Operator POST_CHAMP

1 Goal

Specific postprocessings for the elements of structure (hulls, beams,…):

- extraction of a field for a under-point
- calculation of the maximum minimum/on the whole of the under-points of a point
- taking into account of the offsetting of the plates for the calculation of the efforts

2 Syntax

```
resu2 [*] = POST_CHAMP  (

        ♦  R ESULTAT   =  resu,

        ◊ #  Selection of the sequence numbers:
             /  TOUT_ORDRE =     'YES',                    [DEFECT]
             /  NUME_ORDRE =     l_nuor ,                  [l_I]
             /  NUME_MODE  =     lnumode,                  [l_I]
             /  LIST_ORDRE =     l_nuor ,                  [listis]
             /  NOEUD_CMP  =     l_nocmp,                  [l_K16]
             /  NOM_CAS    =     nocas,                    [K16]
             /  ♦  /  INST =     l_inst ,                  [l_R]
                   /  LIST_INST =  / l_inst,               [listr8]
                   /  FREQ      =  / l_inst,               [listr8]
                   /  LIST_ FREQ = / l_freq,               [listr8]
                ◊  |  PRECISION =  / prec,
                                   / 1.0E-6,               [DEFECT]
                   |  CRITERION =      / 'RELATIVE',          [DEFECT]
                                   / 'ABSOLUTE',

        ◊ #  Selection of the geometrical zone:
             /  ALL    =      'YES',                    [DEFECT]
             /  GROUP_MA  =      l_grma ,                  [l_group_ma]

        ♦    /  EXTR_COQUE    =  _F (
                ♦  NOM_CHAM     =      lnosym ,           [l_KN]
                ♦  NUME_COUCHE  =      nucou,             [I]
                ♦  NIVE_COUCHE  =      /   'INF',
                                       /   'SUP',
                                       /   'MOY',
                ),

             /  EXTR_TUYAU    =  _F (
                ♦  NOM_CHAM  =      lnosym ,              [l_KN]
                ♦  ANGLE     =      delta,                [I]
                ♦  NUME_COUCHE =    nucou,                [I]
                ♦  NIVE_COUCHE =    /   'INF',
                                    /   'SUP',
                                    /   'MOY',
                ),

             /  EXTR_PMF  =  _F (
                ♦  NOM_CHAM  =      lnosym ,              [l_KN]
                ♦  NUME_FIBRE =     nufib,                [I]
                ),

             /  MIN_MAX_SP    =  ( _F (
                ♦  NOM_CHAM  =      nomsym ,              [KN]
                ◊  NOM_CMP   =      nocmp,                [KN]
                ◊  NOM_VARI  =      novari,               [KN]
                ♦  TYPE_MAXI =  /   'MAXIMUM',
                                /   'MINI',
                                /   'MAXI_ABS',
                                /   'MINI_ABS',
                ♦  NUME_CHAM_RESU   =     nuch,           [I]
```

```
                ),

            /   COQU_EXCENT   =   ( _F (
                ♦   NOM_CHAM  =      /   'EFGE_ELNO'   ,
                                     /   'EFGE_ELGA'   ,
                ♦   MODI_PLAN =      'YES',
                )),
        )
```

[*] The type of `resu2` is the same one as that of `resu`

3 General information

3.1 Extraction of a field for a under-point

When that one sd_resultat (resu) contains fields “under-points” (case of the multi-layer hulls, pipe sections or multifibre elements of beam), the order POST_CHAMP allows to create another sd_resultat (resu2) who will contain the restriction of the fields on under-points on only one under-point.

4 Operands

4.1 Operand RESULT

♦ RESULTAT = resu

Name of a concept result of the type result.

4.2 Selection of the sequence numbers

Use of the keywords TOUT_ORDRE, NUME_ORDRE, INST,… is described in the document [U4.71.00].

4.3 Selection of the elements concerned

Thanks to the keywords TOUT=' OUI', and GROUP_MA, the user can select the elements on which calculations will take place.

Notice : if the user selects elements which are not elements of structure, those are ignored.

4.4 Keyword EXTR_COQUE

This keyword is used to extract a field on only one under-point for elements as hull.

4.4.1 Operand NOM_CHAM

The keyword NOM_CHAM allows to indicate the fields to be extracted in the result resu.
Are authorized:

SIGM_ELGA	SIGM_ELNO	SIEQ_ELGA	SIEQ_ELNO
EPSI_ELGA	EPSI_ELNO	EPEQ_ELGA	EPEQ_ELNO
SIEF_ELGA	SIEF_ELNO	VARI_ELGA	VARI_ELNO

4.4.2 Operand NUME_COU

♦ NUME_COU = nucou, [I]

Number of the layer containing the under-point to be extracted.

By convention, the layer 1 is the sub-base (in the direction of the normal) of the elements of hull.

4.4.3 Operand NIVE_COU

♦ NIVE_COUCHE =

For the layer nucou defined by NUME_COU, allows to specify the ordinate of the under-point:

'INF'	lower ordinate of the layer	(skin interns),
'SUP'	higher ordinate of the layer	(external skin),
'MOY'	average ordinate of the layer	(average layer).

4.5 Keyword EXTR_TUYAU

This keyword is used to extract a field on only one under-point for pipe sections.

4.5.1 Operand NOM_CHAM

The keyword NOM_CHAM allows to indicate the fields to be extracted in the result resu.
Are authorized: (see 4.4.1)

4.5.2 Operand NUME_COU

♦ NUME_COU = nucou, [I]

Number of the layer containing the under-point to be extracted.

