Abstracts

Shifted-frequency internal equivalence

A. Koksal. "Shifted-frequency internal equivalence." 1998 Transactions on Microwave Theory and Techniques 46.1 (Jan. 1998 [T-MTT]): 76-81.

The shifted frequency internal equivalence (SFIE) theorem involving inhomogeneous regions is introduced and proven. For a lossless inhomogeneous region using a vector Green's theorem and potential formulation, it is shown that the frequency-domain electromagnetic field at frequency /spl omega/ inside the region can be obtained using a set of equivalent volume and surface currents radiating in free space and at the different frequency /spl omega//sub 0/. The equivalent currents thus obtained are functions of the two frequencies, electric- and magnetic-volume-type sources of the original problem, material parameters, and the original field phasors at /spl omega/, and they only exist inside the region and on its boundary. A direct application of this equivalence is that it can be used to construct an internal equivalence at a shifted frequency for electromagnetic scattering problems if data are needed in a band of frequency. /spl omega//sub 0/ can be kept constant while the incident field frequency changes and, as a result, full computation of fields at each different frequency for volume-type equivalent sources can be avoided.

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