

PACKAGE ID - 000533SUN0000 WIMS-D/5

KWIC TITLE - Multigroup Reactor Lattice Cell Calculation

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

COMPLETION DATE - 08/01/1997 **PUBLICATION DATE** - 06/01/1997

DESCRIPTION - The Winfrith Improved Multigroup Scheme (WIMS), is a general code for reactor lattice cell calculations on a wide range of reactor systems. In particular, the code will accept rod or plate fuel geometries in either regular arrays or in clusters, and the energy group structure has been chosen primarily for thermal calculations. The basic library has been compiled with 14 fast groups, 13 resonance groups and 42 thermal groups, but the user is offered the choice of accurate solutions in many groups or rapid calculations in few groups. Temperature dependent thermal scattering matrices for a variety of scattering laws are available in the library for the principal moderators which include hydrogen, deuterium, graphite, beryllium and oxygen. WIMSD5 is a successor version of WIMS-D/4.

PACKAGE CONTENTS - Software Abstract; Information File (3 pages, includes directory of media files); WIMSD Manual; Media Includes Source Code, Sample Problems;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - The treatment of resonances is based on the use of equivalence theorems with a library of accurately evaluated resonance integrals for equivalent homogeneous systems at a variety of temperatures. The collision theory procedure gives accurate spectrum computations in the 69 groups of the library for the principal regions of the lattice using a simplified geometric representation of complicated lattice cells. The computed spectra are then used for the condensation of cross-sections to the number of groups selected for solution of the transport equation in detailed geometry. Solution of the transport equation is provided either by use of the Carlson DSN method or by collision probability methods. Leakage calculations including an allowance for streaming asymmetries may be made using either diffusion theory or the more elaborate B1-method. The output of the code provides eigenvalues for the cases where a simple buckling mode is applicable or cell-averaged parameters for use in overall reactor calculations. Various reaction rate edits are provided for direct comparison with experimental measurements.

COMPUTER - SUN

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OPERATING SYSTEMS - Machine dependent

PROGRAMMING LANGUAGES - FORTRAN

SOFTWARE LIMITATIONS - As variable dimensions are used in WIMS, there are no specific limits on such parameters as number of energy groups or mesh intervals other than an overall limit on the core storage of the computer used. The library of cross-sections has only 69 energy groups. Flexibility is provided for running problems with a smaller number of groups.

SOURCE CODE AVAILABLE (Y/N) - Y

RELATED SOFTWARE - WIMS-D/4 previous version and associated libraries WIMS7 for more complicated requirements and 3D calculations LWRWIMS for PWR or BWR cluster geometries.

OTHER PROG/OPER SYS INFO - WIMSD5 can now run on a variety of platforms such as IBMs running MVS, SUNs running UNIX, and Vaxes running MVS. It can be run also on PCs if compilers are used allowing extended memory.

TIME REQUIREMENTS - The 16 test cases for the program were run at the NEA Data Bank on a Dec Alphastation 200-4/166. The execution times varied from less than 1 second to 40 seconds.

REFERENCES - ANSWERS Software Service, WIMSD: A Neutronics Code for Standard Lattice Physics Analysis, June 1997.

ABSTRACT STATUS - Released tested November 4, 1998.

SUBJECT CLASS CODE - B

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
W CODES
MULTIGROUP THEORY
REACTOR CELLS

EDB SUBJECT CATEGORIES -
990200 220100

SPONSOR - UKAEA

PACKAGE TYPE - TESTED