Abstracts

Exact, Closed-Form Expressions for Transient Fields in Homogeneously Filled Waveguides

S.L. Dvorak. "Exact, Closed-Form Expressions for Transient Fields in Homogeneously Filled Waveguides." 1994 Transactions on Microwave Theory and Techniques 42.11 (Nov. 1994 [T-MTT]): 2164-2170.

It is well known that transient electromagnetic waves in waveguides exhibit dispersion. Exact, closed-form expressions, which involve Bessel functions of the first kind, have been derived for the impulse response of a waveguide, but exact, closed-form expressions for more complex pulses are absent from the literature. In this paper, it is demonstrated that incomplete Lipschitz-Hankel integrals can be used to represent transient pulses in homogeneously filled waveguides. A continuous wave pulse is investigated in this paper, however, this technique can also be applied to a number of other transient waveforms. The resulting expressions are verified by numerically integrating the pulse distribution multiplied by the known impulse response.

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