

Iteration-Free Approaches to Solving Large Antenna and Scattering Problems

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This course will focus on recently developed techniques for solving Large Antenna and scattering problems without the use of iteration.

We will begin with an Introduction, which will briefly touch on Integral Equation formulation, Green's functions for stratified media, and key numerical issues encountered in the solution of large problems. Next, we will present the concept of multi-scale aggregate functions and show how they are used as basis functions to construct the solution of large array problems.

Following this, we will discuss the concepts of Characteristic Basis Functions (CBFs), both in the context of MoM and FDTD, and show how to derive them by solving manageable size problems. We will then move on to illustrate their use in solving both the large array as well as associated microwave circuit problems.

Finally, we will turn to the FDTD and show how the concepts of CBs are extended to the time domain to solve large antenna, scattering and EMI/EMC problems using the Serial-Parallel FDTD (SPFDTD) algorithm.