Abstracts

Validation and Extension to Three Dimensions of the Berenger PML Absorbing Boundary Condition for FD-TD Meshes

Berenger recently published a novel absorbing boundary condition (ABC) for FD-TD meshes in two dimensions, claiming orders-of-magnitude improved performance relative to any earlier technique. This approach, which he calls the "perfectly matched layer (PML) for the absorption of electromagnetic waves," creates a nonphysical absorber adjacent to the enter grid boundary that has a wave impedance independent of the angle of incidence and frequency of outgoing scattered waves. This paper verifies Berenger's strong claims for PML for 2-D FD-TD grids and extends and verities PML for 3-D FD-TD grids. Indeed, PML is > 40 dB more accurate than second-order Mur, and PML works just as well in 3-D as it does in 2-D. It should have a major impact upon the entire FD-TD modeling community, leading to new possibilities for high-accuracy simulations especially for low-observable aerospace targets.

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