Abstracts

Numerical simulation of microstrip resonators and filters using the ADI-FDTD method

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In this paper, we derived the characteristics of typical and practical microstrip components such as microstrip linear resonators and microstrip low-pass filters using the alternating-direction-implicit-finite-difference-time-domain (ADI-FDTD) method to examine the calculation accuracy and efficiency of the method. The resonators and the filters included very narrow gaps and strips, respectively. In this case, very fine cells must be applied there for the finite-difference time-domain (FDTD) modeling. In the conventional FDTD method, fine cells cause a reduction of the time-step size because of the Courant-Friedrich-Levy (CFL) stability condition, which results in an increase in calculation time. In the ADI-FDTD method, on the other hand, a larger time-step size than the CFL stability condition limitation could be set. We compared the results of the ADI-FDTD method for various time-step sizes with the results of the conventional FDTD method and measured data.

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