Abstracts

Transmission Characteristics of Spherical TE and TM Modes in Conical Waveguides (Short Papers)

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The transmission properties of spherical TE and TM modes in a perfectly conducting conical waveguide are treated in detail. To start with, an analytically simple and highly accurate digital-computer based iterative algorithm has been employed to evaluate the eigenvalues associated with the spherical TE and TM modes within the guide irrespective of the flare angle (2alpha/sub 0/) of the conical waveguide (theta < 2alpha/sub 0/ < 360°). Subsequently, explicit expressions for the attenuation constant, phase constant, phase velocity, and wave impedance are obtained for the spherical modes transmitted within the guide. Accurate eigenvalues obtained numerically are used to study the variation of attenuation constant, phase constant, phase velocity, and wave impedance as a function of the radial distance from the apex with alpha/sub 0/ as a parameter. Measured data on the phase constant of a conical waveguide for the TE/sub 11/ mode have been compared with the analytical results obtained by calculation and an excellent agreement between the two justifies the validity of the analysis presented. Finally, a study of the phase coherence between the dominant spherical TE and TM modes within the guide is presented which may be fruitfully employed in the design of dual-mode conical waveguides.

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