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## Procedure POST\_ENDO\_FISS

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### 1 Drank

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command `POST_ENDO_FISS` carries out a postprocessing on result resulting from the mechanics of the continuums. The goal is to find the curve which represents crack from a field representative and the crack opening. The field can be the damage or another scalar field. As starter, the command uses a concept `evol_noli` or `cham_gd`, containing the field with post-treating. This one must be a field at nodes. In output, the command returns a mesh of crack (constituted by elements `SEG2`), as well as an array containing the coordinates of the nodes of crack and the value of the opening on each node. The procedure applies to studies 2D.

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## 2 Syntax

```
MAFISS [mesh] = POST_ENDO_FISS

(
# OUTGOING CONCEPTS
  ◆ ARRAY = CO ("array") [CO]
# CONCEPTS IN ENTRY
  ◆ /CHAM_GD = chamgdr [cham_gd]
  /RESULTAT = resu [evol_noli]

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

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

  ◇ OPENING = /"NON" [DEFAULT]
  /"OUI"

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

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

## 3 Operands

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### 3.1 Operand COUNTS

◆ ARRAY = CO ("array")

This operand (compulsory) makes it possible to give the name of the leaving concept of the command. The array in output contains information on the way of cracking and the crack opening.

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

### 3.2 Operands RESULTAT/CHAM\_GD

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

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

### 3.3 Operands INST/NUME\_ORDRE

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

These operands should be indicated only in the presence of operand RESULTAT. They are used to select time with post-treating. It is obligatorily necessary to choose one of both.

### 3.4 Operand NOM\_CHAM

◆ NOM\_CHAM= nom\_cham

This operand is compulsory. One gives here the name of the field to post-treating and to which then the procedure of search of the ways of cracking is applied, for example VARI\_NOEU.

### 3.5 Operand NOM\_CMP

◆ NOM\_CMP= nom\_cmp

This operand is compulsory. 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

◆ OUVERTURE= /NON  
/OUI

Under this operand, one informs the type of operation carried out by the command. By default, only the way of cracking (OUVERTURE=' NON ') is sought. If OUVERTURE=' OUI ', the opening of crack is also calculated.

### 3.7 Key word SEARCHES

One informs here the parameters for the search of crack and the corresponding openings. The call to this key word is répétable to allow the search of the several cracks which are on mesh groups distinct.

### 3.7.1 Operands TOUT/GROUP\_MA

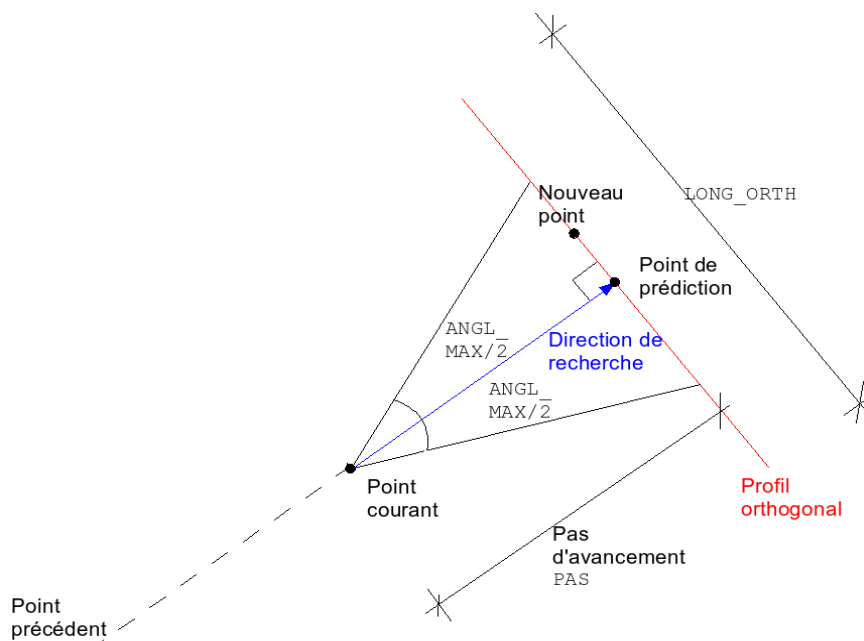
◇ /TOUT = "YES" [DEFAULT]  
/GROUP\_MA = group\_ma

Under operand GROUP\_MA, one can inform the mesh group about which to seek the way of cracking. If this operand is absent, the search is carried out on all the geometrical field defined by the mesh.

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

◆ LONG\_ORTH = long\_orth  
◆ LONG\_REG = long\_reg

Under operand LONG\_ORTH, one informs the length of the orthogonal profile to the direction of search, used by the procedure with each computation step. 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 crack layout. 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 correct operation of the method, LONG\_REG must be in the beach 0.5 with 2 times the size of meshes which are in the damaged tape. Appear 3.7.2-a watch a diagram of the search of the way of cracking, one will of the command look at the document [R7.02.17] for a more detailed explanation of operation.



Appear 3.7.2-a : diagram of the search of the way of cracking.

### 3.7.3 Operand NOT

◆ NOT = not

It is the step of advance of the procedure of search. 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 crack characterized by strong curvatures. 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 crack.

## 3.7.4 Operand BORNE\_MIN

◇ BORNE\_MIN = threshold

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

## 3.7.5 Operand BORNE\_MAX

◆ BORNE\_MAX = lfpz

This quantity defines the damaged bandwidth, on whom the crack opening is calculated. It is with being informed only with option OUVERTURE=' OUI '.

## 3.7.6 Operand ANGL\_MAX

◇ ANGL\_MAX = /120.  
/angle\_max

the search on the orthogonal profile can be restricted on a definite central piece by the means of an angle (in degrees) equal to `angle_max`, symmetric compared to the point of prediction (see Appear 3.7.2-a).

## 3.7.7 Operand NB\_POINTS

◇ NB\_POINT = nb\_points

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

## 4 Example use

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See the zzzz264 benchmark (document [V1.01.264]).