Abstracts

Analysis of passive microwave circuits by using a hybrid 2-D and 3-D finite-element mode-matching method

J. Rubio, J. Arroyo and J. Zapata. "Analysis of passive microwave circuits by using a hybrid 2-D and 3-D finite-element mode-matching method." 1999 Transactions on Microwave Theory and Techniques 47.9 (Sep. 1999, Part I [T-MTT]): 1746-1749.

A method of analysis of passive microwave circuits based on the segmentation concept is introduced. Complex three-dimensional (3-D) structures are divided into regions delimited by arbitrarily shaped waveguide ports, in which a modal expansion of the field is made. Waveguides can also be filled with inhomogeneous and/or anisotropic media. The regions are analyzed by the mode-matching method (MM) combined with either a two-dimensional (2-D) finite-element method (2-D FEM/MM) or a 3-D FEM (3-D FEM/MM). Open regions are dealt with using the perfectly matched layer. The result of the 3-D FEM analysis is a multimode multiport generalized admittance matrix, from which a generalized scattering matrix is computed. Finally, the method is applied to the analysis of a coax-to-waveguide transition and of a pair of unshielded microstrip lines coupled through an aperture in the common ground plane.

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