1112-78-309 **Shaolin Allen Liao*** (sliao@anl.gov), 9700 S Cass Avenue, Lemont, IL 60439, and **Hua-Te Chien**. *On Fast Computation of Wave Scattering through Adaptive Multi-level Convolution.*

By exploring the conjugate bandwidth relation between spatial domain and spectral domain of electromagnetic scattering by the object geometry, we have formulated an adaptive multi-level local convolution algorithm to obtain the wave Fourier spectrum of the scattering wave. Also through Surface Integral Equation (SIE) method, both scattering far field and near field can be represented by the equivalent currents on the scattering object boundary. Starting with root-level spectrum/space tree (quadtree for 2D) and leaf-level space/spectrum tree, the adaptive multi-level algorithm traverse down the spectrum/space tree through spatial/spectral domain convolution of the spatial/spectral function with a set of spectrum/space band-limited convolution kernels; the algorithm keep traversing down on the spectrum/space tree until required spectrum/space resolution is obtained. During each traversal, the algorithm can perform local adaptive search for optimized level decrement in spectrum/space tree (increment in space/spectrum tree) based on local spectral/spatial bandwidth. The algorithm has an O(NlogN) complexity for an input dependent N data points. Numerical 2D example has been successfully performed to validate the algorithm. (Received August 07, 2015)