Abstracts

Efficient FDTD/Matrix-Pencil Method for the Full-Wave Scattering Parameter Analysis of Waveguiding Structures

A combined finite-difference time-domain/matrix-pencil method is presented for the efficient and rigorous calculation of the full-wave modal S-parameters of waveguide components including structures of more general shape or high complexity. The application of the S-parameter definition for unmatched ports requires merely standard Mur's absorbing boundaries for reliable results, and a nonaorthogonal or contour path mesh formulation allows the convenient inclusion of curved boundaries. The efficiency of the method is demonstrated at the analysis of waveguide and monolithic microwave millimeter wave integrated circuit (MMIC) components of practical importance, such as the twisted waveguide, the twisted waveguide bend, the post compensated magic T, the waffle-iron filter, and the MMIC spiral inductor including an air bridge. The method is verified by excellent agreement with measurements, with finite element method (FEM) or moment method results.

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