PACKAGE ID - 000255DVX1100 FACET

KWIC TITLE - Radiation View Factor With Shadowing

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

COMPLETION DATE - 07/01/1987 **PUBLICATION DATE -** 08/01/1983

DESCRIPTION - FACET calculates the radiation geometric view factor (alternatively called shape factor, angle factor, or configuration factor) between surfaces for axisymmetric, two-dimensional planar and three-dimensional geometries with interposed third surface obstructions. FACET was developed to calculate view factors as input data to finite element heat transfer analysis codes.

PACKAGE CONTENTS - Software Abstract; UCID-19887; Media Includes Source Code, Sample Problem;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - Three algorithms are incorporated to integrate the view factor equation for three dimensional geometries. The algorithm used for any two surfaces depends on their geometric relationship and whether third surface obstructions exist. The three algorithms are the area integration (AI) method, the line integration method (LI), and the Mitalas and Stephenson (MS) method. The LI method is used to calculate the view factor between two disjoint surfaces. If the two surfaces have an adjoint edge, the MS method is used. The AI method is used if there is self or third surface shadowing. In two-dimensional planar geometries, the view factor between two surfaces is calculated using Hottel's cross string method. For axisymmetric geometries in the absence of shadowing, the view factor between two surfaces is calculated by view factor algebra using the view factors between parallel coaxial discs. In the presence of self or third surface shadowing, the geometry is represented in three dimensions before calculating the view factors.

COMPUTER - DEC VAX11

OPERATING SYSTEMS - VMS 5.0 (DEC VAX8810)

PROGRAMMING LANGUAGES - FORTRAN 77

SOURCE CODE AVAILABLE (Y/N) - Y

RELATED SOFTWARE - The FACET plot file containing the geometry data can be viewed using TAURUS. CNVUFAC can be used to calculate the

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RELATED SOFTWARE -(CONT) geometric black body radiation node to node view factors. GRAY uses the black body view factors calculated by CNVUFAC to determine gray body exchange factors required by thermal analyzer codes. MONTE uses a Monte Carlo method to calculate exchange factors for specular emitting and reflecting surfaces for two-dimensional planar geometries.

TIME REQUIREMENTS - NEADB executed the sample problem in less than 1 second on a DEC VAX8810.

REFERENCES - Arthur B. Shapiro, FACET - A Radiation View Factor Computer Code for Axisymmetric, 2D Planar, and 3D Geometries with Shadowing, UCID-19887, August 1983\ FACET, NESC No. 9578, FACET Tape Description and Implementation Information, National Energy Software Center Note 87-102, September 25, 1987; Robert L. Wong, User's Manual for CNVUFAC, the General Dynamics Heat-Transfer Radiation View Factor Program, UCID-17275, June 25, 1976; Robert L. Wong, GRAY: A Program to Calculate Gray-Body Radiation Heat Transfer View Factors from Black Body View Factors, UCID-17277, June 14, 1976.

ABSTRACT STATUS - Abstract first distributed September 1987. DEC VAX11, Cray1 version submitted July 1987, sample problem executed by NEADB October 1988.

SUBJECT CLASS CODE - H

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
F CODES
GEOMETRY
AXIAL SYMMETRY
THREE-DIMENSIONAL CALCULATIONS
HEAT TRANSFER
RADIATION TRANSPORT

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/DP

PACKAGE TYPE - SCREENED