Abstracts

Analysis of a Longitudinal Gyroelectric Discontinuity Inside a Fiber Waveguide

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The scattering of guided electromagnetic waves from a finite-length longitudinal gyroelectic discontinuity inside a fiber waveguide is treated analytically. An integral equation approach is employed to formulate the corresponding boundary-value problem. The induced field inside the gyroelectic discontinuity region is expanded into a Fourier-type series in terms of the well-known cylindrical waves M and N plus a purely longitudinal wave Q. Then the method of moments is applied to decouple the basic integral equation. The resulting infinite coupled system of equations is truncated and solved numerically. After determining the field inside the discontinuity, the scattered far field inside the dielectric-rod waveguide is computed by employing a steepest descent integration technique. Numerical results for the scattering coefficients of an incident HE/sub 11/ dominant mode are obtained. Finally, design principles are discussed for practical components based on the treated longitudinal gyroelectric discontinuity.

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