Abstracts

Mode Propagation Through a Step Discontinuity in Dielectric Planar Waveguide (Feb. 1986 [T-MTT])

H. Shigesawa and M. Tsuji. "Mode Propagation Through a Step Discontinuity in Dielectric Planar Waveguide (Feb. 1986 [T-MTT])." 1986 Transactions on Microwave Theory and Techniques 34.2 (Feb. 1986 [T-MTT]): 205-212.

This paper presents two methods for dealing with wave propagation through a dielectric step discontinuity at normal incidence. One method helps to accelerate the convergence of solutions, especially for the TM-mode problem, and the other treats efficiently the continuous mode spectrum by introducing the Legendre transform in the case of open waveguides. As for the former, the singular fields around the dielectric edges are introduced in terms of direct use of their functional forms to the boundary condition, which is fulfilled in the sense of least squares. As for the latter, the expansion in terms of the Legendre functions is performed for optimally divided ranges of a continuous spectrum. A number of numerical examples prove that the methods presented herein are quite powerful for solving the TM-mode discontinuity problems in dielectric waveguides of both closed and open types.

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