Code_Aster

Version default

Titre : Opérateur MACR_LIGN_COUPE
Responsable : Josselin DELMAS

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Operator `MACR_LIGN_COUPE`

1 result

Drank Extraction in an array of the values of one on cut lines defined by two points and an interval or nodes groups.

Result can be mechanical (`evol_elas, evol_noli, mode_meca`) or thermal (`evol_ther`).

Principle:
This macro-command creates a mesh linear, right and regular of segments to two nodes.
This mesh can be:
* right, defined by the data of its ends and a number of intervals the component;
* curve, defined by the data of the center and the angle of a circle, first point of the cut line, amongst wished points, and possibly of a normal vector to the plane containing the cut line (in 3D only);
* unspecified, when the cut line constitutes a path connecting the nodes of a nodes group.

The fields of result provided (by default displacement or temperature) are projected on this mesh thanks to command `PROJ_CHAMP`. Then the nodal values on the cut line of the field to post-treating are recovered in an array by `POST_RELEVE_T`. It is this array which is produced by the macro - command.

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2 Syntax

```
[array] = MACR_LIGN_COUPE (

♦/RESULTAT=resu              ,        [evol_elas, evol_noli, mode_meca,
evol_ther]
        ◊NOM_CHAM=/          "SIGM_NOEU",              [so mechanical
DEFAULT]
                            /  "TEMP",                 [so thermal DEFAULT]
        ♦/NUMÉRIQUE_ORDRE=lordre             ,              [l_I]
            /NUME_MODE        =lmode    ,                [listis]
            /LIST_ORDRE     =lenti    ,                  [listis]
            /INST         =llinst  ,             [l_R]
            /LIST_INST        =llinst  ,                 [listr8]
            ◊   PRECISION=/prec           ,             [R]
                        /1.D-6 ,                [DEFAULT]
            ◊   CRITERE=/           "RELATIF",        [DEFAULT]
                        /   "ABSOLU",

    /CHAM_GD       =champ   ,               [cham_no_DEPL_R, cham_no_TEMP_R,
                                cham_no_SIEF_R, cham_elno_SIEF_R]


◊MODELE=mod               ,                  [model]
◊UNITE_MAILLAGE=25        ,                  [DEFAULT]

◊VIS_A_VIS=_F          (
    ♦/MAILLE_1=ma            ,               [l_K8]
        /GROUP_MA_1      =gma ,             [l_K8])


♦LIGN_COUPE=_F          (
    ♦INTITULE=txt        ,                  [kN]

    ♦/NOM_CMP=lcmp          ,               [l_K8]
        ◊REPERE=/          "GLOBAL", [DEFAULT]
                    /"POLAIRE",
                    /"LOCAL",
                        ◊VECT_Y=  (Oy1, Oy2, [Oy3]), [l_R]
                    /"UTILISATEUR"
                        ♦ANGL_NAUT=   (has, B, G), [l_R]
                    /"CYLINDRIQUE"
                        ◊ORIGINE= (x0, y0, [z0]), [l_R]
                        ◊AXE_Z=       (Oz1, Oz2, [Oz3]), [l_R]
                    ◊/TRAC_NOR=' /TRAC_DIR
        OUI'       =  ' OUI',
            ♦DIRECTION=       (X, there, [Z]),         [l_R]
    /INVARIANT         =  ' OUI',
    /ELEM_PRINCIPAUX    =  ' OUI',
    /RESULTANTE       =lcmp ,              [l_R]
```

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```
        ◊OPERATION=          |  ' EXTRACTION',                    [DEFAULT]
                             |  ' MOYENNE',

        ♦TYPE=/              "GROUP_NO"
                             ♦GROUP_NO=gno      ,             [l_K8]

                /     "GROUP_MA"
                      ♦MAILLAGE=ma       ,                   [mesh]
                      ♦GROUP_MA=gma          ,               [group_ma]
                      ◊/NOEUD_ORIG=        noA   ,      [node]
                         /GROUP_NO_ORIG       = gnoA    ,        [group_no]
                      ◊/NOEUD_EXTR=         noB   ,      [node]
                         /GROUP_NO_EXTR       = gnoB    ,        [group_no]
                      ◊VECT_ORIE=               (vx, vy, [vz]),  [l_R]

                /     "SEGMENT"
                      ♦NB_POINTS=nbpt         ,             [I]
                      ♦COOR_ORIG=          (x1, y1, [z1]),     [l_R]
                      ♦COOR_EXTR=          (x2, y2, [z2]),     [l_R]

