Full-wave analysis of multiconductor transmission lines on anisotropic inhomogeneous substrates

The full-wave analysis of the generalized microstrip line on an inhomogeneous anisotropic substrate is carried out by using the finite-difference method. The resulting sparse matrix equation is solved efficiently using the bi-Lanczos algorithm. The use of the inhomogeneous wave equation to formulate the problem makes it easy to analyze structures with multilayered substrates. The algorithm can analyze complicated structures with multiple conductors at arbitrary locations. A spatial interpolation scheme is used to evaluate the contribution from the off-diagonal terms in TT and T. The use of the bi-Lanczos algorithm allows us to solve the problem at $O(N^{1.5})$ complexity. Storage requirements can be made to scale as $O(N)$. This makes it possible to analyze large problems on a small computer. Very good agreement is seen between published results and results obtained using this technique.

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