Abstracts

Effective permittivities for second-order accurate FDTD equations at dielectric interfaces

Kyu-Pyung Hwang and A.C. Cangellaris. "Effective permittivities for second-order accurate FDTD equations at dielectric interfaces." 2001 Microwave and Wireless Components Letters 11.4 (Apr. 2001 [MWCL]): 158-160.

In Yee's finite-difference time-domain (FDTD) scheme, effective permittivities are often used to account for offsets of dielectric interfaces from grid nodes. The specific values of these effective permittivities must be chosen in such a way that the second-order accuracy of the scheme is preserved. It is shown in this work that, contrary to more elaborate techniques proposed recently for the development of these effective permittivities, a rigorous application of the integral forms of Maxwell's curl equations on the Yee's lattice leads to the desired values in a straightforward fashion. Numerical experiments in a two-dimensional (2-D) cavity are used to verify that the calculated effective permittivities preserve the second-order accuracy of the FDTD scheme.

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