

Macro-order MACR_ECLA_PG

1 Goal

To allow a visualization of the fields the points of Gauss without smoothing nor interpolation. The principle of this order is to burst each element of the model in as many small elements it has points of Gauss. Each subelement then carries a constant field by mesh: the value of the point of Gauss.

Product a structure of data `result` and one `grid`.

2 Syntax

```
MACR_ECLA_PG      (

# concepts produced by the macro-order:
♦ RESULT          = CO ( ` resu_2 `) *,           [sd_resultat]
♦ GRID            = CO ( `my` ) *,               [grid]

# operands obligatory:
♦ RESU_INIT       =      resu_1,                 [sd_resultat]
♦ MODELE_INIT     =      model,                  [model]
♦ NOM_CHAM        = | `SIEF_ELGA`,
                   | `VARI_ELGA`,
                   | `SIEF_ELGA`,
                   | `FLUX_ELGA`,
                   | `... ELGA...`,

# optional geometrical parameters:
◇ SHRINK          = / HS,                        [R8]
                  / 0.9,                        [DEFECT]

◇ TAILLE_MIN      = / MT,                        [R8]
                  / 0. ,                        [DEFECT]

# Possible selection of a subset of elements to be visualized:
◇ / ALL           = `YES`,                       [DEFECT]
GROUP_MA         = lgma,                         [l_gr_maille]

# Selection of the sequence numbers:
◇ / TOUT_ORDRE    = `YES`,                       [DEFECT]
/ NUME_ORDRE      = l_nuor ,                     [l_I]
/ LISTE_ORDRE     = l_numo ,                     [listis]
/ . / INST       = l_inst ,                     [l_R]
/ / LIST_INST    = l_inst ,                     [listr8]
◇ | PRECISION    = / prec,                      [DEFECT]
                  / 1.0E-6,
| CRITERION      = / `RELATIVE`,                 [DEFECT]
                  / `ABSOLUTE`

)
```

- * Syntactically, the concepts produced by the order must be obligatorily written:
CO (`xxxx`)

3 Operands

3.1 General information

The order transforms one `SD_resultat` (and sound grid subjacent) in a news `SD_resultat` and new `grid`.

The meshes of the initial grid are burst in smaller meshes: a mesh by point of Gauss. These new meshes all are disjointed (i.e they are not connected between them).

The value of a field on a point of Gauss is then assigned to all the nodes of the small mesh which is associated for him.

`SD_resultat` produced is thus a little particular because the fields (which keep their original name `ELGA_XXXX`) are actually fields with the nodes!

Such a structure of data is intended above all for a visualization (afterwards `IMPR_RESU`). But one can also consider other postprocessings: `POST_RELEVE`, `PROJ_CHAMP`,...

3.2 Operands `RESU_INIT`

- ◆ `RESU_INIT: resu_1`
Name of the result post-to treat

3.3 Operands `MODELE_INIT`

- ◆ `MODELE_INIT: Mo`
Name of the model associated with the result `resu_1`.

3.4 Operand `NOM_CHAMP`

- ◆ `NOM_CHAM:`
Reference symbol of (or of) the fields post-to be treated.

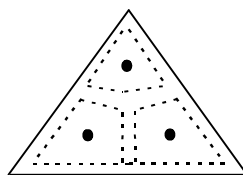
Note:

One treats only the fields by elements with the points of integration (standard `ELGA`), the restrictions (checked by Aster) are:

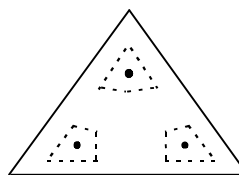
- the fields must be real
- the fields "under-points" (multi-layer hulls for example) are not taken into account.

3.5 Operand `SHRINK`

- ◇ `SHRINK = HS`
Homothetic factor of reduction allowing to ensure to it not interpenetration of the meshes.



`SHRINK : 0,9`



`SHRINK : 0,5`

- Point de Gauss

3.6 Operand TAILLE_MIN

◇ TAILLE_MIN = MT

This makes it possible to fix the minimal size on a side of an element. If this size is not reached, one proceeds to a geometrical transformation (affinity along the too small side). The interest is to be able to display results on very stretched elements (like the elements of joint).
By default, MT is worth 0. : the geometry of the elements is not modified.

Note: this functionality is implemented only in 2D, for the quadrangles.

3.7 Operand RESULT

◆ RESULT = CO ('resu_2')

Name of the SD `result` defined on the new grid on which the fields will be transferred.

3.8 Operand GRID

◆ GRID = CO ('my')

`my` is the name of the grid associated with `resu_2`. This name is necessary for visualization (order IMPR_RESU).

3.9 Operands ALL/GROUP_MA

◇ / ALL = 'YES', [DEFECT]

This keyword makes it possible to carry out the operation on all the meshes of the grid.

/ GROUP_MA = l_{gma},

This keyword makes it possible to carry out the operation on a list of groups of meshes of the grid.

3.10 Operands

TOUT_ORDRE/NUME_ORDRE/LIST_ORDRE/INST/LIST_INST/PRECISION/CRITERION

Selection in a structure of data `result` [U4.71.00].

3.11 Remarks on certain diagrams of points of Gauss

The principle of this order is to cut out the meshes of the grid in as many subelements (of simple form) that there are points of Gauss and to associate each value of the field `ELGA` with the subelement which corresponds to him (see for example the drawing of paragraph 3.5).

It is thus necessary to know to cut out an element in as many subelements (triangle, quadrilateral, tetrahedron,...) that there exist points of Gauss in the diagram of integration. It is unfortunately not always possible and it was necessary to adapt for certain diagrams.

For example, for the diagram at 5 points of Gauss of the tetrahedrons, one cut out the tetrahedron in 6 subelements (4 tetrahedrons and 2 pyramids). The value of the 5th point of Gauss is affected with the 2 pyramidal subelements. The meeting of these 2 pyramids forms actually octahedral which is not a kind of mesh not recognized of the maillieurs or usual visualiseurs.

The case of the pyramids at 27 points of Gauss is much more problematic:

- There exist 12 points of Gauss which are located “outwards” pyramid. It is thus impossible to visualize them without “overflowing” on the close elements. One decides “to forget them” purely and simply.
- Remain 15 interior points then. We did not know to differently cut out the pyramid than in 8 subelements (4 hexahedrons and 4 pyramids). Consequently, we visualize only the values of 8 points of Gauss (on the 27 of the diagram).

4 Example

4.1 Visualization of a field of result at the points of Gauss on some groups of meshes

```
MACR_ECLA_PG ( RESU_INIT = U2, MODELE= MO, GROUP_MA = ('G1', 'G7'),  
              NOM_CHAM= ('SIEF_ELGA', 'VARI_ELGA'),  
              RESULT  = CO ('U2B'), GRID = CO ('MA2B'), )  
  
IMPR_RESU ( FORMAT=' IDEAS', UNITE=38,  
           RESU = _F ( GRID = MA2B, RESULT = U2B, ), )
```