Abstracts

A Modified Residue-Calculus Technique for Solving a Class of Boundary Value Problems-Part II: Waveguide Phased Arrays, Modulated Surfaces, and Diffraction Gratings

G.F. VanBlaricum, Jr. and R. Mittra. "A Modified Residue-Calculus Technique for Solving a Class of Boundary Value Problems-Part II: Waveguide Phased Arrays, Modulated Surfaces, and Diffraction Gratings." 1969 Transactions on Microwave Theory and Techniques 17.6 (Jun. 1969 [T-MTT]): 310-319.

The modified residue-calculus technique (MRCT) described in a companion paper may be combined with scattering matrix, multiple-reflection techniques to provide solutions in scattering matrix form to thick-wall waveguide phased array, modulated surface, and strip grating geometries. Each of these geometries may be regarded as a periodic array of thin plates modified by dielectric fillings, waveguide steps, and terminations. Solutions to the modified geometries are found by combining the exact solution to the thin-wall array problem with approximate solutions to certain waveguide discontinuity problems found by the MRCT. In particular, a value of the dominant mode reflection coefficient versus scan angle for the thick-wall array may be found accurate to two or three significant figures without need for matrix inversion. In general, reduction of matrix size by a factor of 5 or more over conventional methods with equivalent accuracy may be realized.

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