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## Procedure POST\_ENDO\_FISS

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### 1 Goal

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The order `POST_ENDO_FISS` carry out a postprocessing on a result resulting from the mechanics of the continuous mediums. The goal is to find the curve which represents the crack starting from a field representative and the opening of crack. The field can be the damage or another scalar field. As starter, the order uses a concept `evol_noli` or `cham_gd`, containing the field post-to be treated. This one must be a field with the nodes. At exit, the order returns a grid of the crack (consisted elements `SEG2`), as well as a table containing the coordinates of the nodes of the crack and the value of the opening on each node. The procedure applies to studies 2D.

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## 2 Syntax

```
MAFISS [grid] = POST_ENDO_FISS

(
# OUTGOING CONCEPTS
  ◆ TABLE = CO ('table') [CO]
# CONCEPTS IN ENTRÉE
  ◆/CHAM_GD = changdr [cham_gd]
  / RESULT = resu [evol_noli]

  ◆ NOM_CHAM = nom_cham [KN]
  ◆ NOM_CMP = nom_cmp [KN]

  ◆/INST = inst [R]
  / NUME_ORDRE = nume_ordre [I]

  ◇ OPENING = / 'NOT' [DEFECT]
              / 'ORI'

# IF OPENING = 'NOT':
  ◆ RESEARCH = _F (
    ◇ / ALL = "YES" [DEFECT]
    / GROUP_MA = group_ma [grma] [R]
    ◆ LONG_ORTH = long_orth [R]
    ◆ LONG_REG = long_reg [R]
    ◆ NOT = not [R]
    ◇ BORNE_MIN = 0.5 [R]
              = threshold [DEFECT]
    ◇ NB_POINT = / 500 [DEFECT]
              / nb_points [I]
    ◇ ANGL_MAX = / 120. [DEFECT]
              / angle_max [R]
  ),

# IF OPENING = 'YES':
  ◆ RESEARCH = _F (
    ◇ / ALL = "YES" [DEFECT]
    / GROUP_MA = group_ma [grma] [R]
    ◆ LONG_ORTH = long_orth [R]
    ◆ LONG_REG = long_reg [R]
    ◆ NOT = not [R]
    ◇ BORNE_MIN = 0.5 [R]
              = threshold [DEFECT]
    ◆ BORNE_MAX = lfpz [R]
    ◇ NB_POINT = / 500 [DEFECT]
              / nb_points [I]
    ◇ ANGL_MAX = / 120. [DEFECT]
              / angle_max [R]
  ),
)
```

## 3 Operands

---

### 3.1 Operand TABLE

◆ TABLE = CO ('table')

This operand (obligatory) makes it possible to give the name of the outgoing concept of the order. table at exit contains information on the way of cracking and the opening of crack.

In the case that only the way is sought (option OUVERTURE=' NON '), the table has 4 columns, where for each node crack are displayed: the name of the crack of which it node fact part, its coordinate  $X$ , its coordinate  $Y$ , the value of the field post-treaty. If the opening of crack is also required (OUVERTURE=' OUI '), it will be indicated in the table in one 5th column.

### 3.2 Operands RESULT/CHAM\_GD

/ ◆ RESULT= evol\_noli  
◆ CHAM\_GD = cham\_gd

Name of the concept result containing the field post-to be treated (RESULT), or field of sizes (CHAM\_GD). It is obligatorily necessary to choose one of both of them. The field post-to be treated must be obligatorily a field with nodes.

### 3.3 Operands INST/NUME\_ORDRE

/ ◆ INST = inst  
◆ NUME\_ORDRE = nume\_ordre

These operands should be indicated only in the presence of the operand RESULT. They are used to select the moment post-to be treated. It is obligatorily necessary to choose one of both.

### 3.4 Operand NOM\_CHAM

◆ NOM\_CHAM = nom\_cham

This operand is obligatory. One gives the name of the field here post-to be treated and to which then the procedure of research of the ways of cracking is applied, for example VARI\_NOEU.

### 3.5 Operand NOM\_CMP

◆ NOM\_CMP = nom\_cmp

This operand is obligatory. It makes it possible to choose the component post-to be treated in the provided field, for example v1. Indeed, the procedure is applicable only to one scalar field.

### 3.6 Operand OPENING

◆ OPENING = /NON  
/OUI

Under this operand, one informs the type of operation carried out by the order. By default, one seeks only the way of cracking (OUVERTURE=' NOT'). If OUVERTURE=' YES', the opening of crack is also calculated.

### 3.7 Keyword RESEARCH

One informs here the parameters for the research of the crack and the corresponding openings. The call to this keyword is répétable to allow the research of the several cracks which are on groups of distinct meshes.

