Abstracts

Short-pulse transient and characteristics of lossy binomial transmission lines with arbitrary linear and nonlinear termination

Songxin Qi and Ke Wu. "Short-pulse transient and characteristics of lossy binomial transmission lines with arbitrary linear and nonlinear termination." 1999 Transactions on Microwave Theory and Techniques 47.7 (Jul. 1999, Part I [T-MTT]): 1092-1097.

Lossy binomial transmission lines with arbitrary linear and nonlinear loads are modeled for use as short-pulse transformers in electrical and optical high-speed interconnects. An efficient method is proposed in this paper to characterize these lines as an equivalent circuit that consist of a cascaded connection of lumped networks and lossy uniform transmission lines in the frequency domain, while nonlinear problems are formulated and solved with time-domain scattering equations via a convolution technique. Results indicate that binomial lines present an advantage over exponential lines or uniform lines for the nonlinear loading effect, and they can be effectively used as a short-pulse transformer in such systems and devices as laser diodes, junction transistors, and metal-oxide-semiconductor field-effect transistors to enhance power coupling efficiency and reshape digital signal waveforms.

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