Abstracts

Optimum Sectional Shape of Dominant Mode Waveguide

M. Suzuki and T. Hosono. "Optimum Sectional Shape of Dominant Mode Waveguide." 1983 Transactions on Microwave Theory and Techniques 31.10 (Oct. 1983 [T-MTT]): 836-841.

Approximating the cross section of a waveguide by a truncated Fourier series and using the finite element method (FEM), together with the quasi-Newton optimization method, the optimum cross section of the dominant mode waveguide which has minimum conductor loss is obtained. We take the attenuation constant at the cutoff freqnency of the second higher mode as the index of good quality. This index simplifies the computation and gives a unique solution. The obtained optimum cross section is a kind of cigar shape. The Fourier series converges quite quickfy, supporting the reliability of the numerical results. This optimum cross section gives 9.4-percent smaller conductor loss than, and the same frequency bandwidth as, the standard rectangular cross section. The theoretical results are confirmed by measurements.

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