Operator CREA_MAILLAGE

1 Goal

To create a structure of data of the type grid starting from another grid. The new grid is created starting from an existing grid while duplicating, while destroying, while transforming or while bursting of the meshs or by recopying a grid (case of GEOM_FIBRE).

Product a structure of data grid.

2 Syntax

```
ma_2 (grid) =CREA_MAILLAGE    (

          ◊  GRID = ma_1,                              [grid]

          ♦  |  CREA_MAILLE      =      _F (
                       ♦  NOM=   named,                    [K8]
                       ♦  |  GROUP_MA  =  lgma,            [l_group_ma]
                          |  ALL    =  'YES',
                       ♦  PREF_MAILLE  =  pre_ma,          [KN]
                       ◊  PREF_NUME    =  ind,             [I]
                                          ),

             |  MODI_MAILLE      =   _F (
                       ♦  |  ALL    =  'YES',
                          |  GROUP_MA  =  lgma,            [l_group_ma]
                       ♦  /  OPTION    =  /  'TRIA6_7' ,
                                          /  'QUAD8_9' ,
                                          /  'SEG3_4' ,
                                          /  'QUAD_TRIA3' ,
                             ◊  PREF_NOEUD   =  / 'NS',   [DEFECT]
                                                / pre_nd, [KN]
                             ◊  PREF_NUME    =  / ind  ,  [I]
                                                / 1,      [DEFECT]
                          /  OPTION    =      'QUAD_TRIA3',
                             ◊  PREF_MAILLE  =  / 'Ms',   [DEFECT]
                                                / pre_ma, [KN]
                             ◊  PREF_NUME    =  / ind  ,  [I]
                                                / 1,      [DEFECT]
                                          ),
```

```
|  REFERENCE MARK   =      _F (
        ♦  TABLE     =  ,                [tabl_cara_geom]
        ◊  NOM_ORIG  =  /  'CDG',          [DEFECT]
                        /  'TORSION',
        ◊  NOM_ROTA  =  /  'INERTIA',      [DEFECT]
        ◊  GROUP_MA  =  gma,               [group_ma]
                     ),

|  CREA_POI1 =  _F (
        ♦  |  ALL       =  'YES',
           |  GROUP_MA     =  lgma,        [l_group_ma]
           |  GROUP_NO     =  lno,         [l_group_no]
           ♦  NOM_GROUP_MA =  nom_ma ,     [group_ma]
                     ),

|  LINE_QUAD =  _F (
        ♦  |  ALL    =  'YES',
           |  GROUP_MA  =  lgma,           [l_group_ma]
        ◊  PREF_NOEUD   =  /  'NS',        [DEFECT]
                           /  pre_nd ,     [KN]
        ◊  PREF_NUME    =  /  ind,         [I]
                           /  1,           [DEFECT]
                        ),

|  PENTA15_18   =  _F (
        ♦  |  ALL    =  'YES',
           |  GROUP_MA  =  lgma,           [l_group_ma]
        ◊  PREF_NOEUD   =  /  'NS',        [DEFECT]
                           /  pre_nd ,     [KN]
        ◊  PREF_NUME    =  /  ind,         [I]
                           /  1,           [DEFECT]
                     ),

|  HEXA20_27 =  _F (
        ♦  |  ALL    =  'YES',
           |  GROUP_MA  =  lgma,           [l_group_ma]
        ◊  PREF_NOEUD   =  /  'NS',        [DEFECT]
                           /  pre_nd ,     [KN]
        ◊  PREF_NUME    =  /  ind,         [I]
                           /  1,           [DEFECT]
                     ),
|  TETRA4_8  =  _F (
        ♦  |  ALL    =  'YES',
           |  GROUP_MA  =  lgma,           [l_group_ma]
        ◊  PREF_NOEUD   =  /  'NS',        [DEFECT]
                           /  pre_nd ,     [KN]
        ◊  PREF_NUME    =  /  ind,         [I]
                           /  1,           [DEFECT]
                     ),

|  QUAD_LINE =  _F (
        ♦  |  ALL    =  'YES',
           |  GROUP_MA  =  lgma,           [l_group_ma]
                        ),

|  COQU_VOLU =  _F (
        ♦  NOM= named,                     [TXM]
        ♦  GROUP_MA = gma,                 [group_ma]
        ♦  THICK = ep,                     [R8]
```

```
                ◊  PREF_MAILLE  =  /  'Ms',          [DEFECT]
                                   /  pre_ma ,       [KN]
                ◊  PREF_NOEUD   =  /  'NS',          [DEFECT]
                                   /  pre_nd ,       [KN]
                ◊  PREF_NUME =     /  ind,           [I]
                                   /  1,             [DEFECT]
                ♦  /  PLAN   =  /  'SUP',            [TXM]
                                /  'INF',
                   /  PLAN   =     'MOY',
                   ♦  TRANSLATION  =  /  'SUP',      [TXM]
                                      /  'INF',      [DEFECT]
                              ),

        |  CREA_FISS =  _F (
              ♦  NAME             = nogma,            [TXM]
              ♦  GROUP_NO_1    = gno1,             [group_no]
              ♦  GROUP_NO_2    = gno2,             [group_no]
              ♦  PREF_MAILLE   =  pre_ma ,         [KN]
              ◊  PREF_NUME     =  /  ind,          [I]
                                  /  1,            [DEFECT]
                              ),
        |  RESTRICTED   =  _F (
              ♦  GROUP_MA  = lgma,             [l_group_ma]
              ◊  GROUP_NO     = lgno,             [l_group_no]
              ◊  TOUT_GROUP_MA=  / 'NOT',         [DEFECT]
                                 / 'YES',
              ◊  TOUT_GROUP_NO=  / 'NOT',         [DEFECT]
                                 / 'YES',
                              ),

        |  ECLA_PG   =  _F (...) # used by [U4.44.14]

        |  GEOM_FIBRE   =  gfibre,                [gfibre]

♦     | CUTTING _LAC     =      _F (
                ♦  GROUP_MA_ESCL=  lgma,            [l_group_ma]
                ◊  DECOUPE_HEXA =  / 'PYRA',        [DEFECT]
                                   / 'HEXA',
                              ),

◊  INFORMATION  =  /  1,                                  [DEFECT]
                   /  2,
◊  TITLE  =  tit,                                         [TXM]

                              )
```

