Abstracts

Modal analysis of waveguide antennas with arbitrary cross sections

R. Kuhne and J. Marquardt. "Modal analysis of waveguide antennas with arbitrary cross sections." 2001 Transactions on Microwave Theory and Techniques 49.11 (Nov. 2001 [T-MTT] (Special Issue on the 2000 Asia-Pacific Microwave Conference)): 2152-2156.

An approach is given to analyze the modal coupling of open-ended waveguides with arbitrary cross sections located in a conducting screen. The presented theory enables the determination of reflection characteristics of a single waveguide, as well as the analysis of mutual coupling between elements in waveguide antenna arrays. The field inside each waveguide is expressed as a sum of the transverse-electric and transverse-magnetic modes and expressions for the mutual admittances of modes excited at the aperture are obtained using a direct integration method. From these expressions, the mode reflection and conversion coefficients are determined. Computed and measured results are presented. Furthermore, this approach has been used to design a new type of horn antenna with high return loss and equal radiation patterns in the two principle planes.

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