Abstracts

Wave Propagation in Hollow Conducting Elliptical Waveguides

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The propagation of electromagnetic waves in a hollow perfectly conducting pipe with an elliptical cross section and the results of numerical calculations of the cutoff wavelength of nineteen successive modes are presented. Some inaccuracies in the usual mode classification are proven and corrected. As a large number of numerical calculations are required to determine the cutoff wavelength for a single set of dimensions and a single mode, approximate formulas for the eight lowest order modes are suggested. These formulas are of a simple algebraic form and give a relative error smaller than 0.25 percent. With the exact succession of the different modes it becomes possible to compare the bandwidth of an elliptical waveguide to the bandwidth of the rectangular and circular guide. The measured values of the cutoff wavelength of different modes agree very well with the theoretical calculated values.

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