3 Risk to produce a grid nonin conformity

A certain number of features of the order CREA_MAILLAGE can result in producing a grid nonin conformity. For this reason, the user must be particularly vigilant when it employs CREA_MAILLAGE to transform meshs.
A grid is nonin conformity when the functions of form of 2 adjacent elements do not have the same trace on their common border.

For example:
- 2 pentahedrons assembled to form a hexahedron and posed on another hexahedron (1 quadrangle in with respect to 2 triangles).
- 1 QUAD8 dividing one stops with 1 QUAD4 or 1 TRIA3
- 1 TRIA6 dividing one stops with 2 TRIA3

The grids nonin conformity lead in general to false results (at least locally).

Among the possibilities of CREA_MAILLAGE, several situations are potentially dangerous:

- Use of the one of the keywords QUAD_TRIA3 [§4.4.1], LINE_QUAD [§4.5], QUAD_LINE [§4.9], HEXA20_27 [§4.7], PENTA15_18 [§4.6] with the keyword GROUP_MA.
  If for example one transforms **partially** a linear grid in quadratic grid, the grid will be nonin conformity on the border between the linear elements and the quadratic elements.
  During the use of the keyword GROUP_MA , **it is necessary to take care to provide all the meshs implied in the transformation** , in particular meshs of skin or else, one HEXA27 could for example be bordered of meshs of skin QUAD8 .
- Use of the keyword HEXA20_27 [§4.7] (or PENTA15_18 [§4.6], TETRA4_8 [4.8]) if there exists in the grid of the voluminal elements with quadrangular faces of type different from the elements which one modifies. For example, if there exist pentahedrons or pyramids when hexahedrons are modified.
  The risk is that, for example, a quadrangular face of HEXA27 (9 nodes) that is to say coupled with a quadrangular face with 8 nodes of one PENTA15 adjacent.
- Use of the keyword QUAD_TRIA3 if there exists in the grid of the elements TRIA6. In this case, quadrangles transformed into TRIA3 will be incompatible with TRIA6.

4 Operands

4.1 Operand GRID

♦ GRID = ma_1

ma_1 is the name of the initial grid which one wants to reproduce before “enriching it” by new meshs or nodes, or “to impoverish it”.

Note:
The keyword GRID is obligatory except for the use of the keywords ECLA_PG and GEOM_FIBRE.

