Abstracts

Modeling Ferrimagnetic Resonators

The impedance matrix for an arbitrary n-port ferrimagnetic resonator is derived by applying Poynting's theorem to a region of space surrounding the resonator. Simplifications to the impedance matrix for low-loss (Q> /spl ap/100) ferrite material make it possible to obtain an equivalent circuit model for the resonator, which can be used with most computer-based circuit simulation programs. The circuit model for the general-case polymodal ferromagnetic resonator consists of a network of single-pole resonators, each of which has a possible non-frequency-dependent, nonreciprocal phase shift. The components of the circuit model are described in terms of the properties of the ferrite material, and the coupling strength of the microwave circuit to the magnetostatic modes of the ferrimagnet. The method is demonstrated in three simple examples, including a one- and two-port loop coupled filter, and a ferrimagnet in a waveguide.

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