Abstracts

Closed-form Green's functions for cylindrically stratified media

C. Tokgoz and G. Dural. "Closed-form Green's functions for cylindrically stratified media." 2000 Transactions on Microwave Theory and Techniques 48.1 (Jan. 2000 [T-MTT]): 40-49.

A numerically efficient technique is developed to obtain the spatial-domain closed-form Green's functions of the electric and magnetic fields due to z- and /spl phi/-oriented electric and magnetic sources embedded in an arbitrary layer of a cylindrical stratified medium. First, the electric- and magnetic-field components representing the coupled TM and TE modes are derived in the spectral domain for an arbitrary observation layer. The spectral-domain Green's functions are then obtained and approximated in terms of complex exponentials in two consecutive steps by using the generalized pencil of function method. For the Green's functions approximated in the first step, the large argument behavior of the zeroth-order Hankel functions is used for the transformation into the spatial domain with the use of the Sommerfeld identity. In the second step, the remaining part of the Green's functions are approximated on two complementary parts of a proposed deformed path and transformed into the spatial domain, analytically. The results obtained in the two consecutive steps are combined to yield the spatial-domain Green's functions in closed forms.

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