4.2 Keyword CREA_MAILLE

◊ CREA_MAILLE

An occurrence of this keyword factor makes it possible to define a new group of meshs made up of new meshs, being based themselves on existing nodes.
To duplicate several groups of meshs, the keyword factor will be repeated CREA_MAILLE.
Contrary to the order DEFI_GROUP [U4.22.01] for which the concept grid always preserves the same number of meshs and nodes, here the number of meshs of the new grid is increased (the number of nodes remains identical because the new meshs are based on already existing nodes). This can facilitate the creation of new loci to be able to apply modelings different to the same group from meshs.

4.2.1 Operand NAME

♦ NAME = named

One gives here the name of the new group of meshs which will be created.

4.2.2 Operands GROUP_MA / ALL

♦ | GROUP_MA = lgma,
| ALL = ‘YES’,

The whole of the meshs provided by the user with these two keywords will be duplicated and the new meshs will be gathered in a group of meshs bearing the name stipulated by the keyword NAME. If the whole of the meshs to be duplicated contains meshs in double, they are eliminated.

4.2.1 Operands PREF_MAILLE / PREF_NUME

♦ PREF_MAILLE = pre_ma
The value of this keyword makes it possible to define the prefix of the new meshs. One obtains the name of the new mesh while adding in front of his old name, the text specified under the keyword PREF_MAILLE. If this new name has a length higher than eight characters, one stops in fatal error with an error message.

◊ PREF_NUME = / ind

If an entirety ind is given under the keyword PREF_NUME, the number of the new meshs is built by concaténant the text capital letter given under the keyword PREF_MAILLE and an entirety obtained while incrementing ind from 1 with each creation of new meshs.

Note: L*'user must be careful in the choice of his prefix to prevent that the new meshs have the same name as old meshs. This collision of names is detected by the order and conduit with a stop of Code_Aster.*

4.3 Keyword CREA_POI1

◊ CREA_POI1

An occurrence of this keyword factor makes it possible to define meshs of the type 'POI1' (mesh with only one node) starting from nodes or of nodes of meshs.

4.3.1 Operands ALL / GROUP_MA /GROUP_NO

♦ | ALL = 'YES',
| GROUP_MA = lgma,
| GROUP_NO = lno,

All the nodes which belong to entities stipulated by the user with these five keywords, generate a mesh of the type POI1. The mesh created will have the same name as the node which supports it.

4.3.2 Operand NOM_GROUP_MA

♦ NOM_GROUP_MA = nom_ma

All meshs POI1 thus created can be gathered in the same group of meshs named nom_ma.

4.3.3 How to create several meshs POI1 on each node?

Meshs POI1 created by the keyword CREA_POI1 the same names have as the nodes from which they were created. It is thus not possible to create several meshs POI1 on the same node by using several occurrences of the keyword CREA_POI1.

A possible solution of skirting is to combine the use of CREA_MAILLAGE/CREA_POI1 with CREA_MAILLAGE/CREA_MAILLE. For example, to create 2 meshs POI1 on each node of the group 'GNO1', one will be able to make:

```
MA2=CRÉA_MAILLAGE (MAILLAGE=MA1,
      CREA_POI1 =  _F (NOM_GROUP_MA=' GM1', GROUP_NO=' GNO1'))
MA3=CRÉA_MAILLAGE (MAILLAGE=MA2,
      CREA_MAILLE =_F (NOM_GROUP_MA=' GM2', GROUP_MA=' GM1', PREF_MAIL='))
```

4.4 Keyword MODI_MAILLE

◊ MODI_MAILLE

An occurrence of this keyword factor makes it possible to transform a set of meshs.

4.4.1 Operand OPTION

♦ OPTION = / 'SEG3_4'
/ 'TRIA6_7'
/ 'QUAD8_9'
/ 'QUAD_TRIA3'

This keyword indicates the transformation to be carried out:

1) transformation of the segments with three nodes into segments with four nodes (usable for example for modeling 'PIPE' [U3.11.06],
2) transformation of the triangles with six nodes into triangles with seven nodes,
3) transformation of the quadrangles with eight nodes into quadrangles with nine nodes,
4) transformation of the quadrangles into triangles with 3 nodes:
   - transformation of meshs of the type QUAD4 in two meshs of the type TRIA3
   - transformation of meshs of the type QUAD8 in six meshs of the type TRIA3
   - transformation of meshs of the type QUAD9 in eight meshs of the type TRIA3

4.4.2 Operands PREF_NOEUD/PREF_MAILLE/PREF_NUME

◊ PREF_NOEUD = / pre_nd,
/ 'NS',

The value of this keyword makes it possible to define the prefix of the new nodes. One obtains the name of the new node while adding in front of his old name, the text specified under the keyword PREF_NOEUD. If this new name has a length higher than eight characters, one stops in fatal error with an error message.

