ZZZZ215 – Sequence 3D *Code_Saturne* *Summarized*

Code_Aster:

This test validates the sequence 3D *Code_Saturne Code_Aster*. Various features are concerned with this validation:
- the reading of a field of pressure in med file
- creation of a data structure Result of type EVOL_CHAR
- the spatial projection of a field of a mesh on the another
- temporal interpolation of the loading induced by the fluid pressure of the fluid temporal discretization to that of solid

As example, various types of inputted fields are used
- a field of pressure produced by *Code_Saturne*
- of the fields of pressure created artificially by *Code_Aster*

1 Problem of reference

1.1 Geometry

the geometry of the problem is that of a cube on side 200 and whose sides are called $Face1$ $Face2$ $Face3$ $Face4$, $Face5$ and $Face6$.

1.2 Properties of the material

It is about an isotropic linear elastic material of modulus Young $1.$ and Poisson's ratio 0.3.

1.3 Boundary conditions and loadings

the cube is embedded on its face $Face1$ while all the others are subjected to the pressure of the fluid.

1.4 Initial conditions

the initial conditions virgin of any displacement and of are very forced.

2 Reference solution

Without object. The data-processing sequence here is validated.

3 Modelization A

3.1 Characteristic of the modelization

One defines here 2 fields of pressure on the fluid mesh which one associates with 2 times, 0 and 1. One then assembles them in a data structure of type loading.
In order to apply this loading to the solid mesh, one projects data structure of type loading on the solid mesh.
One carries out solid computation at times 0.2 0.4 0.6, 0.8 and 1 what validates the temporal interpolation of the loading.

3.2 Characteristics of the mesh

Of no importance

4 Modelization B

4.1 Characteristic of the modelization

One defines here a field of pressure on the fluid mesh depend on time and space according to the function $1.\mathrm{E}-4\times INST\times(X+Y+Z)$. One then associates it with the list of times 0, 1 in a data structure of type loading.
In order to apply this loading to the solid mesh, one projects data structure of type loading on the solid mesh.
One carries out solid computation at times 0.2 0.4 0.6, 0.8 and 1 what validates the temporal interpolation of the loading.

4.2 Characteristics of the mesh

Of no importance

5 Modelization C

5.1 Characteristic of the modelization

One reads here a truth result *Code_Saturne* of constant pressure by element at times 0.25 0.5, 0.75 and 1, which one defines as being a data structure of type loading.
In order to apply this loading to the solid mesh, one projects data structure of type loading on the solid mesh.
One carries out solid computation at times 0.333, 0.6666 and 0.9999 what validates the temporal interpolation of the loading.

5.2 Characteristics of the mesh

Of no importance

6 Summary of the results

the results are completely those expected.