

PACKAGE ID - 000388IBMPC00 CITATION

KWIC TITLE - 1,2,3-D Diffusion Depletion Multi-Group

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LIMITATION CODE - UNL **AUDIENCE CODE** - UNL

COMPLETION DATE - 11/06/1989 **PUBLICATION DATE** - 07/01/1972

DESCRIPTION - CITATION is designed to solve problems using the finite difference representation of neutron diffusion theory, treating up to three space dimensions with arbitrary group to group scattering. X-y-z, theta-r-z, hexagonal z, and triagonal z geometries may be treated. Depletion problems may be solved and fuel managed for multi-cycle analysis. Extensive first order perturbation results may be obtained given microscopic data and nuclide concentrations. Statics problems may be solved and perturbation results obtained with microscopic data.

PACKAGE CONTENTS - Media Directory; Software Abstract; ARC Release Information (2 pages); ORNL/TM-2496 Rev. 2, with Supplements 1, 2, and 3; Media Includes Source, Sample Problem, Control Information;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 4 5.25 diskettes

METHOD OF SOLUTION - Explicit, finite difference approximations in space and time have been implemented. The neutron-flux-eigenvalue problems are solved by direct iteration to determine the multiplication factor or the nuclide densities required for a critical system.

COMPUTER - IBM PC

OPERATING SYSTEMS - DOS

PROGRAMMING LANGUAGES - FORTRAN

SOFTWARE LIMITATIONS - CITATION has been designed to attack problems which can be run in a reasonable amount of time. Storage of data is allocated dynamically to give the user flexibility in dimensioning. Typically, a finite difference diffusion problem could have 200 depleting zones, 10,000 nuclide densities, and 30,000 space energy point flux values.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - CITATION is considered unusual in that it should be relatively easy to modify the contents or to add routines. Effective techniques are incorporated to determine a critical

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UNIQUE FEATURES - (CONT) system. More than one set of microscopic cross sections may be used in a system and nuclide behavior can be followed on a sub zone scale within depletion regions. The user has flexible control over the route of a calculation as well as the edit of results.

RELATED SOFTWARE - For ease of distribution CITATION is compressed using the software package ARC.

OTHER PROG/OPER SYS INFO - CITATION contains about 28,700 source statements. Without overlay, storage for the code instructions would approach 574,000 32 bit words, but with overlay the storage requirement is about 90,000 for the program and fixed storage, 10,000 of this 90,000 is used for system library routines.

HARDWARE REQS - At least 578K RAM must be available (use NORTON SI if possible to check). There cannot be any other resident programs (including PRINT). If you are using the shell command, make sure the e parameter does not exceed 800. this is necessary to allow the largest possible array size in the compiled code (presently 87,000 words). A numeric math coprocessor is recommended. IBM360/91 or equivalent with at least 128,000 32-bit words of directly-addressable main storage, 7 to 32 I/O devices depending upon the calculation, excluding input and output devices and system requirements.

TIME REQUIREMENTS - On a 16MHz 80386 machine, the CITSAMP sample problem took about 45 mins. to complete. On a XT clone, the same problem took about 4 hours.

REFERENCES - T.B. Fowler, D.R. Vondy, and G.W. Cunningham, Nuclear Reactor Core Analysis Code CITATION, ORNL-TM-2496, Revision 2, and Supplements 1,2, and 3, July 1972\ N.M. Greene and C.W. Craven, Jr., XSDRN, A Discrete Ordinates Spectral Averaging Code, ORNL-TM-2500, July 1969; D.R. Vondy and T.B. Fowler, Job Stream of Cases for the Computer Code CITATION, ORNL-TM-3793, July 1972.

ABSTRACT STATUS - Abstract first distributed May 1970. IBM PC version submitted 05/31/89. Tested 10/19/88 on two PC clones using DOS 3.31 and DOS 3.21 with 640K ram at Chalk River.

SUBJECT CLASS CODE - B

KEYWORDS -

C CODES
MULTIGROUP THEORY
ITERATIVE METHODS
DIFFUSION
CRITICALITY
BUCKLING
HEXAGONAL CONFIGURATION

E S T S C
ENERGY SCIENCE & TECHNOLOGY SOFTWARE CENTER
SOFTWARE ABSTRACT

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FUEL MANAGEMENT
COMPUTER PROGRAM DOCUMENTATION

EDB SUBJECT CATEGORIES -
990200 220100 663610

SPONSOR - AECL

PACKAGE TYPE - TESTED