

PACKAGE ID - 000700D0VAX00 MICROX

KWIC TITLE - Two-Region Flux Spectrum Code for Calculating
Broad Group Cross Sections

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

COMPLETION DATE - 09/15/1992 **PUBLICATION DATE** - 09/15/1992

DESCRIPTION - MICROX is an integral transport theory flux spectrum code which solves the neutron slowing down and thermalization equations on a detailed energy grid for a two-region lattice cell for many different mixtures in parallel. The fluxes in the two regions (fuel and moderator) are coupled by collision probabilities and the fuel region may have grain structure. MICROX can handle two types of grains in each cell (mixture). Neutron leakage effects are determined from energy-dependent bucklings. MICROX explicitly accounts for overlap and interference between resonance levels and allows for the simultaneous treatment of leakage and resonance self-shielding. Broad group cross sections are prepared for diffusion and transport theory codes by averaging the basic nuclear data over the calculated flux and current spectra.

PACKAGE CONTENTS - Software Abstract; GULF-GA-A10827; Media Includes Source Code, Executable Module, Object Module, Sample Problem Input and Output, Read.me File;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 Mag Tape

METHOD OF SOLUTION - After region 1 has been homogenized, collision probabilities are used to solve two coupled integral equations. Because of a lack of upscatter in the fast range, the solution is from high to low energy in a once-through fashion. On the ultra fine energy grid in the resolved range, the slowing down integrals are evaluated using synthetic kernel techniques. Above the resolved range, the cell is assumed to be homogenous. In the thermal energy range the scattering integrals are solved by trapezoidal rule integration. Because of the presence of upscattering, the iteration includes a combination of Gaussian iteration, renormalization, over-relaxation, and coarse mesh rebalancing to accelerate convergence.

COMPUTER - DEC VAX

OPERATING SYSTEMS - VMS

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PROGRAMMING LANGUAGES - FORTRAN

SOFTWARE LIMITATIONS - The fine group data in the fast energy range is application dependent when it is processed through the GGTAPE code. Hence, data processed for HTGR use would not be appropriate for designs with significantly different fast flux spectra.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - MICROX is capable of interpolating between pointwise data sets of different temperatures in the resolved and thermal energy ranges.

RELATED SOFTWARE - MICROX input nuclear data files are generated by the GGTAPE and TAPER codes. The GGTAPE code processes files in the GAM-II and GATHER formats. The TAPER code processes files in the GAR format.

OTHER PROG/OPER SYS INFO - In the fast energy range all mixtures are processed in parallel and data from the fine point resonance file (GAR) is used only for those energies required by certain criteria for all mixtures; the same mixtures run separately might use data from different energy points and hence the results might be somewhat different. Package compiled without error. Linkage failed undefined symbols (BAKSPC, DATGET, DRMRD, DRMWRT, ENFILE, INOUT, ITE, MERR, REWND, SECRED, SECWRT, SKPFLS, TICKER).

HARDWARE REQS - DEC VAX running VMS

TIME REQUIREMENTS - Variable

REFERENCES - P. Walti and P. Koch, MICROX, A Two-Region Flux Spectrum Code for the Efficient Calculation of Group Cross Sections, GA-A10827, April 1972.

ABSTRACT STATUS - Submitted December 1993. Released AS-IS June 27, 1994.

SUBJECT CLASS CODE - AB

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
M CODES
MULTIGROUP THEORY
CROSS SECTIONS
NEUTRON LEAKAGE
NEUTRON FLUX
NEUTRON SPECTRA
DOPPLER BROADENING
EIGENVALUES
FAST NEUTRONS

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FORTRAN
FUEL RODS
GRAPHITE MODERATED REACTORS
HELIUM COOLED REACTORS
NUCLEAR DATA COLLECTIONS
REACTOR LATTICES
RESONANCE
SELF-SHIELDING
THERMAL REACTORS
THERMALIZATION
TRANSPORT THEORY

EDB SUBJECT CATEGORIES -
990200 663610 220100

SPONSOR - DOE/NP

PACKAGE TYPE - AS - IS