Abstracts

Wave propagation in curved waveguides of rectangular cross section

P. Cornet, R. Dusseaux and J. Chandezon. "Wave propagation in curved waveguides of rectangular cross section." 1999 Transactions on Microwave Theory and Techniques 47.7 (Jul. 1999, Part I [T-MTT]): 965-972.

We present a rigorous differential method describing the propagation of an electromagnetic wave in an elementary mitred bent waveguide (H- and E-planes). Maxwell's equations are used in tensorial form, written in a nonorthogonal coordinate system where the boundary surfaces coincide with coordinate surfaces. Therefore, the expression of boundary conditions on the perfectly conducting walls becomes simplified. The electric and magnetic fields are expanded on trigonometric series, which satisfy the boundary conditions. For this problem, the interesting results are the magnitude and phase of the reflected and transmitted modes (transverse-electric modes for H-plane bend, longitudinal-section electric modes for E-plane bend). The transition conditions between the bent waveguide and access waveguides enable us to determine the scattering matrix of this structure. The knowledge of the scattering matrix enables us to simulate any uniform bent waveguides, even those with radii of curvature equal to zero.

❑ Return to main document.