
A NUMERICAL ABSORBING BOUNDARY CONDITION FOR FINITE-DIFFERENCE AND FINITE-ELEMENT ANALYSIS OF OPEN STRUCTURES

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KEY TERMS

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ABSTRACT

In this article we present a novel approach to deriving local boundary conditions that can be employed in conjunction with the finite-difference and finite-element methods (FD/FEM) to solve electromagnetic scattering and radiation problems. The key step in this approach is to derive linear relationships that link the values of the field at the boundary grid points to those at the neighboring points. These linear relationships are satisfied, to within a certain tolerance, by all of the outgoing wave components. They can thus be used in lieu of the FD/FEM equations employing the usual absorbing boundary conditions for the boundary points. The present approach not only provides a simple way to derive an accurate boundary condition for mesh truncation, but also preserves the banded structure of the FD/FEM matrices. © 1994 John Wiley & Sons, Inc.