Abstracts

Transient Analysis of Ferrite in Three-Dimensional Space

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The anisotropic medium has been applied to realize the nonreciprocal devices. The characteristics of these devices have become more advanced through the appearance of various materials and the miniaturization of the circuit created by the integration of circuits in MIC. In particular for microwave and millimeter-wave circuits, ferrite is a typical gyroanisotropic medium. So a significant amount of research and many analyses have been carried out to develop nonreciprocal devices using ferrite. To obtain more exact determinations of the properties of these devices, it is necessary to analyze three-dimensional space due to their complicated structures and the medium conditions. And recently, high-speed digital technology has been developed, so that it is important to analyze the electromagnetic field with time domain. This paper presents Bergeron's formulation of vector analysis for magnetized ferrite in a three-dimensional space and time domain. Results are provided for two cases with respect to the relative angle between the directions of the dc magnetic field and wave propagation. For both cases, the results are compared with analytical ones, and the validity of the formulation is verified.

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