

ANALYSIS OF LIGHT-PULSE TRANSPORT THROUGH TWO-DIMENSIONAL SCATTERING AND ABSORBING MEDIA

M. Sakami^{*}, K. Mitra^{}, and P.-F. Hsu^{**}**

^{*}Department of Mechanical Engineering

Lamar University, P.O. Box 10028, Beaumont, Texas 77710

^{}Mechanical and Aerospace Engineering Department**

Florida Institute of Technology Melbourne, Florida 32901

ABSTRACT. In this paper, a two-dimensional transient radiation transport algorithm is developed to analyze the ultra-short light pulse propagation in an anisotropically scattering rectangular medium. The time-dependant discrete ordinates method is used with the high order upwind piecewise parabolic interpolation scheme. The upwind difference scheme is needed to resolve the propagating wave front. This method extends from a prior one-dimensional model to treat the two-dimensional geometry through a Strang-type dimensional splitting. The accuracy and efficiency of this algorithm are studied. Comparisons with one-dimensional case and a parametric study show the flexibility of this method for homogeneous and non-homogeneous media.