

# Turkish Journal of Electrical Engineering & Computer Sciences

Turkish Journal

of

Dispersion Analysis of the ADI-FDTD and S-FDTD Methods

Electrical Engineering &  
Computer Sciences

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 [Keywords](#)  
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**Abstract:** Numerical dispersion performances of ADI-FDTD and S-FDTD methods have been compared. It has been shown that for time steps below the stability limits of the S-FDTD method it has much better dispersion performance compared with the ADI-FDTD method and that the S-FDTD method can be usefully employed for space increments in the order of  $\Delta/25$  to  $\Delta/50$ .

**Key Words:** Symplectic finite-difference time-domain (S-FDTD) method, alternating-direction-implicit finite-difference time-domain (ADI-FDTD) method

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Turk. J. Elec. Eng. & Comp. Sci., **16**, (2008), 201-206.

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