1096-78-1298 **Pengrui Hui*** (hpengrui11@students.desu.edu). *Moving Window Finite-Difference Time-Domain Method with Perfectly Matched Layer Boundary Conditions.*

In this work, we study the moving window Finite-Difference Time-Domain (FDTD) method with the Perfectly Matched Layer (PML) absorbing boundary condition for solving Maxwell's equations of electromagnetic waves over a long-distance region. The FDTD method is widely used in solving Maxwell's equations numerically. When dealing with the long-distance wave propagation, the computational burden quickly becomes too huge to afford. To overcome this problem, we investigate the moving window or moving frame technique. In this thesis, we focus on the Eulerian moving window FDTD method. The basic idea of this moving window FDTD method is to select a proper window centering about the wave location to cover the whole wave packet. Then, at each time step, we just need to update the information inside this small window instead of the whole large region. As a result, the moving window FDTD solver is much more efficient than the FDTD approach in the stationary frame. Numerical examples of optical pulse propagation in both linear and nonlinear media are shown. When comparing the moving window FDTD method with the standard FDTD method in stationary frame, the error is less than 1% which is similar to the FDTD second order discretization error. (Received September 14, 2013)