PACKAGE ID - 001167MLTPL00 ICOMFLO2

KWIC TITLE - Two-Dimensional Integral Combustion for Multiple Phase Flow

AUTHORS - S.L. Chang
Argonne Nationa Lab, IL (United States)

S. Lottes
Argonne Nationa Lab, IL (United States)

LIMITATION CODE -COPY **AUDIENCE CODE -** LIM

COMPLETION DATE - 05/01/1990 **PUBLICATION DATE -** 05/01/1990

DESCRIPTION - This ANL multiphase two-dimensional combustion computer code solves conservation equations for gaseous species and solid particles (or droplets) of various sizes. General conservation laws, expressed by ellipitic-type partial differential equations are used in conjunction with rate equations governing the mass, momentum, enthaply, species, turbulent kinetic energy, and turbulent dissipation for a two-phase reacting flow. Associated submodels include an integral combustion, a two-parameter turbulence, a particle evaporation, and interfacial submodels. A newly-developed integral combustion submodel replacing an Arrhenius-type differential reaction submodel is implemented to improve numerical convergence and enhance numerical stability. The two-parameter turbulence submodel is modified for both gas and solid phases. The evaporation submodel treats size dispersion as well as particle evaporation. Interfacial submodels use correlations to model interfacial momentum and energy transfer.

PACKAGE CONTENTS - Media Directory; Software Abstract; Media Includes Source Code, Program Flow Diagram, Sample Problem Input and Output Data;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 2 3.5 Diskettes

METHOD OF SOLUTION - An elliptic-type partial differential equation solver using the control volume approach is employed. Conservation of mass, energy, momentum, and species is applied for both phases; the SIMPLER algorithm is incorporated.

COMPUTER - MLT-PLTFM

OPERATING SYSTEMS - Microsoft Fortran Powerstation under Windows 3.1 or higher when run on a PC.

PROGRAMMING LANGUAGES - FORTRAN IV

SOFTWARE LIMITATIONS - The grid size and number of condensed phase size groups are limited by the amount of CPU memory space available.

PACKAGE ID - 001167MLTPL00 ICOMFLO2

SOFTWARE LIMITATIONS -(CONT) Double-precision calculations are recommended on both the VAX and PC.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - The ellipitic-type partial differential equation solver uses the control volume approach which achieves conservation of flow properties independent of grid size. The Eulerian approach is used for both the gas and condense phases. The integral combustion submodel enhances numerical stability and convergence, and the evaporation submodel allows mass transfer between phases.

HARDWARE REQS - Operation under Windows on the Pentium PC requires a minimum of 8 Mbytes RAM.

TIME REQUIREMENTS - With a grid of 3,000 nodes and one particle size group, a steady state computation takes about 15 minutes of Cray/YMP CPU time for 300 iterations.

ABSTRACT STATUS - Submitted May 13, 1997. Released AS-IS June 20, 1997

SUBJECT CLASS CODE - H

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
I CODES
HEAT TRANSFER
FLUID FLOW
TRANSIENTS
TURBULENCE
COMBUSTION
MULTIPHASE FLOW
HYDRODYNAMICS

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/FE

PACKAGE TYPE - AS - IS