

# Code Aster

Version  
default

Titre : ZZZZ306 – Vérification de PROJ\_CHAMP / ECLA\_PG  
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## ZZZZ306 – Checking of PROJ\_CHAMP/ECLA\_PG

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### Summary:

This test validates the programming of the routines `ecla2d.f` and `ecla3d.f`

This programming is used by the features:

- MACR\_ECLA\_PG
- PROJ\_CHAMP / METHOD = 'ECLA\_PG'
  
- Modeling a:
  - Tetrahedron/ FPG15
  - Hexahedron / FPG27
  - Pentahedron/ FPG21
- Modeling b:
  - Tetrahedron/ FPG1
  - Hexahedron / FPG8
  - Pentahedron/ FPG6
- Modeling C:
  - Tetrahedron/ FPG4
- Modeling D:
  - SORTED / FPG3
  - SORTED / FPG6
  - QUAD / FPG4
  - QUAD / FPG9
- Modeling E:
  - Pyramid/ FPG5
  - Pyramid / FPG27
- Modeling F (projection of a field of an element FEM towards an element X-FEM):
  - Tetrahedron/FPG1 → XFEM90

## 2 Principle of the test

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For each modeling, the grid is very simple: formed by 1 to 4 elements.

One creates an analytical field (CH1) on the points of Gauss of the elements using a formula depending on the coordinates  $(X, Y, Z)$ .

One projects then the field (CH1) on the same grid. What produces the field (CH2).

## 3 Validation

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### 3.1 Modelings A with E

For each modeling, one tests the value of ALL the points of Gauss of the diagrams of integration.

Values of CH1 are tested in 'NON\_REGRESSION'

Values of CH2 are tested in 'ANALYTICAL'

### 3.2 Modeling F

This modeling carries out the projection of a field since a mesh tetrahedron FEM towards a mesh Ttetrahedron X-FEM. The field CH1 is thus stored on a single point of Gauss, while the field CH2 is stored on a family of 90 points of Gauss. Moreover, the interface considered corresponds to cutting of the element tetrahedron in 4 under-tetrahedrons, which implies that only 60 points of Gauss on the 90 available ones store really a value.

That is to say  $C$  the value stored by the single point of Gauss of the field CH1. The first 60 points of Gauss field CH2 store the value  $C$ , while the last 30 points of Gauss store value 0, The sum of caeurs of CH2 is thus equal to  $60C$  and the greatest stored value is  $C$ .

In order not to weigh down the command file by using 90 tests of analytical values:

- The single value of CH1 is tested in 'NON\_REGRESSION',
- The sum of the values of CH2 and the greatest value of CH2 are tested in 'ANALYTICAL'.