◊ PREF_MAILLE = pre_ma

The value of this keyword makes it possible to define the prefix of the new meshs. One obtains the name of the new mesh while adding in front of his old name, the text specified under the keyword PREF_MAILLE. If this new name has a length higher than eight characters, one stops in fatal error with an error message.

◊ PREF_NUME = / ind,
/ 1,

If an entirety ind is given under the keyword PREF_NUME, the number of the new nodes (news meshs) is built by concaténant the text capital letter given under the keyword PREF_NOEUD (PREF_MAILLE) and an entirety obtained while incrementing ind from 1 with each creation of new nodes (news meshs).

Note:

The user must be careful in the choice of his prefix to prevent that the new ones nodes (news meshs) have the same name as old nodes (news meshs). This collision of names is detected by the order and conduit with a stop of Code_Aster.

An automatic procedure of cutting of the meshs quadrangles in triangles can generate a kind of "polarization" of the grid: starting from a grid QUAD given, all the diagonals are found directed in the same direction.

Caution: the use of the option 'QUAD_TRIA3'can lead to a grid nonin conformity. See [§3].

4.5 Keyword LINE_QUAD

◊ LINE_QUAD

This functionality makes it possible to create a quadratic grid starting from a linear grid.

One can apply it only to part of the grid (keyword GROUP_MA), but itis disadvised. See [§3].

The groups of meshs are preserved, the groups of nodes also (without change).
As at the time of the refinement of a grid, the nodes created are not introduced into the groups of existing nodes.

If a group of nodes corresponds on a board, afterwards LINE_QUAD, this group does not contain the nodes mediums of edges. To obtain one GROUP_NO complete, one can use for example the order DEFI_GROUP/OPTION = 'SUPPORT'.

4.5.1 Operands GROUP_MA / ALL

♦ | GROUP_MA = lgma,
| ALL = 'YES',

The whole of the meshs stipulated by the user with these two keywords will be transformed into quadratic meshs.

Attention, the use DU keyword GROUP_MA is disadvised. See [§3].

4.5.2 Operands PREF_NOEUD / PREF_NUME

As for MODI_MAILLE.

4.6 Keyword PENTA15_18

This keyword factor functions like the keyword factor LINE_QUAD (even syntax). It is used to transform PENTA15 in PENTA18 by adding nodes to the mediums of the quadrangular faces.

Attention, the use of this keyword is disadvised if the grid contains other types of voluminal meshs (HEXA and PYRAM). See [§3].

4.7 Keyword HEXA20_27

This keyword factor functions like the keyword factor PENTA15_18 with the hexahedrons. It is used to transform HEXA20 in HEXA27 by adding nodes to the mediums of the faces and the center of each hexahedron.

Attention, the use of this keyword is disadvised if the grid contains other types of voluminal meshs (PENTA and PYRAM). See [§3].

4.8 Keyword TETRA4_8

This keyword factor functions like the keyword factor PENTA15_18 with tetrahedrons. It is used to transform TETRA4 in TETRA8 while adding one node in the middle of each face tetrahedrons.

Attention, the use of this keyword is disadvised if the grid contains other types of voluminal meshs (PENTA, HEXA and PYRAM). See [§ 3].

4.9 Keyword QUAD_LINE

◊ QUAD_LINE

This functionality makes it possible to create a linear grid starting from a quadratic grid, one can apply it only to part of the grid (attention in this case with the connection of the linear and quadratic zones). See [§3].

4.9.1 Operands GROUP_MA / ALL

♦ | GROUP_MA = lgma,
| ALL = 'YES',

Lbe meshs stipulated by the user with these two keywords will be transformed into quadratic meshs.

Attention, the use DU keyword GROUP_MA is disadvised. See [§3].

4.10 Keyword REFERENCE MARK

◊ REFERENCE MARK

An occurrence of this keyword factor makes it possible to define a new grid starting from the old grid by carrying out a change of reference mark.

This functionality is used in particular in the macro-order MACR_CARA_POUTRE [U4.42.02] for the calculation of the constant of warping.

