Abstracts

Transient Analysis of Tapered Transmission Lines Used as Transformers for Short Pulses

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The transient behavior of tapered transmission lines is studied in detail by investigating their step responses by an improved method of characteristics. We take interest in the first arriving wave and following dropping process at the load end which play important roles in determining the response waveform and power coupling efficiency under short pulse excitation. Numerical results show that, for given load and source impedances and propagation delay, the magnitude of the first arriving wave is invariable for any tapered line under both ends are well matched, and the slowest dropping is reached as the characteristic impedance distribution satisfies some condition. The concept of instantaneous dropping speed is used in further theoretical analysis and the numerical results are verified by theoretical formulas. Finally, we show the relation between the instantaneous dropping speed and frequency-domain characteristics.

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