Abstracts

Coupling of Circuit Structures to Magnetostatic Modes of Ferromagnetic Resonators

N.J. Moll. "Coupling of Circuit Structures to Magnetostatic Modes of Ferromagnetic Resonators." 1977 Transactions on Microwave Theory and Techniques 25.11 (Nov. 1977 [T-MTT]): 933-938.

The coupling between a current-carrying circuit structure and the magnetostatic modes of a general ferromagnet, such as a YIG resonator, is examined. A small-signal theory is presented that describes the excitation of an arbitrary mode in terms of an effective susceptibility matrix; this description leads to a simple method for calculating the z parameters of the resonator and coupling structure combination. This result is tested by comparison with other theory and with experiment. Applied to the case of a uniform field exciting the uniform mode of an ellipsoidal resonator, it reduces to Carter's well-known formula. Applied to the case of a particular nonuniform field exciting the main mode of a thin square resonator, it predicts the experimental finding that the coupling strength depends only on the resonator's thickness. This last case illustrates the extended generality of our result which allows the treatment of situations where the RF magnetization and field are not uniform.

❑ Return to main document.