Abstracts

Spectral-domain Green's function of magnetic type for NRD guides and H-guides

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Nonradiative dielectric guides and H-guides are widely used in millimeter-wave integrated circuits and antennas. To analyze the behavior of discontinuities, obstacles, and slots in such structures, an increasingly used mathematical formulation is the integral-equation approach, for which Green's function is required. Here, an efficient programmable full-wave Green's function, due to a magnetic-current element placed inside the dielectric layer, is derived in the spectral domain. In the derivation procedure, the field is divided into two parts: the incident and scattering fields. The contribution of the surface wave is included in the scattering part, while the singularity, when the field and source points are the same, is presented in the incident field part. By doing so, one can deal with the singularity caused by the source and surface-wave poles encountered in the integration separately and freely. The Green's function is then used to analyze the radiation characteristics of a single transverse slot in upper plate of the H-guide. The results obtained are in good agreement with experimental data available in literature.

❑ Return to main document.