracuse University, Syracuse, NY, in 1975. From 1975 to 1976, he was with the TACO Division of the General Instruments Corporation. He was with the Rochester Institute of Technology, Rochester, NY, from 1976 to 1985. He was a Research Fellow at the Gordon McKay Laboratory, Harvard University, Cambridge, MA, from 1977 to 1978. He is now a Professor in the Department of Electrical and Computer Engineering, Syracuse University. His current research interests deal with numerical solutions of operator equations arising in electromagnetics and signal processing with application to system design. He obtained one of the “best solution” awards in May 1977 at the Rome Air Development Center (RADC) Spectral Estimation Workshop. He received the Best Paper Award of the IEEE Transactions on Electromagnetic Compatibility in 1979 and in the 1997 National Radar Conference. He has authored or coauthored more than 300 journal articles and numerous conference papers and 32 chapters in books and fifteen books, including his most recent ones, Iterative and Self Adaptive Finite-Elements in Electromagnetic Modeling (Boston, MA: Artech House, 1998), Wavelet Applications in Electromagnetics and Signal Processing (Boston, MA: Artech House, 2002), Smart Antennas (IEEE Press and John Wiley & Sons, 2003), History of Wireless (IEEE Press and John Wiley & Sons, 2005), and Physics of Multiantenna Systems and Broadband Adaptive Processing (John Wiley & Sons, 2007), Parallel Solution of Integral Equation-Based EM Problems in the Frequency Domain (IEEE Press and John Wiley & Sons, 2009), Time and Frequency Domain Solutions of EM Problems Using Integral Equations and a Hybrid Methodology (IEEE Press and John Wiley & Sons, 2010) and Higher Order Basis Based Integral Equation Solver (HOBBIES) (John Wiley & Sons, 2012).


He received Docteur Honoris Causa both from Universite Blaise Pascal, Clermont Ferrand, France in 1998, from Politechnic University of Madrid, Madrid, Spain in 2004, and from Aalto University, Helsinki, Finland in 2012. He received the medal of the friend of the city of Clermont Ferrand, France, in 2000.

Analysis of the Improvement of Radiation Behavior for THz Devices
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Abstract

THz technologies promise a wide range of applications in a variety of fields like radioastronomy, medical imaging, security and so on. One of the main issues in THz technology is the generation of THz signals of medium to high power, wide bandwidth, and frequency stability. In this presentation the principle of electro-optical down conversion or photomixing is highlighted and several techniques for the improvement of the characteristics of the signal thus obtained are presented.

Magdalena Salazar-Palma was born in Granada, Spain. She received the MS and PhD degrees in Electrical and Electronic Engineering from Polytechnic University of Madrid, Spain, where she has been Assistant and Associate Professor at the Department of Signals, Systems and Radiocommunications. Since 2004 she is with the Department of Signal Theory and Communications, Carlos III University of Madrid, Spain, where she is Full Professor, co-director of the Radiofrequency, Electromagnetics, Microwaves and Antennas Research Group (GREMA) and served for three years as Department head. She has developed her research in a number of areas: electromagnetic field theory; advanced computational and numerical methods for microwave and millimeter wave passive components and antennas analysis and design; advanced network theory, in particular, passive devices, filters and multiplexers theory and design; antenna arrays and smart antennas; novel materials and metamaterials for the implementation of devices and antennas with improved performance (multiband, miniature size, and so on) for the new generation of communication systems; design, simulation, optimization, implementation, and measurement of microwave circuits both in waveguide and integrated (hybrid and monolithic) technologies; millimeter, submillimeter and THz frequency band technologies; radio waves propagation theory; and history of telecommunications.

She has authored or co-authored 705 publications: 8 scientific books and 30 book contributions published by international editorial companies, 14 academic books, 103 articles in scientific journals, 380 contributions for international symposia, 78 papers in national conferences, 53 project reports, 30 short courses notes, and 9 other publications. She has coauthored 2 European/USA patents and 6 software packages for the analysis and design of microwave and millimeter wave passive components, antennas and antenna arrays, and advanced filters and multiplexers, which are under exploitation by multinational companies. She has participated (as principal investigator or researcher) in a total of 93 research projects (43) and contracts (50) financed by Spanish, European, and USA public institutions and companies. She has advised numerous Master and PhD Thesis of Spanish and foreign students. She has delivered numerous invited presentations and short courses in the frame of International Conferences and Symposia. She has been invited to deliver numerous talks and seminars in Universities, companies, and other scientific and technical organizations all over the world. She has received two individual research awards, and together with her Department another research award. In 2016 she has received an Honorary Doctorate from Aalto University, Finland. She received several grants and other awards and recognitions, among them the elevation to IEEE Fellow. She was the lecturer of the Inaugural Lesson of the Academic Year 2015-2016 at Carlos III University of Madrid, and delivered also the Invited Talk during the annual celebration of the Cáceres College of Engineering, Extremadura University, Spain. Recently she was interviewed by the BIT journal of the Spanish Official College of Telecommunication Engineers, COIT (see https://www.coit.es/archivo-bit/febrero-2016), with the front cover of the February 2016 issue devoted to her. She has been member of the Accreditation Committee of Full Professors in Engineering and Architecture of the Spanish National Agency for Quality Evaluation and Accreditation (ANECA), and other accreditation panels of other Spanish and foreign institutions. She has assisted several Spanish agencies in the evaluation of projects, research grants applications, and so on. She has served in evaluation panels of the Commission of the European Communities, and other countries, including the National Science...
Foundation in USA. She has been associate editor of several scientific journals, member of the Technical Program or Organizing Committees of many international and national symposia, and reviewer for many international scientific journals, symposia, and editorial companies.

