Abstracts

On Solving Waveguide Junction Scattering Problems by the Conservation of Complex Power Technique

Normal mode expansions are used to mode match the tangential electric field at the transverse junction of two cylindrical waveguides. Instead of mode matching the tangential magnetic field the principle of conservation of complex power is invoked and leads, without a matrix inversion, to an expression for the junction's input admittance matrix, as seen from the smaller guide. Simple matrix algebra and the reciprocity theorem then provide the generalized scattering matrix of the two-port (with higher order modes included). It is also shown that the solution satisfies the continuity condition for tangential magnetic field in the junction's aperture. Numerical results are given for parallel plate waveguides with TEM, TE/sub 1/, and TM/sub 1/ incident fields, numerical convergence being achieved with about ten modes in the smaller waveguide.

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