FDTD method with a conformal polygonal mesh and perfectly matched layer absorbing boundary condition

The accuracy of the finite-difference time-domain (FDTD) method in microwave circuit simulation depends significantly on the accuracy with which the computational grid resolves the structure's geometry, especially when it has curved boundaries (e.g., dielectric resonator filters). Body-conformal grids allow for accurate resolution of the object, but complicate the implementation of absorbing boundary conditions (ABC). In order to address this conflict, we propose a new FDTD implementation in which triangular grids are used near the scatterer boundary, while rectangular grids are employed away from the scatterer to facilitate simple ABC. The improvement in accuracy by the new method is illustrated by its application to the scattering from a circular dielectric cylinder.

❑ Return to main document.