

PACKAGE ID - 000799SGIIP00 MFIX

KWIC TITLE - Multiphase Flow with Interphase eXchanges

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LIMITATION CODE -UNL

AUDIENCE CODE - UNL

COMPLETION DATE - 01/12/1993

PUBLICATION DATE - 12/01/1993

DESCRIPTION - MFIX is a general-purpose hydrodynamic model that describes chemical reactions and heat transfer in dense or dilute fluid-solids flows, flows typically occurring in energy conversion and chemical processing reactors. With such information, the engineer can visualize the conditions in the reactor, conduct parametric studies and what-if experiments, and, thereby, assist in the design process. MFIX has the following modeling capabilities: mass and momentum balance equations for gas and multiple solids phases; a gas phase and two solids phase energy equation; an arbitrary number of species balance equations for each of the phases; granular stress equations based on kinetic theory and frictional flow theory; a user-defined chemistry subroutine; three-dimensional Cartesian or cylindrical coordinate systems; nonuniform mesh size; impermeable and semi-permeable internal surfaces; user-friendly input data file; multiple, single-precision, binary direct-access output files that minimize disk storage and accelerate data retrieval; extensive error reporting; post-processors for creating animations and for extracting and manipulating output data.

PACKAGE CONTENTS - Media Directory; Software Abstract;

DOE/METC-94/1004; DOE/METC-95/1013; Media includes Source Code, User Guide, Executable Module, Compilation Instructions, Sample Problem Input Data, Programmer Documentation;

SOURCE CODE INCLUDED? - Yes

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MEDIA QUANTITY - 2 3.5 Diskettes

METHOD OF SOLUTION - MFIX solves the mass, momentum, energy, and species-mass balance equations for describing multiphase flow with chemical reactions and heat transfer. MFIX uses a finite difference method for discretizing the equations. The non-linear equations are solved using an iterative technique.

COMPUTER - SILICON GRAPHIC

OPERATING SYSTEMS - The program has been run under IRIX 5.3 and ULTRIX 4.3A.

PROGRAMMING LANGUAGES - Fortran 77 with extensions (100%)

SOFTWARE LIMITATIONS - The mesh size and the number of species are user-defined. These are restricted only by the available computer memory and CPU time.

SOURCE CODE AVAILABLE (Y/N) - Y

HARDWARE REQS - The hardware requirements are problem dependent. For a large-size MFIX problem (12,036 nodes, 2 solids phases, 8 gas species, and 8 solids species) the total size of the process was 6 Mb and required 17 Mb of disk space for storing data on one second of reactor operation.

TIME REQUIREMENTS - The time requirement depends upon the problem specifications and also on the computer used. On a Silicon Graphics Crimson Workstation the time varies from several days to several weeks.

REFERENCES - M. Syamlal, W.Rogers, and O'Brien, T.J., MFIX Documentation: Theory Guide, Technical note, DOE/METC-94\1004, December 1993; M. Syamlal, MFIX Documentation User's Manual, DOE/METC-95/1013, November 1994.

ABSTRACT STATUS - Released AS-IS 6/20/95.

SUBJECT CLASS CODE - H

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
M CODES
HEAT TRANSFER
MULTIPHASE FLOW
CHEMICAL REACTIONS
HYDRODYNAMIC MODEL

EDB SUBJECT CATEGORIES -
990200 420400

E S T S C
ENERGY SCIENCE & TECHNOLOGY SOFTWARE CENTER
SOFTWARE ABSTRACT

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SPONSOR - DOE

PACKAGE TYPE - SCREENED