                /     "ARC"
                      ♦NB_POINTS=nbpt         ,             [I]
                      ♦COOR_ORIG=          (x1, y1, [z1]),     [l_R]
                      ♦CENTER=             (x0, y0, [z0]),     [l_R]
                      ♦ANGLE=q               ,              [R]
                      ◊DNOR=            (xa, there is, [za]),       [l_R]


        ◊DISTANCE_MAX=distmax          ,                    [R]
    ),);
```

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3 Operands

3.1 Operand RESULTAT/CHAM_GD

♦/RESULTAT=resu   ,   [evol_elas, evol_noli, mode_meca, evol_ther]

Name of the result concept of the evol `type` containing the field with post-treating

/CHAM_GD   =champ   ,   [cham_no_DEPL_R, cham_no_TEMP_R,
                             cham_no_SIEF_R, cham_elno_SIEF_R]

Name of the concept of the field to post-treating. The optional key word MODELS must be indicated as soon as CHAM_GD is present.

3.2 Operands NUME_ORDRE/NUME_MODE/LIST_ORDRE/INST/LIST_INST/accuracy/CRITERE

Confer to the documentation [U4.71.00]

3.3 Operand NOM_CHAM

♦NOM_CHAM=/   "SIGM_NOEU", [so mechanical DEFAULT]
          /   "TEMP",   [so thermal DEFAULT]
          /champ ,   [K16]

Name of the field of result the resu of which one wishes to record the values on a cut line. If this key word is not indicated, one projects by default the stress field with the nodes calculated starting from displacements for result of mechanical type and the temperature for result of thermal type.

Note:

The macro-command treats all types of fields: NOEUD , ELEM , ELNO .

3.4 Operand MODELS

◊MODELE=modele   ,   [model]

Name of the model associated with the result concept evol_xxx. The model is necessary during the projection of the field by PROJ_CHAMP.

3.5 Operand UNITE_MAILLAGE

◊UNITE_MAILLAGE=25   ,   [DEFAULT]

Specifies the logical number of unit in which the linear mesh of the cut line is created. This unit is by default 25; one gives to the user the opportunity of modifying it if unit 25 would be already assigned to another use in its study.

3.6 Operands VIS_A_VIS

◊VIS_A_VIS=_F   (
    ♦/MAILLE_1=ma   ,   [l_K8]
      /GROUP_MA_1   =gma ,   [l_K8])   )

This factor key word by the operator PROJ_CHAMP is used and allows with its operands MAILLE_1 and GROUP_MA_1 to restrict intended field to project. The user is invited to consult documentation [U4.72.05] for more information.

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3.7 Key word `LIGN_COUPE`

♦LIGN_COUPE=_F   (

Key word répétable allowing to define one or more cut lines.
A cut line is made up of segments with 2 nodes being able to describe:
- either a straight line,
- or an arc of a circle or a circle,
- or one broken line unspecified.

In the first case, the cut line is made up of a right segment, defined by its two ends and a number of regular intervals cutting out it.
In the second case, the cut line is made up of homogeneous right segments, whose union forms an arc of a circle, or typical case a circle.
In the third case, the cut line is defined from nodes groups or of mesh groups of mesh: the cut line is then the path defined by the succession of the nodes of the group.

3.7.1 Operand `INTITULE`

◆INTITULE=txt   ,   [kN]

Label of heading in the array allowing to distinguish the various cut lines. If this key word is not indicated, the label of heading is worth "l.coupe (N)" where (N) is the number of occurrence of the cut line. Operand

3.7.2 TYPE `This`

key word makes it possible to define the type of cut line which one wishes to create. It can be identified SEGMENT , GROUP_NO , GROUP_MA or to ARC . TYPE

3.7.2.1 = ' SEGMENT'

the cut line is identified with a right segment, defined by its   two ends and a number of regular intervals cutting out it. TYPE

3.7.2.2 = ' GROUP_NO' One

defines the cut line by the data of nodes groups in the mesh supporting the fields: the cut line is then the path defined by the succession of the nodes of these groups. TYPE

3.7.2.3 = ' GROUP_MA'

the cut line is built starting from the nodes of a mesh group made up of meshes of type SEG . The cut line is then the path defined by the succession of the reordered nodes of this group. If line is closed, it should be specified by indicating the nodes origin and end (for example with key keys GROUP_NO_ORIG and GROUP_NO_EXTR). These 2 nodes must be identical. To impose the directional sense of line, one can use key word VECT _ORIE. For
