

EUROPEAN SCHOOL OF ANTENNAS (ESoA)



ADVANCED COMPUTATIONAL ELECTROMAGNETICS



September 10-14, 2018 - Turin, Italy

Course coordinators:

Prof. Francesco P. Andriulli, Politecnico di Torino

Prof. Giuseppe Vecchi, Politecnico di Torino



This course addresses frequency-domain, integral-equation based computational techniques for the analysis of challenging antenna problems, including recent metamaterials issues. The challenges come from the need to apply computational electromagnetics to real-life antenna and antenna platform design. The course will give a working knowledge of a number of topics that allow to solve complex antenna problems. While addressing advanced topics, it is structured so as to give attendees a practical understanding of problems, the techniques to solve them, and of how to implement them when "back at home". Attendees willing to participate actively in practical sessions are asked to come equipped with a laptop and a WiFi connection.

Course Topics

Review of IE/MoM fundamentals

Integral-Equation/MoM formulation for PEC and penetrable bodies; Geometrical and EM discretization; Antenna modeling issues; Iterative Methods for linear systems and Problem conditioning

Higher order basis functions

Higher-order polynomial vector basis functions
Higher order modeling of both geometry and equivalent currents

Integration methods for 3D structures

Singularities in MoM matrix entries: overview;
Integration of singular terms for patches and wires

Fast methods 1

Overview of fast methods;
FFT based methods;

Fast methods 2

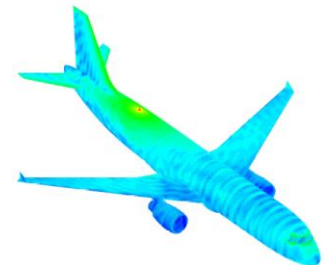
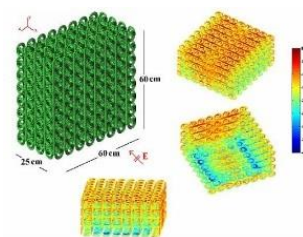
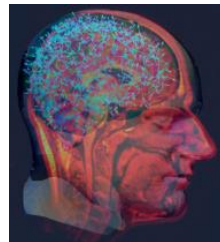
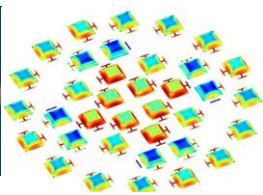
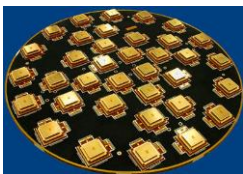
Fast Multipole Method (FMM): single- and multilevel (MLFMA);
Kernel-free methods: overview

Preconditioning

Spectral properties of most relevant Integral Equations
High-density mesh and multi-scale problems
Quasi-Helmholtz decomposition
Calderon preconditioning: theory and implementations
Multi-Resolution (wavelet) approaches for 3D structures

Domain-Decomposition

Overview of Domain-Decomposition approaches
Aggregate functions: strategies, implementations
Shannon basis functions



Courtesy of Thales-Alenia Space and IDS

Registration fee: 440€ for Universities and non-profit Research Institutions, 880€ for business companies.

Grants: A reduced number of grants covering registration fees will be available

For registration forms, information on grants, payment and any other course details please visit http://www.antennasvce.org/Community/Education/Courses?id_folder=646

or contact: francesco.andriulli@polito.it or giuseppe.vecchi@polito.it

Deadline: September 5th, 2018 for registration and fee payment.