Abstracts

FDTD Analysis of Magnetized Ferrites: Application to the Calculation of Dispersion Characteristics of Ferrite-Loaded Waveguides

The finite-difference time-domain (FDTD) method is extended to include magnetized ferrites. The treatment of the ferrite material is based on the equation of motion of the magnetization vector. Magnetic losses are also included in the equation of motion by means of Gilbert's approximation of the phenomenological Landau-Lifschitz damping term. The discretization scheme is based on central finite-differences and linear interpolation. This scheme allows the fully explicit nature of the FDTD method to be maintained. This extension of the FDTD method to magnetized ferrites is applied to the full-wave analysis of ferrite-loaded waveguides. The dispersion curves are calculated by using a recently proposed 2D-FDTD formulation for dispersion analysis which has been adapted to the present problem. The results for both the phase and attenuation constants of various transversely and longitudinally magnetized ferrite-loaded waveguides are compared with the exact values and with those obtained by means of Schelknnoff's method.

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