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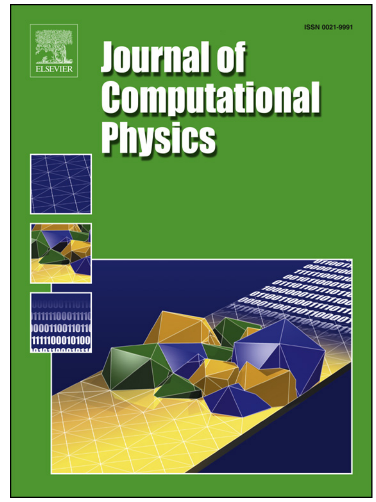

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Double Absorbing Boundaries for Finite-Difference Time-Domain Electromagnetics

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Abstract

We describe the implementation of optimal local radiation boundary condition sequences for second order finite difference approximations to Maxwell's equations and the scalar wave equation using the double absorbing boundary formulation. Numerical experiments are presented which demonstrate that the design accuracy of the boundary conditions is achieved and, for comparable effort, exceeds that of a convolution perfectly matched layer with reasonably chosen parameters. An advantage of the proposed approach is that parameters can be chosen using an accurate *a priori* error bound.

Keywords: radiation boundary conditions, Maxwell's equations, wave equation, Yee scheme

1. Introduction

An important issue in the simulation of electromagnetic effects is the ability to truncate unbounded domains into regions of interest that can be simulated efficiently and accurately for long times. In the context of finite difference time domain (FDTD) solvers, this typically takes the form of a perfectly matched layer (PML) [1]. The PML method is attractive because it is effective and easy to implement; however, the performance is closely tied to a selection of parameters. While work has been done to automate

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