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TransAT SUITE

Grid Generation : Orthomesh

2D Cartesian
2D Axisymmetric
2D BFC (limited)
3D Cartesian

Grid Generation : TransAT-MESH

IST (Immersed Surfaces Technology)
BMR (Block Mesh refinement)
AMR (Adaptive Mesh Refinement)

PRE-PROCESSOR

Numerics

Implicit update
Explicit update
Muligrid
2nd and 3rd order schemes

Transient

Steady State

BASIC MODULE

Unsteady

Boundary conditions

Inflow, outflow, wall, symmetry
Pressure, oscillating inflow

Post-Processing

Data compatible with Tecplot
Data compatible with Paraview
Data compatible with OpenDX
Data compatible with CGNS

Flow Physics Single-Phase

Isothermal/Incompressible/Newtonian
Weak compressible
Heat Transfer & Scalar

- Boussinesq
- Passive
- Conjugate (solid)

Turbulence

- k-delta (1-equation)
- k-epsilon
- Wall functions
- Two-layer (3 models)
- ASM (3 models)
- Low Re modeling (3 models)
- k-Omega/SST

BASIC MODULE

Flow Physics Multi-Phase

Phase Change Heat Transfer

- With correlations (5 correlations)
- With direct flux integration

Dilute Mixture (concentration)

- Single Class Suspended Particle
- Multiple Class Suspended Particle

Lagrangian Particle Tracking

- One-way coupling
- Two-way coupling
- Four-way coupling
- Wall-particle collision
- With heat transfer

Interface Tracking 1-fluid model

- Level Sets
- VOF

Mixture 1-fluid model

- Homogeneous
- Algebraic Slip

Dense Gas Flows (Fluidized beds)

MULTIPHASE MODULE

Numerics

Implicit update (V-LES)

Explicit update (LES & DES)

2nd and 3rd order schemes

Turbulence

LES (SGS) single phase

- Smagorinsky/wall functions/Low-Re
- VMS
- Dynamic

LES/V-LES/DES MODULE

- WALE

LES (SGS) two-phase

- Smagorinsky with interface damping

- VMS

- WALE

V-LES (SGS) single & two-phase

- Filter based approach

DES (SGS) single phase

- Two-layer TLV 1-eq. model

Boundary conditions & Signals

Unsteady correlated inflow Cdfs.

FFT signals and PSD

Turbulent stresses output

Flow Physics

Non-Newtonian

- Bingham/Plastic

- Daugherty

- Cross-Carreau

- Power law

- Water-emulsions

Marangoni effects

Three-phase flow

- FFF (3 fluids)

- FFP (2 fluids & particles)

Electrowetting

Thin film modelling

Cavitation

COMPLEX PHYSICS MODULE

Nanoparticles & nanofluids
Sedimentation & thickening
Surfactants

Flow Physics (2010)

Premixed Combustion

- G-Equation Flamelet Model
- Coherent Flame Model

Non-premixed Combustion

- Mixture Fraction Flamelet Model
- CMC

Chemical Kinetics

Eddy Breakup Model
Supercritical Fluids

COMBUSTION MODULE