

## Spectral Domain Fast Multipole Method for Solving Integral Equations of One and Two Dimensional Wave Scattering

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**Abstract :** In this paper, a spectral domain implementation of the fast multipole method is presented. It is shown that the aggregation, translation, and disaggregation stages of the fast multipole method (FMM) can be performed using the spectral domain (SD) analysis. The spectral domain fast multipole method (SD-FMM) has the advantage of eliminating the near field/far field classification used in conventional FMM formulation. The study focuses on the application of SD-FMM to one-dimensional (1D) and two-dimensional (2D) electric field integral equation (EFIE). The case of perfectly conducting strip, circular and square cylinders are numerically analyzed and compared with the results from the standard method of moments (MoM).

**Keywords :** electric field integral equation, fast multipole method, method of moments, wave scattering, spectral domain

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