Abstracts

On the fully numerical evaluation of the linear-shape function times the 3D Green's function on a plane triangle

A numerical technique is reported for the evaluation of improper integrals associated with the self-interaction terms arising in the application of linear (Rao-Wilton-Glisson) current basis functions, defined on planar triangular patches, to three-dimensional electromagnetic surface scattering problems. The two-dimensional numerical integration arising in more conventional approaches, which follow Graglia [1993], is replaced by a one-dimensional integration by means of a suitable change of the local coordinate system, and analytical expressions for the functions to be numerically integrated are derived. Numerical results obtained using Graglia's method, our alternative method, and a reliable reference solution are compared for accuracy and computational complexity. The alternative technique appears to be conceptually simpler than the conventional method, is easier to implement, and causes no degradation in accuracy; in fact, it seems to more efficiently achieve a slightly specified level of accuracy.

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