Abstracts

A unified approach to the design, measurement, and tuning of coupled-resonator filters

J.B. Ness. "A unified approach to the design, measurement, and tuning of coupled-resonator filters." 1998 Transactions on Microwave Theory and Techniques 46.4 (Apr. 1998 [T-MTT]): 343-351.

The concept of coupling coefficients has been a very useful one in the design of small-to-moderate bandwidth microwave filters. It is shown in this paper that the group delay of the input reflection coefficients of sequentially tuned resonators contains all the information necessary to design and tune filters, and that the group-delay value at the center frequency of the filter can be written quite simply in terms of the low-pass prototype values, the LC elements of a bandpass structure, and the coupling coefficients of the inverter coupled filter. This provides an easy method to measure the key elements of a filter, which is confirmed by results presented in this paper. It is also suggested that since the group delay of the reflection coefficient (i.e., the time taken for energy to get in and out of the coupled resonators) is easily measured, it is a useful conceptual alternative to coupling concepts.

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