PACKAGE ID - 000245SUN0001 TSAR2.3

KWIC TITLE - Temporal Scattering And Response

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LIMITATION CODE -COPY **AUDIENCE CODE -** LIM

COMPLETION DATE - 06/01/1992 **PUBLICATION DATE -** 12/01/1991

DESCRIPTION - TSAR2.3 (Temporal Scattering and Response) is a finite-difference time-domain electromagnetics code suite. TSAR2.3 is a software package for simulating the interactions of electromagnetic waves with linear materials through the use of the finite-difference time-domain method. The code suite contains grid generation, grid verification, input-file creation and post-processing utilities. The physics package, written in Fortran 77, can be pre-processed to run on many different architectures including Cray, Vax and many Unix workstations. Tools are provided to easily port the code to new computers. The physics package is an efficient, flexible electromagnetic simulator. A body under study can be represented as a three-dimensional grid of materials with arbitrary linear properties. This grid can be simulated in a number of ways including incident plane waves, dipoles, and arbitrary incident fields. The grid can be terminated with numerous boundary conditions including free-space radiation, electric conductor, or magnetic conductor. Projection to the far-field in both the time and frequency domains is possible. This distribution includes make files for installing and maintaining the entire code suite.

PACKAGE CONTENTS - Media Directory; Software Abstract; Installation Instructions (5 pages); UCRL-MA-104860; UCRL-MA-104861 Vol. 2.3; UCRL-MA-105580; Media Contains Source Code, Sample Problem Input and Output;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - TSAR2.3 solves Maxwell's two curl equations using the Yee FDTD algorithm. Programs for pre- and post-processing are

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METHOD OF SOLUTION -(CONT) also included. TSAR2.3 uses a solid-model-based approach for creating a finite-difference mesh. The suite relies on the US Army's BRL-CAD package for pre-processing. MGED is used to construct the solid model, and RT is used to obtain pictures of the solid model. A single underlying model is created, from which meshes of different cell sizes may be easily made with ANASTASIA. Once the mesh is created, the IMAGE program allows it to be visually inspected prior to running the finite-difference code, reducing inaccurate answers from improper grids.

COMPUTER - SUN

OPERATING SYSTEMS - SUN OS VERSION 4.1.1-GF

PROGRAMMING LANGUAGES - C (60%) FORTRAN (40%)

SOFTWARE LIMITATIONS - TSAR2.3 will run a wide variety of problem geometries and sizes. Two factors affect the size of the problem which may be run: 1), the speed of the computer, and 2) the amount of RAM. To run efficiently, the entire grid should fit in memory, and 7 words are required for each cell in the 3D mesh.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - TSAR2.3 distribution uses the following naming conventions for source code files: Files with a .F extension indicate Fortran files with system-dependent code. The 'C' pre-processor is used to convert these to machine specific files with a .f extension prior to compilation. Files with a .f extension indicate system independent Fortran code. Files with a .inc extension are Fortran include files. Files with .ctp (compile-time parameter) extensions are FORTRAN include files with user definable parameter statements. These must be copied to the user's directory, renamed to have inc extensions, and the parameters set to the desired sizes prior to compilation. Files with a .h extension are C include files.

OTHER PROG/OPER SYS INFO - TSAR2.3 will run on a multiplicity of platforms including IBM RS/6000, Silicon Graphics IRIS 4D, and SUN4.

HARDWARE REQS - To fully utilize the TSAR2.3 package, a graphics workstation with 48 Mbytes of RAM would be desirable.

TIME REQUIREMENTS - Time requirements range from 25 micro-seconds/cell/time step on a DEC Station 5000, to 2 micro-seconds/cell/time step on a CRAY. To estimate the overall time required for a particular run, multiply tha above figures by the total number of cells in the problem space and by the total number of time steps desired.

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TIME REQUIREMENTS -(CONT)

REFERENCES - Robert R. McLeod, Temporal Scattering and Response Software, User's Manual Version 2.3, UCRL-MA-104861 V 2.3, June 1992; Gary Laguna, Anastasia: A Solid Model Based 3D Finite Differnce Mesh Generator, UCRL-MA-105580, November 9, 1990; Robert R. McLeod and Michael J. Allison, IMAGE3.3 Tutorial Manual Version 1.5, UCRL-MA-104860, October 1, 1990.

ABSTRACT STATUS - Abstract first distributed December 1991. TSAR submitted July 1991. TSAR2.3 submitted December 1992.

SUBJECT CLASS CODE - W

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
T CODES
THREE-DIMENSIONAL CALCULATIONS
ELECTROMAGNETIC RADIATION
WAVE PROPAGATION
SCATTERING

EDB SUBJECT CATEGORIES -
990200 661100

SPONSOR - DOE/DP

PACKAGE TYPE - SCREENED