Abstracts

The Modeling of Singularities in the Finite-Difference Approximation of the Time-Domain Electromagnetic-Field Equations

G. Mur. "The Modeling of Singularities in the Finite-Difference Approximation of the Time-Domain Electromagnetic-Field Equations." 1981 Transactions on Microwave Theory and Techniques 29.10 (Oct. 1981 [T-MTT]): 1073-1077.

When the electromagnetic-field equations are solved in a region with a corner, singularities in the field or in its spatial derivatives will be present at these corners. These singularities cause the load truncation error in a finite-difference approximation of the field equations to be unbounded. In this paper it is shown that failing to take these singularities into account leads to large errors in the finite-difference solution of the time-domain electromagnetic-field equations. A simple method is described to account for these singularities while retaining the simplicity of the finite-difference formulation. Numerical results are given that demonstrate the accuracy obtained when our technique is used.

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