Abstracts

A New Finite-Difference Time-Domain Formulation and its Equivalence with the TLM Symmetrical Condensed Node

Z. Chen, M.M. Ney and W.J.R. Hoefer. "A New Finite-Difference Time-Domain Formulation and its Equivalence with the TLM Symmetrical Condensed Node." 1991 Transactions on Microwave Theory and Techniques 39.12 (Dec. 1991 [T-MTT] (1991 Symposium Issue)): 2160-2169.

This paper describes a new finite-difference time-domain (FD-TD) formulation which is different from the FD-TD based on Yee's scheme. It is shown that the new finite-difference time-domain formulation is exactly equivalent to the symmetrical condensed node model used in the transmission line matrix (TLM) method. More specifically, the TLM method can be exactly formulated in a finite-difference form in terms of total field quantities. Due to a better field resolution and fulfillment of continuity conditions, the new FD-TD formulation or its TLM equivalent model give better convergence and accuracy than the traditional FD-TD method presently used. This is illustrated by numerical results pertaining to a finned waveguide.

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