Abstracts

Derivation and Application of a Passive Equivalent Circuit for the Finite Difference Time Domain Algorithm

The widely used finite difference time domain (FDTD) algorithm in its standard form is conditionally stable, the condition being the well-known Courant criterion. Much research has focussed on modifying the standard algorithm to improve its characterisation of geometrical detail and curved surfaces; these modified algorithms, however, may easily be conditionally stable--there is no value of time step that stabilizes the algorithm. This contribution presents a passive electrical circuit that, by virtue of its formal equivalence with FDTD, provides a criterion by which unconditionally unstable algorithms may be avoided. As an example the passive circuit criterion is used to remove the instability from a contour-path FDTD algorithm.

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