

## Operator POST\_CHAMP

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### 1 Goal

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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, [DEFECT]
  / 1.0E-6,
  | 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

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### 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

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### 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:

<code>SIGM_ELGA</code>	<code>SIGM_ELNO</code>	<code>SIEQ_ELGA</code>	<code>SIEQ_ELNO</code>
<code>EPSI_ELGA</code>	<code>EPSI_ELNO</code>	<code>EPEQ_ELGA</code>	<code>EPEQ_ELNO</code>
<code>SIEF_ELGA</code>	<code>SIEF_ELNO</code>	<code>VARI_ELGA</code>	<code>VARI_ELNO</code>

#### 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:

<code>`INF'</code>	lower ordinate of the layer	(skin interns),
<code>`SUP'</code>	higher ordinate of the layer	(external skin),
<code>`MOY'</code>	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:

<code>`INF'</code>	lower ordinate of the layer	(skin interns),
<code>`SUP'</code>	higher ordinate of the layer	(external skin),
<code>`MOY'</code>	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:

<code>VALLEY</code>	The value of the “max”
<code>NUCOU</code>	Number of the layer if the element is a multi-layer hull or a pipe
<code>NUSECT</code>	Number of the angular sector if the element is a pipe
<code>NUFIBR</code>	Number of fibre if the element is a multifibre beam
<code>POVIC</code>	“Position” in the layer: -1. : position “ <code>INF</code> ” 0. : position “ <code>MOY</code> ” +1. : position “ <code>SUP</code> ”
<code>POVIS</code>	“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:

<code>'MAXIMUM'</code>	One extracts the maximum value from the component by taking account of his sign
<code>'MINI'</code>	One extracts the minimal value from the component by taking account of his sign
<code>'MAXI_ABS'</code>	One extracts the maximum value from the absolute value of the component
<code>'MINI_ABS'</code>	One extracts the minimal value from the absolute value of the component

### 4.7.4 Operand `NUME_CHAM_RESU`

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◆ 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 structure 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

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### 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),  
                ));
```