PACKAGE ID - 000321IPCAT00 AYER

KWIC TITLE - 2-D Finite Element Heat Conduction

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

COMPLETION DATE - 10/29/1989 **PUBLICATION DATE -** 05/01/1974

DESCRIPTION - AYER is a finite element program which implicitly solves the general two-dimensional equation of thermal conduction for plane or axisymmetric bodies. AYER takes into account the effects of time (transient problems), in-plane anisotropic thermal conductivity, a three-dimensional velocity distribution, and interface thermal contact resistance. Geometry and material distributions are arbitrary, and input is via subroutines provided by the user. As a result, boundary conditions, material properties, velocity distributions, and internal power generation may be made functions of, e.g., time, temperature, location, and heat flux.

PACKAGE CONTENTS - Media Directory; Software Abstract; LA-5613-MS; Media Includes Source Code, Object, Executable, Sample Problem Input and Output;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 5.25 Diskette

METHOD OF SOLUTION - The finite element method is used with the assumption of a linear temperature distribution in each of the basic triangular elements.

COMPUTER - IBM PC/AT

OPERATING SYSTEMS - DOS 3.1,3.2

PROGRAMMING LANGUAGES - RYAN MCFARLAND FORTRAN 2.4

SOFTWARE LIMITATIONS - Maxima of 1000 nodes, 100 materials, 50 boundaries, and 6 sides/elements. The nodes, materials, and boundaries maxima are set in DIMENSION statements and can be adjusted.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - Because geometry input is arbitrary, AYER is compatible with any finite element stress program. Because the input is mainly in the form of subroutines supplied by the user, the complexity of the input is directly related to the complexity of the problem.

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RELATED SOFTWARE - The AYER code was developed originally for mainframe CDC systems. This edition includes tests to make the code more robust with respect to input data and is in better conformance to the FORTRAN 77 standard than the previous release.

OTHER PROG/OPER SYS INFO - Recommended optional software is the Professional FORTRAN Scientific Subroutine Library from Wiley Professional Software. The sample problem was taken from reference 3.

HARDWARE REQS - IBM PC/AT with 256 Kbytes memory, Intel 80287 math coprocessor; core AT plus 30 or larger fixed disk; IBM Proprinter or IBM-compatible Centronics interface graphics printer.

REFERENCES - R.G. Lawton, The AYER Heat Conduction Computer Program, LA-5613-MS, May 1974; AYER, NESC No. 9564.PCATB AYER Flexible Disk Cartridge Description, National Energy Software Center Note\ Frank P. Incropera and David P. DeWitt, 'Chapter 4. Two-Dimensional Steady-State Conduction,' Introduction to Heat Transfer, John Wiley & Sons, New York, pp. 155-165, 1985.

ABSTRACT STATUS - Abstract first distributed February 1988. IBM PC/AT version submitted May 1987, replaced by edition B October 1989.

SUBJECT CLASS CODE - H

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
A CODES
TWO-DIMENSIONAL CALCULATIONS
THERMAL CONDUCTIVITY
FINITE ELEMENT METHOD
HEAT TRANSFER
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EDB SUBJECT CATEGORIES -
990200 420400

SPONSOR - DOE/DP

PACKAGE TYPE - SCREENED