Abstracts

An application of FDTD in studying the end effects of slotline and coplanar waveguide with anisotropic substrates

In this paper, the finite-difference time-domain (FDTD) method is applied in conjunction with the generalized pencil of function (GPOF) technique to evaluate the reflection coefficient from shorted slotlines and coplanar waveguides (CPW) on anisotropic substrates, and to extract the propagation constant along the line from these data. For each frequency, the field solutions at different locations are processed by using the GPOF technique to extract two complex exponents that correspond to the forward and backward traveling waves, which provide all the information about the reflection coefficient and the dispersion characteristic of the transmission line. The advantage of combining the GPOF technique with the FDTD method is that the reflection coefficients can be obtained with a single run. Recognizing that there is a dearth of results for the reflection coefficients of slotline and CPW-line discontinuities with anisotropic substrates, the present problem is also solved by using the spectral-domain method for the purpose of validation, and the two results are found to compare quite well with each other. For further validation, the FDTD and GPOF solutions are derived for isotropic substrates, and are compared with the published theoretical and experimental results.

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