Abstracts

Equivalent Circuit of Orthogonal-Loop-Coupled Magnetic Resonance Filters and Bandwidth Narrowing Due to Coupling Inductance

P.S. Carter. "Equivalent Circuit of Orthogonal-Loop-Coupled Magnetic Resonance Filters and Bandwidth Narrowing Due to Coupling Inductance." 1970 Transactions on Microwave Theory and Techniques 18.2 (Feb. 1970 [T-MTT]): 100-105.

The equivalent circuit of an orthogonal-loop-coupled magnetic resonance filter is shown to consist of a gyrator, two ferrite-induced inductances, and two coupling loop inductances. The effects of the coupling inductances on the passband and stopband responses are shown to be significant by means of calculations based on this equivalent circuit. It is proved that the maximum passband bandwidth Delta f /sub -3dB/ = f/sub 0/ (L/sub f/ / L/sub c/), where f/sub 0/, is the center frequency, and L/sub f/ and L/sub c/ the ferrite-induced and the coupling-loop inductance, respectively. Other unusual insertion-loss characteristics of this filter which differ from those of a conventional reciprocal-element bandpass filter are shown. Finally, a test circuit for determining experimentally the coupling inductance ratio L/sub c/ / L/sub f/ and the external Q, Q/sub f/ of a ferrite resonator is presented.

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