Abstracts

The Diffraction of Electromagnetic Waves by Dielectric Steps in Waveguides (Apr. 1972 [T-MTT])

E.G. Royer and R. Mittra. "The Diffraction of Electromagnetic Waves by Dielectric Steps in Waveguides (Apr. 1972 [T-MTT])." 1972 Transactions on Microwave Theory and Techniques 20.4 (Apr. 1972 [T-MTT]): 273-279.

The problem of determining the scattered electromagnetic fields when a dielectric step discontinuity is placed in a waveguide is considered. Although an exact method of solution is not presently known, the recently introduced modified residue-calculus technique (MRCT) can be successfully extended to obtain a very accurate and numerically efficient approximate solution of the semi-infinite dielectric step. A still further extension of the modified residue-calculus method yields the approximate solution for the case of a finite dielectric step. A unique advantage of the present methods is that the degree of accuracy obtained is independent of the relative permittivity of the dielectric material and of the frequency. Thus very high permittivities or frequencies can be considered without an attendant increase in computational complexity. Numerical data are presented which confirm the accuracy of the method.

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