fluidyn-MP - CHT module

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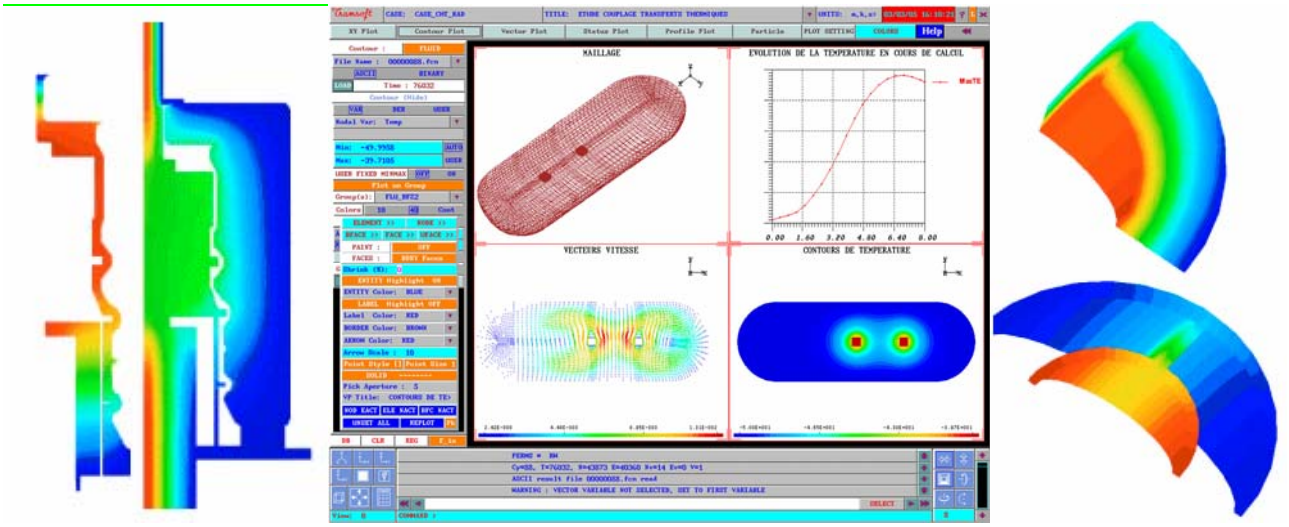
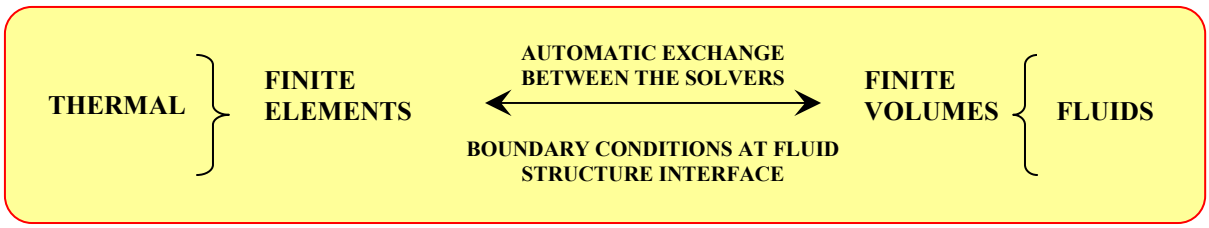
Transoft - INTERNATIONAL

