

# Multiscale 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, based on the multi-scale perspective of the Method of Moments (MoM)..

We will begin with key numerical issues encountered in the solution of large and complex problems, and address the multi-scale perspective of their solution.

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; this class includes the Synthetic Functions (SFX), the Characteristic Basis Functions (CBF), and the Truncated Floquet Waves (TFW) expansions. We will show how to derive them and how their application reduces the problem to a manageable size that allows iteration-free solutions.

Finally, the use of Multi-Resolution (MR) to solve 3D problems with complex geometry will be addressed.

We will illustrate the use of the introduced techniques with special emphasis on large array problems, also including the associated microwave circuits, and on antenna platforms