Abstracts

Ferromagnetic Tridisk-Coupled Resonator and Magnetically Tunable Stripline Y Circulator

T. Nagao and Z. Tanaka. "Ferromagnetic Tridisk-Coupled Resonator and Magnetically Tunable Stripline Y Circulator." 1992 Transactions on Microwave Theory and Techniques 40.9 (Sep. 1992 [T-MTT]): 1812-1820.

A ferromagnetic tridisk-coupled (TDC) resonator was constructed by placing three YIG ferrite disks mutually attached on the circular center conductor. The EM fields in one of three disks is described in terms of expanded circular harmonics with an approximated transformation of derivative, and the EM fields in a TDC resonator is synthesized from the respective constituent EM fields of three disks, by sum-transformation, regarding three eigen junctures of the TDC resonator. The synthetic EM fields include coefficients A, B and D which are described as functions of radisu ratio r/sub 0//r and azimuthal angle Phi. In this paper, a special case that A = D = 0 is treated. It is remarked that the resonant mode curves having a lowered eigenvalue is bounded by the ferrite anisotropic splitting factor B/sub 0/(K/μ), B/sub 0/ being a function of r/sub 0//r/sub 2/ and Phi = 0. Calculation of two conditional equations of perfect Y circulation is carried out. Theoretical analysis of the magnetically tunable operation is made on the first conditional curves which are drawn super-imposed on the resonant mode curves, and subsequently on the second conditional curves of Z/sub yeq/ the equivalent input impedance of the stripline Y junction. The latter gives the graphical way of impedance matching of the devise. Finally the magnetically tunable operation is examined experimentally with the theoretical analysis.

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