Abstracts

On the Treatment of the Second Partial Derivative of the Integral of the Green's Function (Short Papers)

A. Rahhal-Arabi, J.R. Mautz and R.F. Harrington. "On the Treatment of the Second Partial Derivative of the Integral of the Green's Function (Short Papers)." 1994 Transactions on Microwave Theory and Techniques 42.6 (Jun. 1994 [T-MTT]): 1102-1104.

A method to evaluate the second normal partial derivative of the integral of the Green's function is presented in this short paper. Such a derivative appears in the solution of aperture problems in electrostatics. When computing the self-elements of the moment matrix, interchanging the order of differentiation and integration leads to integrals that are very unstable numerically and hence undesirable. This is due to the fact that these integrals grow in proportion to the reciprocal of the radius of the circle deleted around the singularity. In this paper, we present a method to avoid this difficulty for triangular patches. Plane triangular patches were chosen for their usefulness and popularity for arbitrarily shaped apertures. The theory is applicable to other surfaces of interest, such as polygons. The results obtained are simple and very convenient for numerical purposes.

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