Abstracts

Theoretical Analysis of Magnetic Resonance Nonreciprocal Circuits -- Limitations of 3-dB Bandwidth and Available Range

M. Igarashi and Y. Naito. "Theoretical Analysis of Magnetic Resonance Nonreciprocal Circuits -- Limitations of 3-dB Bandwidth and Available Range." 1974 Transactions on Microwave Theory and Techniques 22.9 (Sep. 1974 [T-MTT]): 821-829.

The general formulas for both 4-port magnetic-resonator circulators and 2-port magnetic-resonator bandpass filters (BPF's) are given. The effects of the circuit structure and the physical properties of the resonator on the characteristics of the circuit are investigated. The maximum dissipation loss of the resonator is just one half of the input power. Contrary to the results shown in previous reports, it is understood that for a given resonator, there exists an optimum value of the external Q of the circuit and also that a polycrystalline magnetic resonator may be useful for the nonreciprocal circuit, if the product of unloaded Q and saturation magnetization has a sufficiently large value. The requirements for the insertion loss (IL), the reverse loss (RL), and the reflection at the center frequency are introduced, and then the necessary conditions of resonator loss and the limitations of 3-dB bandwidth and available range are clarified.

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