4.10.1 Operands TABLE / NOM_ORIG / NOM_ROTA / GROUP_MA

♦ TABLE =

One gives here the name of the table of concept “geometrical characteristics” which contains in particular, the coordinates of the centre of inertia and the center of torsion, the nautical angles defining the principal reference mark of inertia,… This table can be obtained by the order POST_ELEM with the keywords factors CARA_GEOM or CARA_POUTRE [U4.81.22].

◊ NOM_ORIG = / 'CDG',
/ 'TORSION',

The center of the new reference mark is indicated: the centre of gravity or the center of torsion.

◊ NOM_ROTA = / 'INERTIA',

The direction of the new reference mark is indicated. Only one solution is possible: the directions are those of the principal reference mark of inertia.

◊ GROUP_MA = gma

If NOM_ORIG = 'CDG', one can indicate the name of the group of meshs whose centre of gravity will be the origin of the new reference mark. If one does not use GROUP_MA, the centre of gravity of the whole of MODEL will be the origin of the new reference mark.
If NOM_ORIG = 'TORSION', the keyword GROUP_MA is inoperative.

4.11 Keyword COQU_VOLU

◊ COQU_VOLU

From the data of a group of surface meshs (QUAD, TRIA3), one builds the voluminal grid (HEXA8, PENTA6) by extrusion according to the normal of the elements (in a node, one takes the average of the normals of the convergent elements). Only one lays down elements is created.
The operation applies only to linear grids; if one wishes to create a quadratic grid, it is enough to use then CREA_MAILLAGE/LINE_QUAD.

4.11.1 Operands NAME

♦ NAME = named,

Name of the group of meshs made up of the voluminal meshs created at the time of this operation.

4.11.2 Operands GROUP_MA

♦ GROUP_MA = lgma,

Groups of meshs constituting the surface grid to extrude.

4.11.3 Operands THICK

♦ THICK = ep,

Thickness of the layer of elements created (thickness of the hull).

4.11.4 Operands PLAN

♦ PLAN = /'SUP',
/'INF',
/'MOY',

It is specified here that surface made up of lgma will be the Higher, Lower plan or Means of the hull.

4.11.5 Operands TRANSLATION

♦ TRANSLATION = /'SUP',
/'INF',

If PLAN=' MOY', it is specified if initial surface made up of lgma is relocated in Higher or Lower skin.

4.11.6 Operands PREF_MAILLE / PREF_NOEUD / PREF_NUME

As for MODI_MAILLE.

4.12 Keyword CREA_FISS

```
◊ CREA_FISS = _F (
              ♦ NOM= nogma,                    [TXM]
              ♦ GROUP_NO_1 = gno1,             [group_no]
              ♦ GROUP_NO_2 = gno2,             [group_no]
              ♦ PREF_MAILLE = pre_ma ,         [KN]
              ◊ PREF_NUME = / ind,             [I]
                            / 1,               [DEFECT]
                            ),
```

Allows to create a crack with elements of joint [R3.06.09] or elements with discontinuity [R7.02.12] along a line defined by two groups of nodes laid out in glance. The two groups of node will have to have the same number of nodes and to be ordered as a preliminary (for example with DEFI_GROUP/CREA_GROUP_NO/OPTION='NŒUD_ORDO') so that their classification "begins" same side (see Illustration 1).
One will be able, then to affect a modeling of the type "joint" on these new meshs QUAD4 (for example 'PLAN_JOINT').

The meshs created will bear a name formed starting from the prefix pre_ma follow-up of a number.
For example, if PREF_MAILE=' FS' and PREF_NUME=7, the meshs create will be called: FS7, FS8, …

One will create also new GROUP_MA (called nogma) containing the whole of the meshs QUAD4 created.

4.12.1 Operand NAME

Name of the group of meshs made up of the voluminal meshs created at the time of this operation.

4.12.2 Operands GROUP_NO_1/GROUP_NO_2

Groups of node constituting the lips of the crack. The group of node GROUP_NO_1 carry the local nodes 1 and 2 (the first node of the group has a local classification equalizes to 1), it GROUP_NO_2 carry the local nodes 3 and 4 (the first node of the group has a local classification equalizes to 4).
It is necessary to choose these groups of nodes according to the geometry so that the local classification of the elements is carried out in the trigonometrical direction.

