Abstracts

Synthesis of Transformer Coupled Multiple Frequency Circulators with Chebyshev Characteristics

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This paper presents a theory for broad-band matching of stripline junction circulators for operation in two or more frequency bands. In this theory it is assumed that the matching network is composed of cascaded transmission line transformers each of which is an odd multiple of a quarter-wavelength at the center frequencies. The conditions for simultaneous Chebyshev response in multiple frequency bands are determined, and it is investigated to what extent these conditions can be satisfied by stripline circulator junctions. Thus by using a first-order theory, it is shown that if a circulator junction, adjusted for double frequency operation, is matched for Chebyshev response by a transformer of proper length around one of the circulation frequencies then it is also matched for Chebyshev response around the other circulation frequency, provided that the same operation mode is used above and below material resonance. A routine for broad-band multiple frequency matching is proposed for junctions where Chebyshev response is not obtainable. Finally the properties of some externally matched circulators designed according to the theories are shown.

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