**PACKAGE ID -** 000584IBMPC00 DIAMANT-2

**KWIC TITLE -** Transport Code for Regular Triangular Geometry

**AUTHORS -** Kufner, K.
Kernforschungszentrum Karlsruhe GmbH, Karlsruhe
(Germany)

Burkhard, J.
Kernforschungszentrum Karlsruhe GmbH, Karlsruhe
(Germany)

Heger, R.
Kernforschungszentrum Karlsruhe GmbH, Karlsruhe
(Germany)

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

**COMPLETION DATE -** 08/28/1987 **PUBLICATION DATE -** 08/28/1987

**DESCRIPTION -** DIAMANT2 solves the two-dimensional static multigroup neutron transport equation in planar regular triangular geometry. Both regular and adjoint, inhomogeneous and homogeneous problems subject to vacuum, reflective or input specified boundary flux conditions are solved. Anisotropy is allowed for the scattering source. Volume and surface sources are allowed for inhomogeneous problems.

**PACKAGE CONTENTS -** Media Directory; KFK-4133; Software Abstract; Media Includes Source Code, Executables, Sample Problem Input and Output;

**SOURCE CODE INCLUDED? -** Yes

**MEDIA QUANTITY -** 2 3.5 Diskettes

**METHOD OF SOLUTION -** The discrete ordinates approximation for the angular variable is used in finite difference form which is solved with a DIAMOND difference approximation. Spatial discretization is performed on a mesh, composed of equilateral triangles. Negative fluxes are eliminated by a step scheme algorithm. Standard inner (within-group) iterative cycles are accelerated by global rebalancing.

**COMPUTER -** IBM PC

**OPERATING SYSTEMS -** MS-DOS 4.01

**PROGRAMMING LANGUAGES -** FORTRAN 77

**SOFTWARE LIMITATIONS -** Variable dimensioning is used so that any combination of problem parameters leading to a working array less than NCMAX can be accomodated. On most computers, NCMAX can be as large as some hundred thousand words. The remaining maximum values

**PACKAGE ID -** 000584IBMPC00 DIAMANT-2

**SOFTWARE LIMITATIONS -(CONT)** are specified by a PARAMETER statement and can easily be changed.

**SOURCE CODE AVAILABLE (Y/N) -** Y

**UNIQUE FEATURES -** The code is written in FORTRAN 77 (ANSI X3.9-1978). Quadrature sets are tailored to regular triangular geometry. Provision is made for creation of interface output for angular integrated fluxes and angular fluxes. These interface files can easily be applied in perturbation calculations, e.g., by the TPTRIA code. All binary input/output-operations are localized in the subroutine package READKO. Edit options and dump and restart capabilities are provided. DIAMANT2 is designed to benefit from vector-computers as much as possible.

**RELATED SOFTWARE -** DIAMANT2 is an improved version based on the previous DIAMANT program. Many comments were added and simplified programming was performed to make DIAMANT2 as easy to understand as possible. An interface file can be created for the transport perturbation code TPTRIA. A special input check module is provided together with DIAMANT2.

**OTHER PROG/OPER SYS INFO -** This code was designed to run under control of the modular code system KAPROS but it can also be used as stand-alone code. It is recommended to replace the system-dependent timing functions TASKTI and TIMLIM by local equivalents.

**HARDWARE REQS -** Up to four scratch units, up to three interface units (use optional) and the system input/output units are required. A large memory is desirable, but it can be replaced to some extent by disk or tape storage (the transition is made |automatically). To run the test cases on an IBM 3084 computer, the single-precision version of DIAMANT-2 required 1308K bytes, and the double-precision version required 2048K bytes of main storage.

**REFERENCES -** K. Kufner, J. Burkhard, and R. Heger, An Updated FORTRAN-77 Version of the 2-D Static Neutron Transport Code DIAMANT2 for Regular Triangular Geometry, KFK-4133, June, 1987.

**ABSTRACT STATUS -** Arrived at NEADB August 1990. Tested April 1993.

**SUBJECT CLASS CODE -** BF

**KEYWORDS -**
COMPUTER PROGRAM DOCUMENTATION
D CODES
MULTIGROUP THEORY
BOUNDARY CONDITIONS
ITERATIVE METHODS

**EDB SUBJECT CATEGORIES -**
990200 663610 220100

**PACKAGE ID -** 000584IBMPC00 DIAMANT-2

**SPONSOR -** NEA

**PACKAGE TYPE -** TESTED