Abstracts

Synthesis of Wide-Band Planar Circulators Using Narrow Coupling Angles and Undersized Disk Resonators

J. Helszajn and R.D. Baars. "Synthesis of Wide-Band Planar Circulators Using Narrow Coupling Angles and Undersized Disk Resonators." 1991 Transactions on Microwave Theory and Techniques 39.10 (Oct. 1991 [T-MTT]): 1681-1687.

A drawback of the classic tracking solution exhibited by a junction circulator using a planar disk resonator is that it requires a wide coupling angle for its realization. This paper describes the theory of circulators using radial/lumped-element resonators with narrow coupling angles which display equally good, if not better, gyrator circuits that are outside of the classic result. The form of the lumped element variable is not unique and one way to realize it is to make use of the fringing capacitance at the interface between a dielectric resonator and a substrate with a higher relative dielectric constant than that of the resonator. The topology requires the adjustment of electromagnetic, electrostatic, and network conditions with common parameters so that a solution which relies on fringing effects only is not generally ensured. The paper includes the description of one such 1-2 GHz circulator.

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