Abstracts

Analysis and Design of Branch-Line Hybrids with Coupled Lines

V.K. Tripathi, H.B. Lunden and J.P. Starski. "Analysis and Design of Branch-Line Hybrids with Coupled Lines." 1984 Transactions on Microwave Theory and Techniques 32.4 (Apr. 1984 [T-MTT]): 427-432.

The scattering parameters of four-ports consisting of coupled lines with coupled or uncoupled connecting branches are derived in terms of the even- and odd-mode impedances and the lengths of the lines. These are used to analyze and formulate basic design procedures for the application of these structures as directional couplers including 0° and 90° 3-dB hybrids. The proposed new structures are quite compact at lower frequencies as compared to conventional uncoupled branch-line and rat-race hybrids. The results for the case of the coupled-line four-port with uncoupled branch lines also lead to closed-form expressions for the lengths and impedances of the lines required to nullify the effect of coupling between the main lines of a conventional branch-line coupler for use at higher frequencies. The measured response of the fabricated couplers is in good agreement with the theoretical predictions.

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