Abstracts

Matching Considerations of Lossless Reciprocal 5-Port Waveguide Junctions (Short Papers)

Some of the restrictions imposed on general 5-port junctions (or networks) by losslessness and reciprocity are discussed as well as considerations of restrictions due to physical symmetry. It is proven that if a lossless reciprocal 5-port junction (or network) is completely matched, then all off-diagonal elements of the scattering matrix are nonzero; i.e., if the junction is matched, no port is decoupled from any of the others. It is also shown that all off-diagonal scattering coefficients of a lossless reciprocal 5-port junction (or network) have a magnitude of one half if and only if the junction is completely matched. Those physical symmetries which preclude complete matching of 5-port junctions are given and a general theorem concerning the matching of junctions and physical symmetry is proven.

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