Abstracts

Design Calculations for UHF Ferrite Circulators (Correspondence)

H. Boyet, S. Weisbaum and I. Gerst. "Design Calculations for UHF Ferrite Circulators (Correspondence)." 1959 Transactions on Microwave Theory and Techniques 7.4 (Oct. 1959 [T-MTT]): 475-476.

The recent advances in low-noise amplifier work for communications systems has created an additional demand for circulators; in this case, to prevent receiver noise from returning to the low-noise amplifier. In the range of frequencies greater than 2000 mc, ferrite circulators have been developed in circular and rectangular waveguides. However, in the UHF region, which is a range of frequencies of increasing interest and importance in communications, ferrite circulators present a problem in the sense that ordinary waveguides needed in this range are prohibitively large for practical use. Button of Lincoln Laboratory and Seidel of Bell Telephone Laboratories have pointed a way around this difficulty by considering a TEM structure (a coax) loaded antisymmetrically with dielectric material and ferrite. This configuration provides for the longitudinal component of RF magnetic field necessary for nonreciprocity in the phase constant. The essentially TEM nature of the device allows use of reasonably small, practical cross-sectional areas. The parallel-plate analog analysis presented in Button's paper leads to a transcendental equation for the phase constant which we present below for convenience, together with an example of the structure.

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