

## Operator POST\_MAIL\_XFEM

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### 1 Goal

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To create the grid fissured of a structure according to method X-FEM.

This operator produces a new grid by adding meshes in order to follow the place of the crack described by the level sets. One "nets" the crack thus. This grid will be used only with ends as visualization and does not have to be used for a calculation.

Product a concept of the type `maillage_sdaster`.

This concept is essential to the operator `POST_CHAM_XFEM` [U4.82.22].

## 2 Syntax

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```
ma2 [maillage_sdaster] _= POST_MAIL_XFEM (  
    ♦ MODEL          = Mo,                               [modele_sdaster]  
    ♦ PREF_NOEUD_X = / pref_nx,  
                  / 'NX'                               [DEFECT]  
    ♦ PREF_NOEUD_M = / pref_nm,  
                  / 'Nm'                               [DEFECT]  
    ♦ PREF_NOEUD_P = / pref_np,  
                  / 'NP'                               [DEFECT]  
    ♦ PREF_MAILLE_X= / pref_mx,  
                  / 'MX'                               [DEFECT]  
    ♦ PREF_GROUP_CO= / pref_mx,  
                  / 'NFISSU'                          [DEFECT]  
    ♦ TITLE          = title,                            [see U4.03.01]  
    ♦ INFORMATION    = 1,<                               [DEFECT]  
                    2
```

## 3 Operands

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### 3.1 Operand MODEL

- ◆ MODEL = Mo,

Name of model X-FEM generated by the order MODI\_MODELE\_XFEM .

### 3.2 Operands PREF\_NODE\_X, PREF\_NODE\_M, PREF\_NODE\_P, PREF\_MAILLE\_X, PREF\_GROUP\_CO

- ◆ PREF\_NOEUD\_X = pref\_nx,
- ◆ PREF\_NOEUD\_M = pref\_nm,
- ◆ PREF\_NOEUD\_P = pref\_np,
- ◆ PREF\_MAILLE\_X = pref\_mx,
- ◆ PREF\_GROUP\_CO = pref\_gc,

pref\_nx : prefix of the name of the new simple nodes (not located on the lips).

pref\_nm : prefix of the name of the new double nodes located on the lip "less".

pref\_np : prefix of the name of the new double nodes located on the lip "more".

pref\_mx : prefix of the name of the new meshes.

pref\_gc : name of the group created with the nodes located on the lip "less".

The names by default can cause errors if these names already exist in the initial grid (what can be the case with a grid coming from Salomé, because Salomé does not name the nodes *NI* , *N2* ...).

The group of nodes PREF\_GROUP\_CO is intended to be used for the postprocessing of the contact. It contains exactly the nodes on the side slave of the crack which will carry ddls of contact (after call to POST\_CHAM\_XFEM).

### 3.3 Remarks

- 1) The concept produced by this order is only reserved for the postprocessing of elements X-FEM. To in no case, it will not have to be used for calculation.
- 2) To allow the opening of the crack, the nodes tops of the initial grid pertaining to the crack were doubled and of new nodes of the plan of crack were added to carry out the under-cutting of meshes X-FEM.
- 3) GROUP\_MA groups of the healthy grid are preserved in the grid post-treaty:
  - if a mesh of one GROUP\_MA is classical, it is copied such as it is in GROUP\_MA grid post-treaty,
  - if a mesh of one GROUP\_MA is X-FEM, it is replaced by its subelements in GROUP\_MA grid post-treaty, provided the mesh is quite affected of a model.It may be thus that some GROUP\_MA disappear, if they contain only meshes without modeling.
- 4) To allow the visualization of the funds of cracks, of the nodes and the meshes are built in these points. The prefix of the built nodes is *NF* and that of the meshes is *MF* . The meshes are of the type POI1 in 2D and SEG2 in 3D.  
Groups of nodes and meshes are also built. groups of nodes are named *NF\_xx\_yy* where *xx* indicate *xx* ième crack and *yy* *yy* ième bottom. The groups of meshes are named *MF\_xx\_yy* or *xx* indicate *xx* ième crack and *yy* *yy* ième bottom.

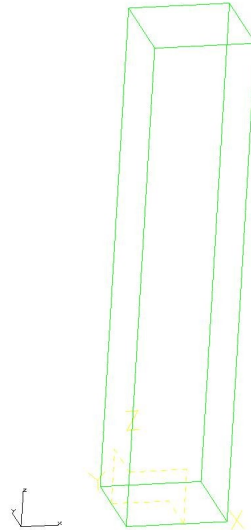
## 4 Example of use

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## 4.1 Bar fissured with X-FEM (treated by test SSNV173A)

### 4.1.1 Voluminal grid initial (not fissured)

Grid made up of only one nets of type HEXA8



### 4.1.2 Extract of the command file

```
BEGINNING ();

# Definition of the model
MODELEIN=AFFE_MODELE ( MAILLAGE=MAILLAG2,
                        AFFE=_F ( GROUP_MA=' VOL',
                                  PHENOMENE=' MECANIQUE',
                                  MODELISATION=' 3D',),),);

# Definition of the crack (planes)
LN=FORMULE (NOM_PARA= ('X', 'Y', 'Z'), VALE=' Z-12.5 ');
LT=FORMULE (NOM_PARA= ('X', 'Y', 'Z'), VALE=' X-10. ');

FISS=DEFI_FISS_XFEM ( MODELE=MODELEIN,
                      DEFI_FISS=_F ( FONC_LT=LT,
                                      FONC_LN=LN,),
                      GROUP_MA_ENRI=' VOL',);

# Taken into account of the crack in the model
MODELEK=MODI_MODELE_XFEM ( MODELE_IN=MODELEIN,
                           FISSURE=FISS,
                           INFO=2,);

# Design of the grid fissures
MA_XFEM=POST_MAIL_XFEM ( MODELE=MODELEK,);

END ();
```

## 4.1.3 Fissured grid

