Abstracts

A Perturbation Procedure for Nearly Rectangular, Homogeneously Filled, Cylindrical Waveguides

B.J. McCartin. "A Perturbation Procedure for Nearly Rectangular, Homogeneously Filled, Cylindrical Waveguides." 1996 Microwave and Guided Wave Letters 6.10 (Oct. 1996 [MGWL]): 354-356.

The cut-off frequencies and propagating modes of a hollow cylindrical waveguide may be approximated by conformal mapping to a canonical domain followed by the numerical solution of a Helmholtz-like equation. This letter considers the problem of how these frequencies and modes change under a small perturbation of the bounding metallic walls. A procedure is herein presented that produces a perturbation expansion involving only computations in the unperturbed cross section, thus avoiding costly additional mappings. Moreover, the resulting analytical expressions for these frequencies and modes are then available for optimization of waveguide parameters. An application of this procedure is presented together with comparison to published numerical and experimental results.

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