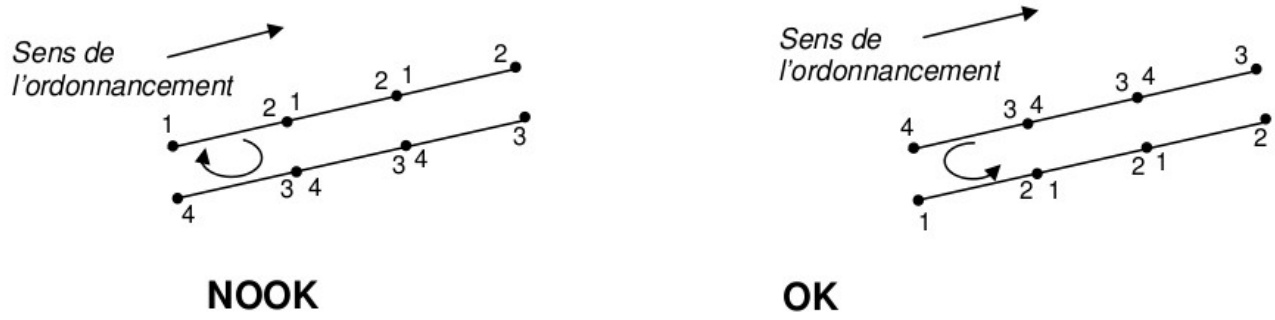


Illustration 1: Scheduling of the segments

4.12.1 Operands PREF_MAILLE/PREF_NUME

As for MODI_MAILLE.

4.13 Keyword ECLA_PG

◊ ECLA_PG

This keyword factor does not have to be used directly. It is used by the order MACR_ECLA_PG [U4.44.14].

4.14 Keyword GEOM_FIBRE

◊ GEOM_FIBRE
This key word makes it possible to obtain the grid created by DEFI_GEOM_FIBRE [U4.26.01]. This grid contains the whole of the groups of fibres of the study as well as the grid containing all fibres.

4.15 Keyword RESTRICTED

This keyword factor (non-répétable) makes it possible to generate “under” grid extracted from an existing grid.
Grid ma_2 extract (or “restricted”) is formed starting from a list of meshs provided by the user.

4.15.1 Meshs

The keyword GROUP_MA allows to define the meshs of the restricted grid.

4.15.2 Nodes

The nodes selected are those of the meshs selected. Moreover, if the keyword GROUP_NO=lgno is used, the nodes of the groups of lgno are added.

4.15.3 Groups of meshs

Grid ma_2 will contain all them GROUP_MA of lgma. Moreover, if the keyword TOUT_GROUP_MA=' OUI' is used, the groups of meshs of ma_1 not vacuums are added.

4.15.4 Groups of nodes

Grid ma_2 will contain all them GROUP_NO of lgno. Moreover, if the keyword TOUT_GROUP_NO=' OUI' is used, the groups of nodes of ma_1 not vacuums are added.

