Abstracts

Numerical Experiments on the Determination of Cutoff Frequencies of Waveguides of Arbitrary Cross Section

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Finding the exact mathematical solution of an electromagetic waveguide problem is only possible in a rather limited number of technological situations. The electronic engineer usually confronts a large variety of complicating factors which makes it necessary to employ an approximate method in order to predict cutoff frequencies, propagation modes, attenuation parameters, etc. The present paper considers only one case of complexity: a waveguide of "exotic" boundary shape. Undoubtedly the finite-element method is the most popular technique for dealing with such a situation. Usually the accuracy of the method is tested by applying it to simple geometric domains. The purpose of the present study is twofold: first to verify its accuracy in the case of domains of complicated geometry and second to introduce an approximate approach which is based on a Fourier expansion of the boundary condition coupled with a collocation technique which may be of interest to electronic engineers.

❑ Return to main document.