Abstracts

Ray-Optical Diffraction Coefficients for Waveguide Discontinuity Problems

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The ray optical technique has proved its computational advantages in high frequency scattering by objects in unbounded media and has only been recently applied to waveguide problems. Besides its simplicity, the method is surprisingly accurate in the short wavelength range and gives a physical insight into various complex propagation and diffraction mechanisms, Yee, Felsen and Keller used this technique to treat the reflection from an open-ended parallel plate waveguide. Later, Yee and Felsen solved the corresponding vector case for rectangular and circular waveguides. The agreement between theory and experiment was naturally better for shorter wavelengths. Yee and Felsen also treated waveguide discontinuities such as strips and bifurcation using the same technique. An excellent agreement with the exact solutions, whenever possible, was noted in the multimode range with less accuracy in the range of propagation of the dominant mode and inaccurate results in the vicinity of the modal cut-offs. In order to improve the accuracy of the technique, a more accurate "near field" diffraction coefficient is necessary.

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