Abstracts

A Unified TLM Model for Wave Propagation of Electrical and Optical Structures Considering Permittivity and Permeability Tensors

J. Huang and K. Wu. "A Unified TLM Model for Wave Propagation of Electrical and Optical Structures Considering Permittivity and Permeability Tensors." 1995 Transactions on Microwave Theory and Techniques 43.10 (Oct. 1995 [T-MTT]): 2472-2477.

A generalized transmission line matrix (TLM) formalism is proposed for unified simulation of wave propagation problems. The present modeling is made possible with a new TLM node that is derived to account for simultaneously the electromagnetic effects of permittivity and permeability tensors of material. It is shown, through numerical examples, that the new node-based TLM algorithm in the frequency domain can be used to solve a large class of complex electromagnetic problems ranging from microwave circuits to optical devices. A dynamic solution for the r-cut sapphire-based microstrip is presented that highlights its application to high-temperature superconducting microwave circuits.

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