Abstracts

Computation of TM and TE Modes in Waveguides Based on a Surface Integral Formulation

M. Swaminathan, T.K. Sarkar and A.T. Adams. "Computation of TM and TE Modes in Waveguides Based on a Surface Integral Formulation." 1992 Transactions on Microwave Theory and Techniques 40.2 (Feb. 1992 [T-MTT]): 285-297.

The surface integral formulation has been used here for the computation of TM and TE modes propagating in dielectric loaded waveguides. This formulation makes use of the surface equivalence principle whereby the field at any point internal or external to the waveguide can be expressed in terms of equivalent surface currents. This procedure reduces the original problem into a set of integro-differential equations which is then reduced to a matrix equation using method of moments. The solution of this matrix equation provides the propagation characteristics of the waveguide and the equivalent surface currents existing on the waveguide walls. The equivalent surface currents can be used to compute the fields at all points, both inside and outside the waveguide. The surface integral method has been used to compute the propagation characteristics of waves propagating in dielectric loaded wave-guides. The computed results agree very well with analytical and published data. However, the use of the surface integral method on dielectric loaded waveguides sometimes leads to the existence of spurious modes. A method has been illustrated which can be used to remove these spurious modes.

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