Abstracts

Modeling Sources in the FDTD Formulation and Their Use in Quantifying Source and Boundary Condition Errors

D.N. Buechler, D.H. Roper, C.H. Durney and D.A. Christensen. "Modeling Sources in the FDTD Formulation and Their Use in Quantifying Source and Boundary Condition Errors." 1995 Transactions on Microwave Theory and Techniques 43.4 (Apr. 1995, Part I [T-MTT]): 810-814.

The modeling of voltage and current sources as either added or replaced sources in FDTD simulations is described and their differences discussed in terms of a transmission line analogy. An infinitesimal current element (ICE) is used to illustrate the validation of added source modeling and to study the errors involved with modeling an infinitesimal element within the finite-sized FDTD grid. This model is also used to illustrate the behavior of radiation boundary conditions as their near-field position with respect to the source is varied. We characterize the errors due to modeling and boundary conditions and give guidelines for obtaining acceptable accuracy in simulations.

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