CONJUGATE HEAT TRANSFER

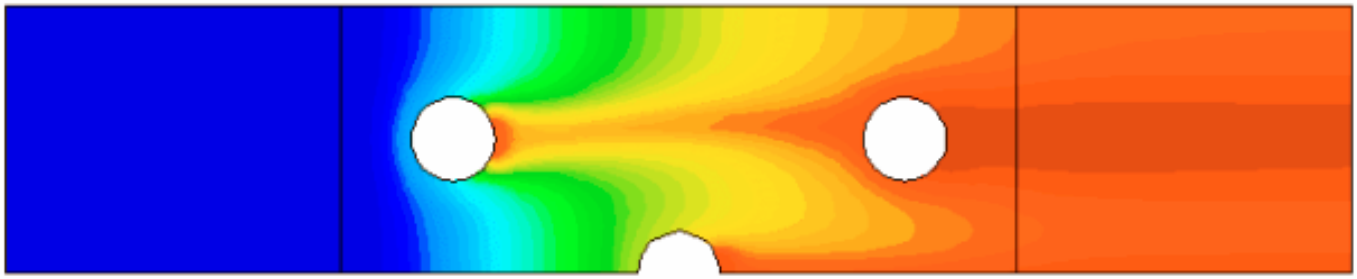


***fluidyn*-MP CHT** (**C**onjugate **H**eat **T**ransfer) is a numerical tool dedicated to the simulation of heat transfer in fluids and structures. The numerical methods (Finite Elements or Finite Volumes) can optimally model the fluid and structures. The heat transfer coefficient through the boundary layer is calculated with the help of a computational fluid dynamics code, very often in finite volumes. This coefficient is then used by a finite element code to calculate the heat conduction and thermal deformation in the structure.

A new approach to the simulation of conjugate heat exchange has been used in ***fluidyn*- MP CHT** by the simultaneous strong coupling of the solvers.

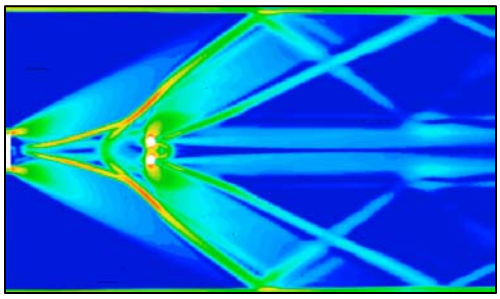


Thus *fluidyn*- MP CHT couples the finite element structured mesh (which allows to increase the conduction time step) and the finite volume modelling of fluids which helps to easily integrate the complex physical phenomena often present in fluid mechanics.



MULTIPLICITY OF SOLVERS AND SOLUTION SCHEMES

A highly adaptable and precise solution to each problem can be found thanks to the vast selection of appropriate solver and numerical schemes offered by ***fluidyn*-MP CHT.**

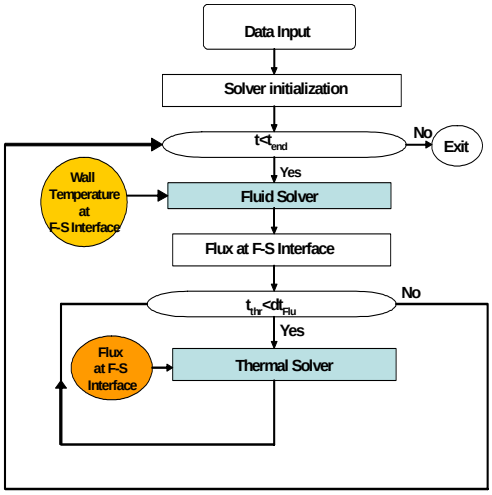


FLUID MODELLING

- Steady uncompressible to highly unsteady and strongly compressible (detonation, shock waves).
- Multi species, multi phase flows (dispersed or free surface).
- Various equations of state for thermodynamic properties
- Various simple to highly evolutive turbulence models
- Reactive flows with different reaction models.
- Radiation in semi-transparent media.
- Structured multi-block, unstructured, hybrid, non-conform, moving mesh.
- Porous media (surface or volume porosities).

THERMAL MODELLING

- Conduction calculation in the structure by a finite elements matrix solution.
- Transient (implicit or explicit scheme) or steady analysis.
- Radiation with shadow effect



MODELLING FLUID STRUCTURE INTERACTIONS

***fluidyn*-MP CHT** offers a new technology of strong coupling which manages simultaneously heat transfer and structural deformations (coupled thermo-mechanical calculation). The automatic exchange of boundary conditions between the Finite Elements and Finite Volumes allows the simultaneous solution of heat and flow.

POST-PROCESSOR

The user-friendly graphical interface of ***fluidyn*-MP CHT** allows result visualisation and interpretation (velocities, pressures, stress, deformations, temperature…) at any point during the calculation as well as the easy creation of images and result animations. The results can be viewed on the sections and profiles and are displayed in the form of vectors, iso-contours and iso-surfaces.

REFERENCES

AIR LIQUIDE, AVENTIS, CEA, CIAT, CITA, COGENTRIX, DGA, EADS, EDF, FRAMATOME, IFP, MITSUBISHI, RATP, SAINT-GOBAIN, SHELL, NCF, STBFT, SUMITOMO, TOTAL, VNF, etc.

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