Analysis of Discontinuities in Planar Dielectric Waveguides: An Eigenmode Propagation Method

In this paper the eigenmode propagation method is proposed to analyze the discontinuity problems in planar dielectric waveguides. This new recursive algorithm is based on the numerical mode matching method, but it uses less computation time and computer memory, which makes the analysis of multiregion, vertically stratitied media much more effective. With this algorithm, the required computer memory is independent of the number of regions in the problem, and the computation time is linearly proportional to the number of regions. Therefore, it is particularly suitable for the analysis of planar waveguide discontinuities and waveguide bends. Using this method, we can analyze larger problems which are impractical with the finite element method. From the numerical examples given in the paper, it is demonstrated that the computation time is linearly proportional to the number of discontinuities, while the computer memory is almost a constant independent of the number of discontinuities, N.

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