Abstracts

A Simplified 2D Graded Mesh FD-TD Algorithm for Calculating the Characteristic Impedance of Shielded or Open Planar Waveguides with Finite Metallization Thickness

A full-wave finite difference time-domain (FD-TD) algorithm is described for the efficient calculation of the characteristic impedance of planar waveguiding structures including the finite metallization thickness. The FD-TD algorithm is based on a two-dimensional graded mesh combined with adequately formulated absorbing boundary conditions. This allows the inclusion of nearly arbitrarily shaped, fully or partially lateral open or shielded guiding structures with layers of finite metallization thickness. Moreover, by a modified formulation, an actual 2D grid for 2D problems is obtained, i.e. the grid size for these problems is zero in z-direction as long as the waveguide is homogeneous in that direction. The characteristic impedances are calculated by using the related adequate power-voltage or power-current definitions, respectively, for structures suitable for usual integrated circuits, such as bilateral finlines, open microstrip line, lateral open triplate line, open slot-line, and open coplanar line. The theory is verified by comparison with results obtained by other methods.

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