Abstracts

Solution of Waveguide Discontinuities by Modal Analysis

A. Wexler. "Solution of Waveguide Discontinuities by Modal Analysis." 1967 Transactions on Microwave Theory and Techniques 15.9 (Sep. 1967 [T-MTT]): 508-517.

A general method is presented for analysis of waveguide junctions and diaphragms by summing normal modes of propagation, giving solutions for the resulting scattered modes. Because interaction effects of dominant and higher-order modes between discontuities are allowed, finite-length obstructions can be studied. Solutions are found without any prior assumption about the total fields existing at the discontinuities and, as a result, the formulation is applicable to a wide range of problems. The technique proves to be simple and is ideally suited to computers, involving mainly the solution of sets of simultaneous linear equations. Thick and thin symmetrical bifurications of a rectangular guide are studied. Forward-scattered mode amplitudes and imput admittances are calculated, the computed admittance of the thin bifurication is compared with well-known results, and transverse field patterns on both sides of the junction are plotted, thus showing the accuracy of the match. The results of a finite-length bifurication by a thick vane are presented for a range of lengths, the parameters of the equivalent T network being given in each case. For very short lengths, the problem corresponds to an inductive strip across the guide.

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