Abstracts

An efficient and accurate technique for the incident-wave excitations in the FDTD method

U. Oguz, L. Gurel and O. Arikan. "An efficient and accurate technique for the incident-wave excitations in the FDTD method." 1998 Transactions on Microwave Theory and Techniques 46.6 (Jun. 1998 [T-MTT]): 869-882.

An efficient technique to improve the accuracy of the finite-difference time-domain (FDTD) solutions employing incident-wave excitations is developed. In the separate-field formulation of the FDTD method, any incident wave may be efficiently introduced to the three-dimensional (3-D) computational domain by interpolating from a one-dimensional (1-D) incident-field array (IFA), which is a 1-D FDTD grid simulating the propagation of the incident wave. By considering the FDTD computational domain as a sampled system and the interpolation operation as a decimation process, signal-processing techniques are used to identify and ameliorate the errors due to aliasing. The reduction in the error is demonstrated for various cases. This technique can be used for the excitation of the FDTD grid by any incident wave. A fast technique is used to extract the amplitude and the phase of a sampled sinusoidal signal.

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