Abstracts

A Rigorous Analytical Solution to Abrupt Dielectric Waveguide Discontinuities

A simple analytical method is proposed for analyzing transmitted, reflected, and radiated fields in abrupt discontinuities of dielectric waveguides, such as step discontinuities and sharp bends. In this method, approximate transmitted fields, both guided mode fields and radiated fields, are first calculated by assuming the incident field to be the source field on the discontinuity interface. Next, the approximate reflected fields are calculated by assuming the difference field of the incident and approximate transmitted fields to be the source field on the discontinuity interface. Then, the improvements for these approximate transmitted fields and approximate reflected fields are calculated in turns, successively. Only a few successive steps suffice for obtaining rigorous solutions. Numerical examples are presented for step discontinuities and sharp bends of dielectric slab waveguides.

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