PACKAGE ID - 001136HPUX900 SCREAMER2.0

KWIC TITLE - Design and Modeling of Pulsed Power Accelerators Via Circuit Analysis

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

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DESCRIPTION - SCREAMER simulates electrical circuits which may contain elements of variable resistance, capacitance and inductance. The user may add variable circuit elements in a simulation by choosing from a library of models or by writing a subroutine describing the element. Transmission lines, magnetically insulated transmission lines (MITLs) and arbitrary voltage and current sources may also be included. Transmission lines are modeled using pi-sections connected in series. Many models of switches and loads are included.

PACKAGE CONTENTS - Media Directory; Software Abstract; User's Guide; Media Includes Source Code, User's Guide In Postscript Format, Sample Problem Input;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 3 3.5 Diskettes

METHOD OF SOLUTION - A self contained, specialized matrix solver is used. It is implicit, time-centered and second-order accurate. By restricting the topology of circuits, a nearly tridiagonal matrix results. The computational time used to invert such a matrix scales nearly linearly with the number of circuit elements.

COMPUTER - HPUX9.05

OPERATING SYSTEMS - UNIX

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PROGRAMMING LANGUAGES - Fortran 77 with extensions (100%)

SOFTWARE LIMITATIONS - Circuit topology is restricted to types normally found in accelerators.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - Specialized integration techniques coupled with circuit topology restrictions result in fast simulations. The software includes a library of models of pulsed power devices and the user can also write subroutines for new device models. The format for the description of a circuit is quite simple.

RELATED SOFTWARE - A software package capable of graphical display, such as Microsoft EXCEL, is required to view the simulation results. The simulation results can be produced in a variety of file formats, including comma separated variables.

OTHER PROG/OPER SYS INFO - UNIX installation requires a Fortran compiler. Use of user written subroutines to describe circuit elements and/or reducing memory usage requires a Fortran compiler on all platforms.

HARDWARE REQS - The internal array sizes can be adjusted and the software recompiled in order to run on computers with limited RAM. It is estimated at the very least, 4 MB of RAM is required. 10 to 20 MB is recommended.

TIME REQUIREMENTS - Typical execution times for most devices are less than 10 minutes on 80486 level processors.

REFERENCES - Mark L. Kiefer, Kelley L. Fugelso, Ken W. Struve, and Mel M. Widner, SCREAMER, A Pulsed Power Design Tool, User's Guide for Version 2.0, August 25, 1995.

ABSTRACT STATUS - Submitted December 1996. Released AS-IS 2/28/97.

SUBJECT CLASS CODE - TP

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
S CODES
ELECTRONIC CIRCUITS
CIRCUIT THEORY
CAPACITANCE
INDUCTANCE
SWITCHES
COMPUTERIZED SIMULATION
ACCELERATORS
FORTRAN
POWER TRANSMISSION

EDB SUBJECT CATEGORIES -
990200 430300 426000

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SPONSOR - DOE/DP

PACKAGE TYPE - AS - IS