Abstracts

Causal-Convolution--A New Method for the Transient Analysis of Linear Systems at Microwave Frequencies

T.J. Brazil. "Causal-Convolution--A New Method for the Transient Analysis of Linear Systems at Microwave Frequencies." 1995 Transactions on Microwave Theory and Techniques 43.2 (Feb. 1995 [T-MTT]): 315-323.

A new convolution-type method is presented for the transient analysis of causal linear systems described in the frequency-domain. The central novelty lies in the proposed method of determining impulse responses in the time-domain, which are interpreted as truly discrete functions corresponding to periodically-extended system functions in the frequency-domain. Such impulse responses may be computed with high numerical efficiency, while having excellent interpolation properties with respect to the original system function. The convolution operations which result are also naturally in the form of a sum-of-products calculation. The method is capable of handling arbitrary excitation signals, and may in principle be readily extended to more general nonlinear analysis. Several examples of the technique are given, including comparisons and validation both using existing methods, analytical results and experimental measurements.

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