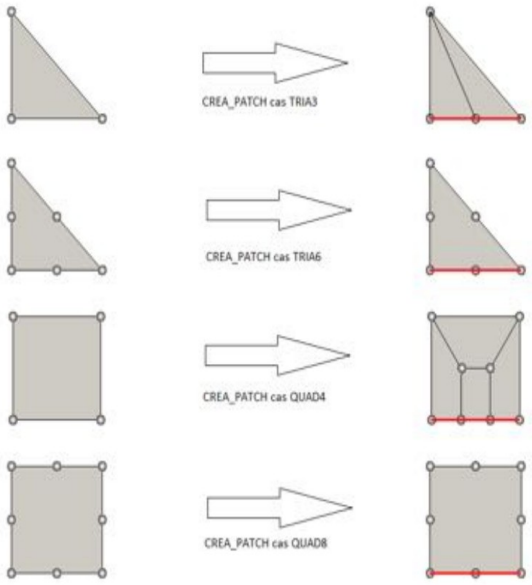
4.16 Keyword DECOUPE_LAC

♦ DECOUPE_LAC

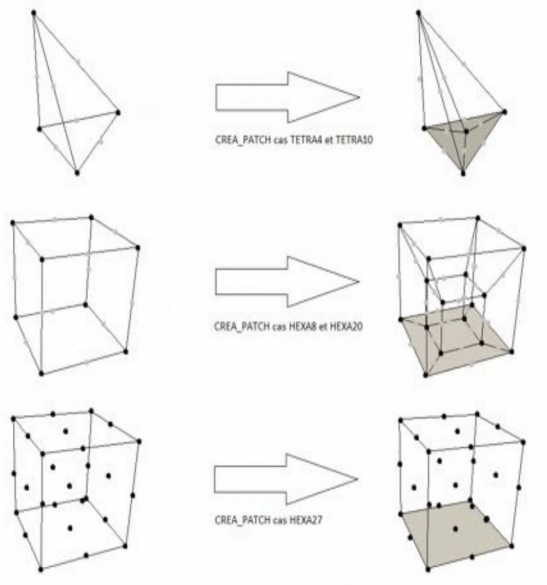
This key word makes it possible to obtain a grid containing of the “patchs” created on the group of mesh specified in GROUP_MA_ESCL. It is an operation of preprocessing of the meshs slaves for the treatment of the contact by the method mortar LAKE.
It should be noted that the mesh subjacent with the meshs of GROUP_MA_ESCL are also cut out.
Cuttings of the elements PYRA5 PYRA13, PENTA6, PENTA15 and HEXA8 HEXA20 in the case DECOUPE_HEXA=' PYRA ' are cuttings “not-in conformity S ” in the direction where they introduce elements different from the element découp é (pyramids and/or tetrahedron S) so as to add only one node by elements cut out in the grid.

The cutting of PENTA18 is not assumption of responsibility.

Caution: DECOUPE_LAC must be the last order to be acted on the grid. Operations MODI_MAILLAGE must be carried out front.



Case 2D (Thesis G. Drouet)



Case 3D (DECOUPE_HEXA=' HEXA')

◊ DECOUPE_HEXA

This key word allows to define the type of cutting used on HEXA8 and them HEXA20. By default, these elements are to cut out in pyramids to limit the number of added nodes. However by using the value HEXA, they are cut out in HEXA what can be useful if the introduction of pyramids into the grid poses problem.

4.17 Operand INFORMATION

◊ INFORMATION = inf

Specify the information printed in the file message (1: no impression, 2: details on the number of meshs create, modified…).

4.18 Operand TITLE

◊ TITLE = tit

Allows to specify a title.

5 Examples

5.1 Duplication of meshs

That is to say ma_1 a grid containing the meshs already:
M1 M2 M3

and groups it meshs:
hull: M1 M2

Each mesh S'supports on the following nodes :
M1: N1 N2 N3
M2: N3 N4 N5
M3: N4 N5 N6

```
ma_2 = CREA_MAILLAGE    (  GRID = ma_1,
             CREA_MAILLE =_F (   NAME             = ground,
                                 GROUP_MA      = 'hull',
                                 PREF_MAILLE   = 'with',
                                 PREF_NUME     = 100,    ),
                         )
```

After call to the order CREA_MAILLAGE , the new grid contains then:
- groups of meshs:
  - hull (initial)
  - ground = (meshs: A100 A101)
- the meshs are based on the following nodes:
  - M1: N1 N2 N3
  - M2: N3 N4 N5
  - M3: N4 N5 N6
  - A100 : N1 N2 N3
  - A101 : N3 N4 N5

5.2 Transformation of triangles with 6 nodes into triangles with 7 nodes

```
ma_2 = CREA_MAILLAGE    (  GRID = ma_1,
          MODI_MAILLE =_F (   GROUP_MA   = 'triangle',
                              OPTION     = 'TRIA6_7',
                              PREF_NOEUD = 'NMI',
                              PREF_NUME  = 10,    ),
                         )
```

Let us suppose that in ma_1 GROUP_MA triangle is composed of two meshs M1, M2 having the following nodes:
M1: N1 N2 N3 N4 N5 N6
M2: N1 N2 N7 N4 N8 N9

In the grid ma_2, two meshs M1, M2 will have the following nodes:
M1: N1 N2 N3 N4 N5 N6 NMI10
M2: N1 N2 N7 N4 N8 N9 NMI11

5.3 Transformation of quadrangles with 4 nodes into triangles with 3 nodes

This example is resulting from test SSLV04E:

The geometry, representing a quarter of disc, is with a grid in quadrangle. It is wished that a eighth of the disc be with a grid in triangle.

```
my = CREA_MAILLAGE  (  GRID = m0,
             MODI_MAILLE =_F (   GROUP_MA     = 'S2',
                                 OPTION       = 'QUAD_TRIA3',
                                 PREF_MAILLE = 'Ms',
                                 PREF_NUME    = 1,    ),
                            )
```

5.4 Example of use of DECOUPE_LAC

This example is resulting from the CAS-tests zzzz383.