IEEE Antennas and Propagation Seminar Announcement

Sponsored by Fort Worth Chapter of IEEE Antennas and Propagation Society

Full-Wave Computational Techniques for Analysis of Scattering from Periodic Structures

Professor Nan-Wei Chen
National Central University, Taiwan

Abstract
In this talk, full-wave computational techniques pertinent to the analysis of scattering from periodic structures are reviewed. Periodic structures have found widespread applications, such as frequency selective surfaces, antenna arrays, and photonic crystals (PCs). Numerical simulation tools that accurately predict the behavior of electromagnetic wave in the periodic structures could greatly reduce the time and costs in the design, fabrication and testing. The tools are categorized into frequency-domain and time-domain ones. In frequency domain, the widely used integral-equation (IE)-based solver exploits the periodic Green's function to achieve a unit-cell analysis of the structures at a single frequency. However, high computational complexity renders the IE-based solver impractical for the characterization of the structure while the unit cell is electrically large and contains fine geometrical details. In time domain, the analysis of transient scattering from periodic structures has been carried out predominantly using the finite-difference time-domain (FDTD) method. Recently, the time-domain IE-based solver exploiting the time-domain Floquet wave expansion for scattered field has been proposed to realize an efficient avenue for predicting the electromagnetic behavior of periodic structures over a wide spectrum of frequencies. Unfortunately, the aforementioned solvers are impractical for analysis of realistic PC structures. The avenues for alleviating this computational burden, such as fast algorithm acceleration and parallelization, will be addressed.

Biography
Nan-Wei Chen received the B.S. degree in atmospheric sciences and the M.S. degree in space sciences from National Central University, Jhongli, Taiwan, in 1993 and 1995, respectively. He received the Ph.D. degree in electrical engineering at the University of Illinois at Urbana-Champaign in 2004. From 1998 to 2004, he was a Research Assistant at the Center for Computational Electromagnetics, University of Illinois. Since 2004, he has been an Assistant Professor of electrical engineering at the National Central University, Taiwan. His research interests include computational electromagnetics with special emphasis on time-domain integral-equations, periodic structures, and millimeter wave antennas and passive circuits.

Date: Thursday, July 9, 2009
Time: 10:00 am – 11:00 am
Place: Rady Room, the 6th floor, Nedderman Hall, the University of Texas at Arlington
Address: 416 Yates St., Arlington, TX 76019
Directions: http://www.uta.edu/maps/acaddepts?id=ee

Seminar contact: Professor Mingyu Lu, EE Department (mingyulu@uta.edu)