She is member of COIT and the Spanish Association of Telecommunication Engineers, AEIT, and other international professional associations, being the most important the IEEE (The Institute of Electrical and Electronics Engineers), the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity with more than 420,000 members as of December 31, 2015.

In 1989 she became IEEE member and was elevated to Senior Member in 2001. In November 2013, she was elevated to IEEE Fellow “for contributions to the application of numerical techniques to electromagnetic modeling”. She is member of IEEE Antennas and Propagation Society (AP-S), Communications Society, Education Society, Magnetics Society, Microwave Theory and Techniques Society (MTT-S), and Women in Engineering (WIE) affinity group.

Since 1989 she has served IEEE under different volunteer positions: Vice-chair and Chair of Spain Section AP-S/MTT-S Joint Chapter, Spain Section Chair, Spain Section Membership Development officer, Spain Section Professional Development officer, Spain Section adviser, Region 8 Committee member, Region 8 Nominations and Appointments Subcommittee member, Region 8 Conference Coordination Subcommittee Chair, Women in Engineering Committee (WIEC) member, WIEC chair, member of Ethics and Member Conduct Committee, History Committee, MGAB (Member and Geographic Activities Board) Geographic Unit Operations Support Committee, elected member-at-large of AP-S Administrative Committee, and member of Division IV Nominations and Appointments Committee. In 2009 she was elected as 2010 AP-S President-Elect, serving as 2011 AP-S President and member of Technical Activities Board (TAB), and, in 2012, as AP-S Past President, Chair of AP-S Nominations Committee and Chair of AP-S Past Presidents Council. She has also been member of AP-S Nominations Committee, Distinguished Lecturer Program Committee, and Chair of the AP-S Constitution and Bylaws Committee. She has been General Chair of MGAB Sections Congress 2014, member of TAB Society Review Committee, member of the IEEE Service Awards Committee and IEEE Honorary Membership Committee (IEEE Awards Board), TAB Leading Representative at the Joint MGAB/TAB/EAB (Educational Activities Board) AdHoc Committee on Member Development, member of TAB Nominations and Appointments Committee, SIGHT (Special Interest Group on Humanitarian Technologies) Communities of Practice Subcommittee, IEEE Fellow Committee and Region 8 Strategic Planning Subcommittee. Currently she is member of TAB Hall of Honor Selection Committee, voting member of MGAB (as TAB representative), and Vice-Chair of Sections Congress 2017 Committee. Within AP-S she is member of the Constitution and Bylaws Committee, Field Awards Committee, Meetings Committee, New Technology Directions Committee, and Chair of the History Committee. She is member of MTT-S Technical Committee # 15. In 2014 she was elected member-at-large of MTT-S Administrative Committee, where she served as member of MGA Committee, Operations Committee, and Publications Committee, and continues to serve as member of the Education Committee, Image and Visibility Committee, SIGHT AdHoc Committee, and Vice-chair of Intersociety Liaison Committee. She has been appointed Chair of 2017 IEEE Ethics and Member Conduct Committee and 2017 MGAB Recognitions and Awards Committee, as 2017 TAB representative to MGAB, and member of IEEE Awards Board, IEEE Awards Board Policy and Portfolio Review Committee, IEEE BoDAd Hoc Committee on IEEE Ethics Programs, MGAB Member Engagement and Life Cycle Committee. Recently she has been elected as 2017-2018 Region 8 Delegate-elect/Director-elect and, as such, Region 8 Operational Committee member, Chair of Region 8 Strategic Planning Committee, and member of Region 8 Nominations and Appointments Committee. She will serve as 2019-2020 Region 8 Delegate/Director and as member of IEEE Board of Directors.