IEEE Coastal Los Angeles Section Antennas & Propagation Chapter Meeting Announcement

"Towards faster and more accurate Electromagnetic Simulation of Radiation, Propagation, and Scattering Problems"

Tuesday, May 26, 2015

Presented by **Professor Wojciech Gwarek**, *Professor at the Warsaw University of Technology, Poland and President of QWED, IEEE Fellow and Recipient of 2011 IEEE Microwave Pioneer Award.*

Abstract:

Electromagnetic simulation software packages have become indispensable tools of every microwave and antenna engineer. Continuous progress in software and hardware brings also challenges to the users who should constantly upgrade their understanding of the new simulation capabilities and constraints. The presenter has more than 20 years of experience in development of time-domain electromagnetic software tools and will discuss some of the subjects he considers important and useful.
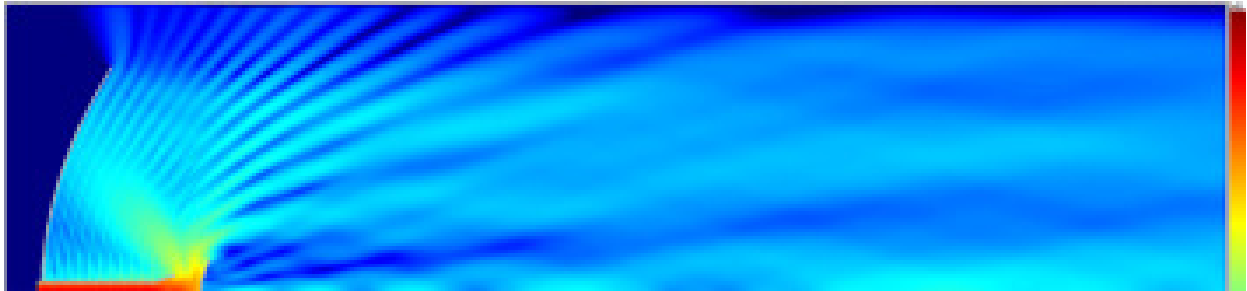
In the main part of the presentation four aspects will be addressed:
- So called V2D approach to analysis of axi-symmetrical problems. By assuming analytical solution in one (angular) dimension, the problem can be reduced to two-dimensional simulation with decisive reduction of the required computer resources needed for particular simulation accuracy. Examples of analysis of large dual reflector antennas will be presented as a typical application of that approach. An example of the electrical field distribution amplitude generated by a dual-reflector antenna is shown in the picture above.
- Application of periodic boundary conditions for scattering problems will be discussed with explanation of the theoretical background for (somewhat unusual) application of complex numbers in time domain.
- Examples of time-domain simulation of wave propagation in metamaterials will be shown. They will refer to a recent vivid discussion about metamaterial properties within the IEEE MTT Society. The author presented his point of view in that discussion in his June 2014 publication in the IEEE Microwave Magazine.
- Discussion on how the progress in computer hardware influences the performance of electromagnetic software and what criteria should be used when purchasing a new hardware destined for electromagnetic analysis.

The presenter will be also happy to discuss other problems of time-domain electromagnetic simulations raised by the participants. They may include (subject to the audience preferences) for example:

- Extraction of S-parameters in multimode environment
- Multi-physics approach to microwave heating problems
- Analysis of high-Q problems in time domain (e.g. in filter problems)
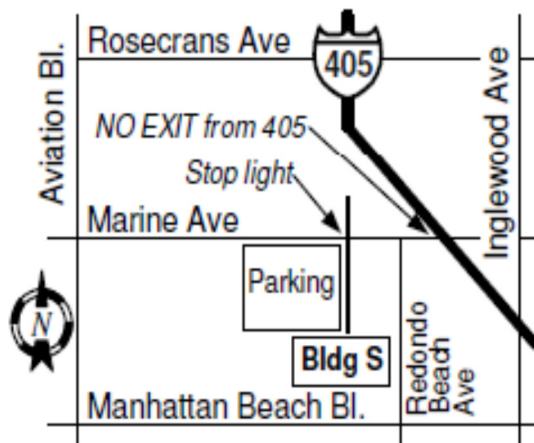
When: Tuesday, 05/26/2015
6:30 pm (social)
7:00-8:00 pm (presentation)

Where:
Building S Cafeteria, Northrop Grumman Aerospace Systems,
1 Space Park Dr., Redondo Beach, 90278

Directions to building S cafeteria:
From the 405, exit onto Rosecrans-West.
Turn LEFT onto Aviation (3rd stoplight).
Turn LEFT on Marine (2nd stoplight). Turn RIGHT at the next stoplight. Parking lot and Building
S are on the RIGHT at the end of the driveway. The meeting is in the basement.

Speaker's Biography:

Wojciech K. Gwarek graduated from Warsaw University of Technology, Warsaw, Poland. He received Ph.D in 1977 from the same institution and is currently a professor and Head of the Microwave and Radar Laboratory there. He also received M.Sc degree in 1974 from M.I.T. (Cambridge, MA). Professor Gwarek's specializes in the field of microwave technology and electromagnetic theory. Since 1984 he has been concentrating on computational electromagnetics and, in particular, on the theory and practice of the finite difference time domain (FDTD) method. In 1996, together with his three co-workers he founded a company named QWED, in which several software packages for electromagnetic modeling have been implemented. Brand names of QuickWave-3D and QW-V2D have become known worldwide. Among a variety of applications of those packages we may find also components designed for ALMA by NRAO (Charlottesville, VA) and JPL (Pasadena, CA). QWED also provides consulting services to industry and Prof. Gwarek is a recognized expert on industrial design of microwave equipment involving electromagnetic modeling.

Professor Gwarek is author of more than 250 technical papers. In the years 2003-2005 he served as an IEEE Distinguished Microwave Lecturer. Since 2001 he is a Fellow Member of the IEEE. In 2011 he received IEEE Microwave Pioneer Award "In recognition of pioneering contributions to development and practical use of the finite-difference time domain (FDTD) method".

IEEE members and non-members welcome!