Abstracts

A Unified Discussion of High-Q Waveguide Filter Design Theory

H.J. Riblet. "A Unified Discussion of High-Q Waveguide Filter Design Theory." 1958 Transactions on Microwave Theory and Techniques 6.4 (Oct. 1958 [T-MTT]): 359-368.

For the general design of conventional, high-Q, direct-coupled waveguide filters to be based on the frequency behavior of a classical ladder network prototype, it is necessary and sufficient that the reflecting elements of the filter be replaceable by admittance inverters and that the lengths of transmission line be replaceable by resonant elements. The error due to the latter assumption is of the order of twice the square of the percentage bandwidth measured in guide wavelengths, and the classical synthesis problem is a limiting case of a solvable transmission line problem. In this limit, an exact equivalence is established between the design of a direct-coupled filter and the design of a quarter-wave-coupled filter based on the same ladder network prototype. Design formulas for equal ripple and maximally flat performance are given for the VSWR's of the reflecting elements in terms of dimensionless quantities. Detailed comparison of previous formulas is made.

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