Abstracts

Analysis and Synthesis of Waveguide Multiaperture Directional Couplers (Dec. 1968 [T-MTT])

R. Levy. "Analysis and Synthesis of Waveguide Multiaperture Directional Couplers (Dec. 1968 [T-MTT])." 1968 Transactions on Microwave Theory and Techniques 16.12 (Dec. 1968 [T-MTT]): 995-1006.

A precise method of analysis of multiaperture waveguide directional couplers has been developed and used to investigate the performance of couplers designed both by conventional theories and by a new synthesis technique. The analysis is based on the equivalent four-port network of the coupler, the apertures being represented by lumped reactances in series and/or shunt with dispersive transmission lines, representing the waveguides. The effects of finite aperture dimensions and common wall thickness are taken into account. Many couplers designed on the usual basis of a first-order loose-coupling approximation have good directivity, even for tight (3 dB) coupling, but previous theories do not give the predicted directivity and are often far from optimum in design. A new synthesis technique based on the distributed low-pass prototype filter has been devised, and shown to give results close to the predicted performance. It has led to the construction of compact multiaperture directional couplers having directivity greater than 43 dB over complete waveguide operating bands.

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