Abstracts

The second-order condition for the dielectric interface orthogonal to the Yee-lattice axis in the FDTD scheme

T. Hirono, Y. Shibata, W.W. Lui, S. Seki and Y. Yoshikuni. "The second-order condition for the dielectric interface orthogonal to the Yee-lattice axis in the FDTD scheme." 2000 Microwave and Guided Wave Letters 10.9 (Sep. 2000 [MGWL]): 359-361.

The reflection coefficient at the dielectric interface orthogonal to the Yee-lattice axis in the finite-difference time-domain (FDTD) scheme is explicitly obtained. In the expression, the effective permittivities assigned to the nodes in the vicinity of the interface are included as parameters. The suitable effective permittivities for the accurate modeling of the interface are investigated theoretically based on the reflection coefficient. Regardless of the angular frequency, the incident angle, and the interface position relative to the lattice, second-order accuracy is achieved by the use of effective permittivities based on the weighted harmonic mean and arithmetic mean of the material permittivities. The second-order accuracy is demonstrated by numerical examples.

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