### 3.7.1 Operands ALL/GROUP\_MA

```
◇ / ALL          = "YES"          [DEFECT]
  / GROUP_MA     = group_ma
```

Under the operand `GROUP_MA`, one can inform the group of meshes on which to seek the way of cracking. If this operand is absent, research is carried out on all the geometrical field defined by the grid.

### 3.7.2 Operands LONG\_ORTH/LONG\_REG

```
◆ LONG_ORTH     = long_orth
◆ LONG_REG      = long_reg
```

Under the operand `LONG_ORTH`, one informs the length of the orthogonal profile to the direction of research, used by the procedure with each step of calculation. On this profile, one keeps the point where the value of the field (project and smoothed) is maximum, which gives the new point of the layout of crack. `LONG_ORTH` must normally be equal or higher than the damaged bandwidth. The projection of the field on this profile is smoothed by the means another length, `LONG_REG`, to prevent that the new point is on the edge of a finite element. For the good performance of the method, `LONG_REG` must be in the beach 0.5 with 2 time size of the meshes which are in the damaged band. Figure 3.7.2-a watch a diagram of the research of the way of cracking, one will look at the document [R7.02.17] for a more detailed explanation of the operation of the order.

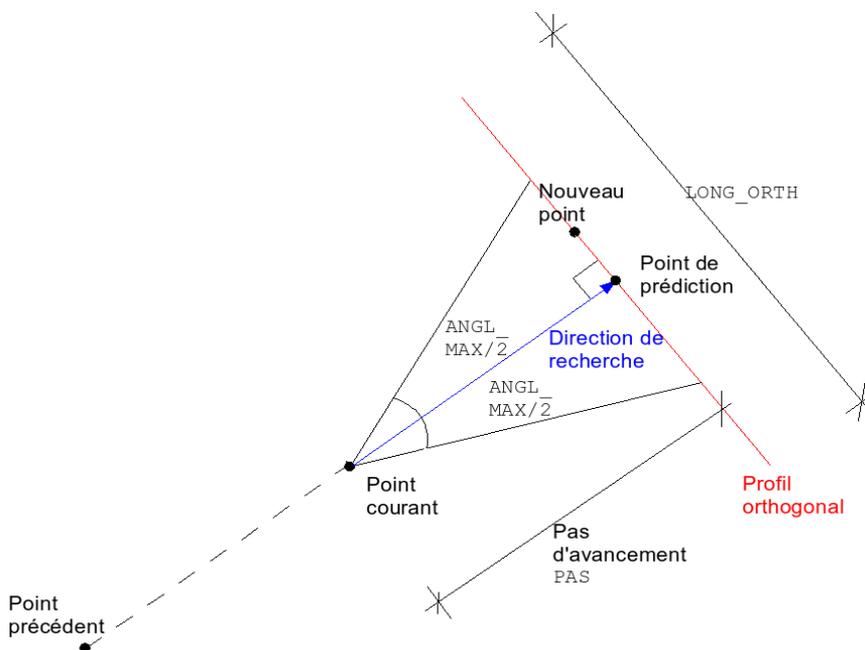


Figure 3.7.2-a : diagram of the research of the way of cracking.

### 3.7.3 Operand NOT

```
◆ NOT          = not
```

It is the step of advance of the procedure of research. There is not a value not advised, the procedure is rather robust compared to the choice of this parameter. On the other hand, if the step of advance is too large, one is likely not to detect the portions of the crack characterized by strong curves. A small

step (of about size of the size of the finite element) can be advised if one seeks to have many points to discretize the crack.

### 3.7.4 Operand BORNE\_MIN

◇ BORNE\_MIN = threshold

Value of the field in correspondence of which one stops the research of the way of the crack.

### 3.7.5 Operand BORNE\_MAX

◆ BORNE\_MAX = lfpz

This quantity defines the damaged bandwidth, on which the opening of crack is calculated. It is to be informed only with the option OUVERTURE=' OUI '.

### 3.7.6 Operand ANGL\_MAX

◇ ANGL\_MAX = / 120.  
/ angle\_max

Research on profil orthogonal can be restricted on a definite central piece by the means of an angle (in degrees) equal to angle\_max, symmetrical compared to the point of prediction (see Figure 3.7.2-a).

### 3.7.7 Operand NB\_POINTS

◇ NB\_POINT = nb\_points

This keyword makes it possible to dedéfinir the number of points on half of the orthogonal profile, which defines the precision on this one. By default, this parameter is equal to 500.

## 4 Example of use

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See the CAS-test zzzz264 (document [V1.01.264]).