Abstracts

Performance of three-dimensional graded ADI-FDTD algorithm

E. Hu and W.J.R. Hoefer. "Performance of three-dimensional graded ADI-FDTD algorithm." 2001 MTT-S International Microwave Symposium Digest 01.2 (2001 Vol. II [MWSYM]): 901-904 vol.2.

In this paper, a 3D unconditionally stable ADI-FDTD algorithm without the CFL stability constraint is described. We have investigated the computational accuracy and the CPU time of this method and compared it with conventional FDTD for both uniform and graded meshes. Since the ADI-FDTD algorithm is unconditionally stable, the selection of the time step is not restricted by stability considerations, but the relative error of the ADI-FDTD algorithm increases with increasing time step. The numerical results show that the saving in CPU time of the ADI-FDTD is not dramatic in comparison with the conventional FDTD algorithm when the mesh size and computational accuracy of both methods are the same. The reduction in the number of time steps and hence, CPU time, is offset by reduced accuracy. Therefore, the choice of the ADI-FDTD method is governed by the acceptable error.

❑ Return to main document.