By convention, the layer 1 is the internal layer of an element PIPE.

4.5.3 Operand NIVE_COU

♦ NIVE_COUCHE =

For the layer nucou defined by NUME_COU, allows to specify the ordinate of the under-point:

'INF'	lower ordinate of the layer	(skin interns),
'SUP'	higher ordinate of the layer	(external skin),
'MOY'	average ordinate of the layer	(average layer).

4.5.4 Operand ANGLE

♦ ANGLE = delta, [I]

delta : angle in degrees (whole value), counted starting from the position of the generator of the element pipe.

Notice : The under-points of the pipes are spaced regularly in the thickness of the pipe like in azimuth. When the user indicates an angle which does not correspond geometrically with a under-point (in azimuth), one carries out a linear interpolation between the 2 under-points which “frame” the specified angle.

4.6 Keyword EXTR_PMF

This keyword is used to extract a field on only one under-point for elements as multifibre beams.

4.6.1 Operand NOM_CHAM

The keyword NOM_CHAM allows to indicate the fields to be extracted in the result resu.
Are authorized: (see 4.4.1)

4.6.2 Operand NUME_FIBRE

♦ NUME_FIBRE = nufib, [I]

Number of fibre corresponding to the under-point to extract.

4.7 Keyword MIN_MAX_SP

This keyword is used to calculate the value “maximum” (or minimal) of a component of a field. The “max” being taken on the whole of the under-points.
If the inlet limit is for example a stress field ELGA on the under-points of a multi-layer hull, the field of exit will be a field ELGA (without under-points) containing for each point of Gauss the value “max” of the constraint.
Besides the value “max”, one extracts also information making it possible to locate the under-point having reached the “max”. At the end of the day, on each “point”, one calculates 6 components:

VALLEY	The value of the “max”
NUCOU	Number of the layer if the element is a multi-layer hull or a pipe
NUSECT	Number of the angular sector if the element is a pipe
NUFIBR	Number of fibre if the element is a multifibre beam
POSIC	“Position” in the layer: -1. : position “ INF ” 0. : position “ MOY ” +1. : position “ SUP ”
POSIS	“Position” in the sector: -1. : “beginning” of the sector (in the direction of the increasing azimuths) 0. : “medium” of the sector (in the direction of the increasing azimuths) +1. : “fine” of the sector (in the direction of the increasing azimuths)

4.7.1 Operand NOM_CHAM

Keywords NOM_CHAM allows to indicate the field to be extracted in the result resu.
Are authorized: (see 4.4.1)

4.7.2 OperandS NOM_CMP/NOM_VARI

◊ NOM_CMP = nocmp, [KN]

Name of the component which one wishes to calculate the “max”.

◊ NOM_ VARI = novari , [KN]

For the fields of the internal variables (VARI_*), one can give the name of the variable interns which one wishes to calculate the “max” (see [U4.51.11] for the rules of naming of the internal variables).

4.7.3 Operand TYPE_MAXI

This keyword is used to choose the “type” of sought maximum:

‘MAXIMUM’	One extracts the maximum value from the component by taking account of his sign
‘MINI’	One extracts the minimal value from the component by taking account of his sign
‘MAXI_ABS’	One extracts the maximum value from the absolute value of the component
‘MINI_ABS’	One extracts the minimal value from the absolute value of the component

4.7.4 Operand NUME_CHAM_RESU

♦ NUME_CHAM_RESU = nuch, [I]

The number nuch is used to name the produced field.

If for example, NOM_CHAM = 'SIEF_ELGA' and NUME_CHAM_RESU = 7, in strcture of data result produced, the field will be accessible by NOM_CHAM = 'UT07_ELGA'. It is the 7th field ELGA " UTilisator "in the structure of data.

Note: nuch is limited to 20.

4.8 Keyword COQU_EXCENT

This keyword is used to modify the "plan" of calculation of the efforts generalized in the offset plates.
The field found under the name NOM_CHAM in the sd_resultat of entry (resu) contains efforts calculated in the "plan" of the grid.
One takes account of the offsetting of the elements to modify the calculation of the moments (one calculates them in the average "plan" of the offset plate).

4.8.1 Operand NOM_CHAM

Keywords NOM_CHAM allows to indicate the field to be extracted in the result resu.
Are authorized: 'EFGE_ELNO' and 'EFGE_ELGA'.

4.8.2 Operand MODI_PLAN = 'YES'

This keyword is used to confirm that one wants to modify the "plan" of calculation for the efforts in the offset plates.

5 Examples

5.1 Extraction of the constraints on 1 under-point for pipe sections

```
U2 =  POST_CHAMP (RESULT = U1,
             TOUT_ORDRE = 'YES',
             ALL = 'YES',
             EXTR_TUYAU =_F (NOM_CHAM    = 'SIGM_ELGA',
                            NUME_COUCHE = 3,
                            NIVE_COUCHE = 'SUP',
                            ANGLE       = 90),);
```

5.2 Extraction of the constraint of Von-Put maximum (and minimum) for pipe sections

```
U2 =  POST_CHAMP (RESULT = U1, TOUT_ORDRE = 'YES', GROUP_MA = 'PIPE',
             MIN_MAX_SP = (
                    _F (NOM_CHAM = 'SIEQ_ELGA', NOM_CMP=' VMIS',
                      TYPE_MAXI = 'MAXIMUM', NUME_CHAM_RESU=1),
                    _F (NOM_CHAM = 'SIEQ_ELGA', NOM_CMP=' VMIS',
                      TYPE_MAXI = 'MINI', NUME_CHAM_RESU=2),
       ));
```