Abstracts

Error analysis for the truncation of multipole expansion of vector Green's functions [EM scattering]

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One of the most important mathematical formulas in fast multipole algorithms (FMA) is the addition theorem. In the numerical implementation of the addition theorem, the infinite series should be truncated. In this paper, the number of terms needed for the scalar Green's function is derived, and the error analysis for the truncation error in the multipole expansion of the vector Green's functions is given. We have found that the error term in vector Green's functions is proportional to 1/R. If the scalar Green's function is truncated at the L-th term and the relative error is /spl epsiv/, then the relative error in the dyadic Green's function is /spl epsiv//4, if it is truncated at the (L+2)-th term. For the vector Green's function related to MFIE, the relative error is /spl epsiv//2 if it is truncated at the (L+1)-th term.

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