Abstracts

The Scattering Parameters and Directional Coupler Analysis of Characteristically Terminated Asymmetric Coupled Transmission Lines in an Inhomogeneous Medium

K. Sachse. "The Scattering Parameters and Directional Coupler Analysis of Characteristically Terminated Asymmetric Coupled Transmission Lines in an Inhomogeneous Medium." 1990 Transactions on Microwave Theory and Techniques 38.4 (Apr. 1990 [T-MTT]): 417-425.

The scattering matrix of asymmetric coupled two-line structures in an inhomogeneous medium terminated in a set of impedances which are equal to the characteristic impedances of the individual, uncoupled lines has been derived in terms of the coupled-mode parameters. It has been proved that the structure can compose an ideal, backward-coupling directional coupler, perfectly matched and isolated at all frequencies, if the inductive k/sub L/ and capacitive k/sub C/ coupling coefficients of the coupled lines are equal. The effect of the nonideal equalization of the coupling coefficients on the coupler critical parameters is then investigated. The normal-mode parameters (mode numbers and mode impedances) in the proximity of the point when k/sub L/ = k/sub C/ and at that point are also examined. Numerical results confirm the validity of the developed analysis and prove the possibility of a very high directivity asymmetrical coupler design.

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