Abstracts

The Coupling Coefficients of an Unsymmetrical High-Q Lossy Waveguide Resonator

H.J. Riblet. "The Coupling Coefficients of an Unsymmetrical High-Q Lossy Waveguide Resonator." 1963 Transactions on Microwave Theory and Techniques 11.1 (Jan. 1963 [T-MTT]): 78-83.

This paper determines the minimum insertion loss and the minimmn VSWR of a waveguide resonator constructed by spacing two, unequal, reactive, primarily-shunt, lossy, reflecting elements approximately one-half-wavelength apart on a lossy transmission line. The requirement that the resonant loss be small, 10 db or less, limits the size of the loss parameters and permits an approximate solution of the problem within an error of the order of 1/Q/sub L/. These formulas can be expressed in terms of two "coupling coefficients". Contrary to the familiar formulas derived from the low frequency analogue, however, these coupling coefficients depend, in general, on the parameters of both reflecting elements. Formulas for the loaded and unloaded Q of the resonator are derived. In general, it is not possible to determine the unloaded Q of the resonator from its loaded Q except by a limiting process. Within the order of the approximation involved, series losses cannot be distinguished from shunt losses. Accordingly they can be lumped together and one is led to the fact that a lossy admittance inverter consists of a lossless admittance inverter surrounded on both sides by series losses. This is used to justify the application of the idea of "predistortion" to the design of narrow-band, lossy, waveguide filters.

❑ Return to main document.