Abstracts

A configuration-oriented SPICE model for multiconductor transmission lines in an inhomogeneous medium

A. Tripathi and V.K. Tripathi. "A configuration-oriented SPICE model for multiconductor transmission lines in an inhomogeneous medium." 1998 Transactions on Microwave Theory and Techniques 46.12 (Dec. 1998, Part I [T-MTT]): 1997-2005.

A configuration-oriented SPICE model for multiple coupled lines in an inhomogeneous medium is presented in this paper. The circuit model consists of a network of uncoupled transmission lines and is readily modeled with simulation tools like LIBRA and SPICE, and provides an equivalent-circuit representation which is simple and topologically meaningful as compared to the model based on modal decomposition. This configuration-oriented model is derived by decomposing the immittance matrices associated with an n coupled-line 2n-port system. Time- and frequency-domain simulations of typical coupled-line multiports are included to exemplify the utility of the model. The model is useful for the simulation and design of general single and multilayer coupled-line components such as filters and couplers and investigation of signal integrity issues, including crosstalk in interconnects associated with high-speed digital- and mixed-signal electronic modules and packages.

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