Abstracts

Non-Minimum-Phase Microwave Filters (1968 [MWSYM])

T. Fjallbrant. "Non-Minimum-Phase Microwave Filters (1968 [MWSYM])." 1968 G-MTT International Microwave Symposium Digest and Technical Program 68.1 (1968 [MWSYM]): 1-7.

Ladder networks are particularly suitable for waveguide realizations. Conventional waveguide filters are designed by means of a transformation of lossless ladder networks terminated into resistances. This configuration, however, only allows the realization of a certain class of minimum-phase transfer functions. In this paper a type of microwave filter is analyzed, in which a reactive ladder is combined in a special way with a magic-T or 90-degree hybrid. This filter type can realize non-minimum phase functions, which can offer very useful combinations of amplitude and phase responses. The insertion loss of the ladder network does not enter the transfer function in the same way as in ordinary wave guide filters. A synthesis procedure is given, and this has been applied in the construction of several microwave filters. The inclusion of non-reciprocity by means of ferrite devices to realize fixed or variable filters or microwave modulators has also been studied. A similar method is applied in the realization of driving point impedances at microwave frequencies, in order to realize such functions as cannot normally be realized by means of ladder structures.

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