Abstracts

Rigorous Analysis of Arbitrarily Shaped H- and E-Plane Discontinuities in Rectangular Waveguides by a Full-Wave Boundary Contour Mode-Matching Method

J.M. Reiter and F. Arndt. "Rigorous Analysis of Arbitrarily Shaped H- and E-Plane Discontinuities in Rectangular Waveguides by a Full-Wave Boundary Contour Mode-Matching Method." 1995 Transactions on Microwave Theory and Techniques 43.4 (Apr. 1995, Part I [T-MTT]): 796-801.

A rigorous boundary contour mode-matching (BCMM) method is presented for the efficient calculation of the modal scattering matrix of arbitrarily shaped H- and E-plane discontinuities, junctions, and or obstacles in rectangular waveguides. For the inhomogeneous waveguide region with general contour, the field is expanded in the complete set of cylindrical wave functions. The full-wave expansion allows the immediate rigorous inclusion of cascaded structures such as combined H- and E-plane bends. The efficiency of the method is demonstrated at the rigorous design of useful waveguide components which could not be modeled by mode-matching techniques so far: cylindrical post-compensated H-plane T-junction, mitered H-plane and E-plane bends of arbitrary angle, cascaded H-/E-plane bends, circular post-coupled filter, E-plane filter with rounded corners, 180° rat race structure, and side-coupled dual TE/sub 311//TE/su113 -mode filter. The theory is verified by measurements.

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