Abstracts

Modal Characteristics of Ferromagnetic Tridisk-Coupled Resonator

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The Elgenvalue characteristics of a ferromagnetic tridisk-coupled (TDC) resonator are described first. A TDC resonator is made of three AIYIG ferrite disks partially scraped and mutually attached on a center conductor. The EM field is treated with a consistent theory. The eigenvalue characteristics computed with stress on the mode of v=1 are represented by the Z/sub 10/ versus Z/sub 0/ and Z/sub 1/ versus K/μ relationships, where Z/sub 10/ is a degenerate eigenvalue, Z/sub 0/ is a wavenumber-eccentric radius product, and Z/sub 1/ is a continuously varying eigenvalue dependent on K/μ, with a given value of Z/sub 0/. Z/sub 10/ is distinguished by either a single- or double-value region as a function of Z/sub 0/. The computed Z/sub 1/ versus K/μ graph belonging to the double-value region demonstrates a contradiction to the physical reality, which is resolved by introducing an equivalent circular resonant mode. The equivalent resonant mode is definitely identified by a degenerate eigenvalue and its modal curve with large modal separation. Experiments were carried out with various center conductors. The experimental results support the equivalent resonant mode. Finally, discussions are presented.

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