

## ZZZZ215 – Chaining 3D Code\_Saturne Code\_Aster

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### Summary:

This test validates the chaining 3D Code\_Saturne Code\_Aster. Various features are concerned with this validation:

- reading of a field of pressure in a file MED
- the creation of a structure of data Result of the type `EVOL_CHAR`
- the space projection of a field of a grid on another
- the temporal interpolation of the loading induced by the fluid pressure of the fluid temporal discretization to that of the solid

By way of an example, various types of inlet limits are used

- a field of pressure produced by Code\_Saturne
- fields of pressure created artificially by Code\_Aster

## 1 Problem of reference

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### 1.1 Geometry

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

### 1.2 Properties of material

It is about an isotropic linear elastic material of modulus Young 1. and of 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

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

## 3 Modeling A

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### 3.1 Characteristics of modeling

One defines here 2 fields of pressure on the fluid grid which one associates with 2 moments, 0 and 1. One then assembles them in a structure of data of type loading.

In order to apply this loading to the solid grid, one projects the structure of data of type loading on the solid grid.

One carries out solid calculation at the moments 0.2, 0.4, 0.6, 0.8 and 1 what validates the temporal interpolation of the loading.

### 3.2 Characteristics of the grid

Of no importance

## 4 Modeling B

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### 4.1 Characteristics of modeling

One defines here a field of pressure on the fluid grid depend on time and space according to the function  $1.E-4 \times INST \times (X + Y + Z)$ . One then associates it with the list of moments 0, 1 in a structure of data of type loading.

In order to apply this loading to the solid grid, one projects the structure of data of type loading on the solid grid.

One carries out solid calculation at the moments 0.2, 0.4, 0.6, 0.8 and 1 what validates the temporal interpolation of the loading.

### 4.2 Characteristics of the grid

Of no importance

## 5 Modeling C

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### 5.1 Characteristics of modeling

A true result here is read *Code\_Saturne* of constant pressure by element at the moments 0.25, 0.5, 0.75 and 1, that one defines as being a structure of data of type loading.

In order to apply this loading to the solid grid, one projects the structure of data of type loading on the solid grid.

One carries out solid calculation at the moments 0.333, 0.6666 and 0.9999 what validates the temporal interpolation of the loading.

### 5.2 Characteristics of the grid

Of no importance

## 6 Summary of the results

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The results are completely those expected.