Abstracts

Parallel-Coupled Transmission-Line-Resonator Filters

S.B. Cohn. "Parallel-Coupled Transmission-Line-Resonator Filters." 1958 Transactions on Microwave Theory and Techniques 6.2 (Apr. 1958 [T-MTT]): 223-231.

This paper describes the synthesis of band-pass transmission-line filters consisting of series of half-wavelength resonant conductors such as strips. The design differs from the usual end-coupled strip configuration in that successive strips are parallel coupled along a distance of a quarter-wavelength. The resulting coupling between resonators is partly electric and partly magnetic. Several important advantages are gained by this arrangement: 1) the length of the filter is approximately half that of the end-coupled type; 2) the gaps are larger and therefore less critical; and 3) the insertion-Ioss curve is symmetrical on a frequency scale with the first spurious response occurring at three times the center frequency of the pass band. Formulas are derived for the parallel-coupled-resonator transmission-line filter that permit accurate design for Tchebycheff, maximally flat, or any other physically realizable response. The formulas are theoretically exact in the limit of zero bandwidth, but frequency-response calculations show them to give good results for band widths up to about 30 per cent. An experimental strip-line filter of this type has been constructed, and the data given in this paper show that excellent performance has been obtained.

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