2-D MODELING OF ELECTROMAGNETIC WAVES WITH VIBRATING CONDUCTING AND DIELECTRIC OBJECTS

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ABSTRACT

This Thesis provides an analysis of the interaction of electromagnetic pulses with vibrating conducting and dielectric objects. Two-dimensional full-vector Maxwell’s equations finite-difference time-domain (FDTD) models are employed that include total-field scattered-field incident plane wave source conditions, a frequency domain near-to-far-field transformation, convolutional perfectly matched layer boundary conditions and an advanced surface boundary condition that accommodates the surface perturbations of the vibrating objects. Reflection and diffraction of incident plane waves are calculated for stationary and vibrating objects and the diffraction coefficient for vibrating right-angle corners are obtained. The work of this Thesis may have application to the interaction of radar pulses with buildings having characteristic vibration signatures.