Abstracts

Exact Simulation and Sensitivity Analysis of Multiplexing Networks

J.W. Bandler, S. Daijavad and Q.-J. Zhang. "Exact Simulation and Sensitivity Analysis of Multiplexing Networks." 1986 Transactions on Microwave Theory and Techniques 34.1 (Jan. 1986 [T-MTT]): 93-102.

This paper presents a novel approach to the simulation and sensitivity analysis of multiplexing networks. All computations are performed efficiently utilizing the concept of forward and reverse analysis which is elegant and effective in cascaded circuit analysis. Formulas are derived for such responses as input or output reflection coefficient, common port and channel output port return losses, insertion loss, gain slope, and group delay. Exact sensitivities w.r.t. all variables of interest, including frequency, are evaluated. The fundamental assumption is that the transmission matrices for the individual components of the network and their sensitivities w.r.t. possible variables inside them are available. An explicit algorithm is provided describing the details of the computational aspects of our theory. The formulas are applied to the optimal design of practical contiguous or noncontiguous band multiplexer consisting of multicavity filters distributed along a waveguide manifold. An example of optimizing a practical 12 channel, 12-GHz contiguous band multiplexer without dummy channels, which is the state-of-the-art structure used as the output multiplexer in satellite transponders, is presented.

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