more details concerning these key keys, to consult of the command the documentation of key word NOEUD_ORDO DEFI_GROUP . TYPE

3.7.2.4 = ' ARC'

the cut line are connected with an arc of circle or a complete circle. It is defined by the following data:
- a first point corresponding at the origin of the circular cut line,
- a second point corresponding to the center of the circle,
- an angle (expressed in degree) allowing to determine the end of the cut line,
- a number of points constituting the cut line,
- a normal vector with the plane containing the cut line in 3D only. Operand

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3.7.3 NB_POINTS ♦

NB_POINTS=nb   ,   [I]   Number of points

of the cut line. Operands

3.7.4 COOR_ORIG ♦

COOR_ORIG= (x1   , y1, [z1]), [l_R   ] Coordinated

first point of the cut line: 2 realities in the plane, 3 in space. This key word is used for TYPE = '
SEGMENT' or TYPE = ' ARC'. Operands

3.7.5 COOR_EXTR ♦

COOR_EXTR= (x2   , y2, [z2]), [l_R   ] Coordinated

of last point of the cut line: 2 realities in the plane, 3 in space. This key word is used for TYPE = '
SEGMENT'. Operand

3.7.6 GROUP_NO ♦

GROUP _NO=gno   , [grno   ] This

key word makes it possible to extract the values on a given nodes group. In the case of the processing
of fields at nodes, it is perfectly similar to POST _RELEVE_T. This key word is used only for TYPE
= ' GROUP_NO'. Operands

3.7.7 GROUP_MA and MAILLAGE ♦

GR OUP _MA=grma   , [l_grma] This

key word makes it possible to make pass the mesh group of the type SEG used to extract the nodes
there in order to reorder them before postprocessing. ♦

MAILLAGE=mail   , [mesh   ] mail

is the concept mesh containing the grma mesh group . These

key words are used for TYPE = ' GROUP_MA'. Operand

3.7.8 DNOR ◊

DNOR=   (xa   , there is, [za]), [l_R   ]

the vector to be transmitted to this key word must be normal with the plane containing the circular cut
line. In
2D: it is useless (DNOR = vector of Z the total reference) In
3D: it makes it possible to define the meaning of traverses cut line (direct meaning). This
key word is used for TYPE = ' ARC'. Operand

3.7.9 CENTER ♦

CENTER= (x0   , y0, [z0]), [l_R   ] Coordinated

point corresponding to the center of the circle support of the circular cut line. This key word is used for
TYPE = ' ARC'. Operand

3.7.10 ANGLE ♦

ANGLE= theta   , [R] It

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corresponds to the angle of the circle support of the circular cut line (expressed in degree) which from its center, of the point origin and the plane containing the cut line, the end of the cut line determines. This key word is used for TYPE = ' ARC'. Operand

3.7.11 DISTANCE_MAX ◊

DISTANCE _MAX=distmax   , [R]   This

key word is useful for operator PROJ_CHAMP . If
the distance between a node of the cut line and the cut mesh are higher than distmax , then this node will be ignored. The user is invited to consult documentation [U 4.72.05] for more information. Operands

3.7.12 INVARIANT   /ELEM_PRINCIPAUX/RESULTANTE/OPERATION/NOM_CMP /TRAC_NOR/TRAC_DIR/DIRECTION/VECT_Y/LOCATES   Confer   to   the documentation

[U 4.81.21]. Resu

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4 example

```
= STAT_NON_LINE (...);


1 = MACR_LIGN_COUPE (RESULTAT  = resu, LIGN_COUPE
                      = (_F
                        (TYPE= "SEGMENT", NB_POINTS
                          = 17, COOR_ORIG
                          = (0. , 0. , 0.), COOR_EXTR
                          = (10. , 0. , 0.), INTITULE
                          = "ligne1",), _F
                        (TYPE= "SEGMENT", NB_POINTS
                          = 25, COOR_ORIG
                          = (- 10. , 0. , 0.), COOR_EXTR
                          = (0. , 20. , 0.), INTITULE
                          = "ligne2",),)
                      );
                IMPR_TABLE
```

(ARRAY = tab1) In

this example, one records the values of the displacement obtained as a result the resu `at` all times of computation on two cut lines.

The array `1 contains` the sequence numbers, the curvilinear abscisses, the coordinates of the points then finally the values of the nodal quantity (on the nodes of line) of the treated field, here by default displacement.