

---

## Operator DEFI\_SQUELETTE

---

### 1 Goal

---

To define the grid of visualization of the results of a dynamic under-structuring.

In the case of the cyclic dynamic under-structuring, the grid is created by using whole or part of the meshes (grid of visualization) of the structure sector then by repeating it in a cyclic way to reconstitute the total structure.

In the case of the general dynamic under-structuring, the grid is created by using whole or part of the meshes (grid of visualization) of the various substructures then by associating them so as to reconstitute the total structure.

The meshes used (called meshes of visualization) are not necessarily support of a finite element. This makes it possible to use meshes of visualization of reduced number, different from the meshes of calculation, and representing coarsely the form of the structure (skeleton).

One can also create a skeleton starting from another skeleton which one will amalgamate certain nodes of the interfaces according to a criterion of proximity.

Restriction: The meshes of visualization must be defined starting from nodes supporting of the degrees of freedom of calculation (there is no interpolation of the results).

#### **Warning:**

**The use of the operand TOUT=' OUI ' can lead to big problems of performance. To always privilege the call by specifying the groups of meshes implied in the skeleton, particularly when the grids of under structures constitute only one small portion of the complete grid.**

This operator creates a structure of data of the type `skeleton`.

## 2 Syntax

---

```
skeleton [skeleton] = DEFI_SQUELETTE
```

### 1. cyclic Under-structuring

```
◆/CYCLIC = _F (◆/MODE_CYCL = mode_cycl [mode_cycl]
                / GRID = e-mail [grid]
                ◆ NB_SECTEUR = nb_sect [RN]
◆ SECTOR = _F ( ◆ / GROUP_MA = grma, [l_gr_maille]
                / ALL = 'YES',
                )
```

### 2. classical Under-structuring

```
◆/MODELE_GENE = mogene, [modele_gene]
◆ SOUS_STRUC = _F ( ◆ NAME = nom_sstruc, [KN]
                   ◆ / GROUP_MA= grma, [l_gr_maille]
                   / ALL = 'YES',
                   ),
◆ NOM_GROUP_MA = _F ( ◆ NAME = 'named', [KN]
                     ◆ SOUS_STRUC = nomsst, [KN]
                     ◆ GROUP_MA =grma, [l_gr_maille]
                     ),
```

### 3. Definition by an existing skeleton

```
◆ / SKELETON = skeleton, [skeleton]
◆ RECO_GLOBAL= _F (/ALL = 'YES', [defect]
                  / ◆ GROUP_NO_1 = grno1, [group_no]
                    ◆ SOUS_STRUC_1 = nom_sstru1, [KN]
                    ◆ GROUP_NO_2 = grno2, [group_no]
                    ◆ SOUS_STRUC_2 = nom_sstru2, [KN]
                    ◆ PRECISION =/prec, [R]
                    / 1.D-3, [defect]
                    ◆ CRITERION =/'RELATIVE',
                    / 'ABSOLUTE',
                    ◆ DIST_REFE = dist_refe, [R]
◆ NOM_GROUP_MA = _F ( ◆ NAME = 'named', [KN]
                     ◆ SOUS_STRUC = nomsst, [KN]
                     ◆ GROUP_MA = grma, [l_gr_maille]
                     )
```

# Code\_Aster

Version  
default

Titre : Opérateur DEFI\_SQUELETTE  
Responsable : CORUS Mathieu

Date : 06/12/2017 Page : 3/8  
Clé : U4.24.01 Révision :  
1e603961905a

```
◇ EXCLUSIVE =/'YES'  
              /'NOT' [defect]  
◇ TITLE = 'title' [KN]  
  
)
```

## 3 Operands

---

### 3.1 cyclic Under-structuring (CYCLIC keyword factor)

#### 3.1.1 Operand `MODE_CYCL`

- ◆ `MODE_CYCL = mocy`

Concept `mode_cycl` resulting from a calculation in cyclic under-structuring.

#### 3.1.2 Operand `MAILLAGE/NB_SECTEUR`

- ◆ `GRID = e-mail`

Concept `maillage_sdaster` used to define the skeleton. It is accompanied by the keyword `NB_SECTEUR`, entirety which gives the number of repetitions of this grid to obtain the complete structure of the skeleton.

#### 3.1.3 Keyword `SECTOR`

- ◆ `SECTOR`

Keyword factor for the creation of a skeleton starting from a result of the type `mode_cycl` product by `MODE_ITER_CYCL` [U4.52.05]. Allows to define on the basic sector the list of the meshes of visualization which will be repeated in a cyclic way.

##### 3.1.3.1 Operands `ALL / GROUP_MA`

- ◆ / `ALL`

All the meshes of the grid of the basic sector will be meshes of visualization.

- ◆ / `GROUP_MA = grma`

List of the groups of meshes of visualization of the basic sector.

### 3.2 classical Under-structuring

#### 3.2.1 Operand `MODELE_GENE`

- ◆ `MODELE_GENE = mogene`

Name of the concept `modele_gene` resulting from `DEFI_MODELE_GENE` [U4.65.02] defining the total structure on which one wishes to define the skeleton.

#### 3.2.2 Keyword `SOUS_STRUC`

- ◆ `SOUS_STRUC`

Keyword factor for the creation of a skeleton following a calculation by classical dynamic under-structuring.

Allows to define on each substructure of the model generalized the list of the meshes of visualization.

### 3.2.2.1 Operand **NAME**

◇ NAME = nom\_struct

Name of the substructure. It must be identical to the one of the names of the substructures defining the model generalized (see DEFI\_MODELE\_GENE [U4.65.02]).

### 3.2.2.2 Operands **ALL / GROUP\_MA**

◇ / ALL

All the meshes of the grid of the substructure will be meshes of visualization.

◇ / GROUP\_MA = grma

List of the groups of meshes of visualization of the substructure.

## 3.3 Keywords **SKELETON** and **RECO\_GLOBAL**

The keyword **SKELETON** an initial concept of standard skeleton defines where one will amalgamate the nodes of the interfaces by the keyword **RECO\_GLOBAL**, that is to say all these nodes (**ALL** = 'YES'), that is to say selectively a group of nodes **grno1** (operand **GROUP\_NO\_1**) substructure **nom\_sstru1** (operand **SOUS\_STRUC\_1**) with a group of nodes **grno2** (operand **GROUP\_NO\_2**) substructure **nom\_sstru2** (operand **SOUS\_STRUC\_2**).

These substructures must belong to the concept of the type **modele\_gene** informed by the operand **MODELE\_GENE**.

The skeleton modified by fusion will be the result of the operator **DEFI\_SQUELETTE**.

### 3.3.1 Operands **DIST\_REFE / CRITERION / PRECISION**

Fusion will be done according to a criterion of proximity is absolute (compared to **dist\_ref**) that is to say relative (compared to **dist\_ref\*prec**).

## 3.4 Keyword **NOM\_GROUP\_MA**

If one modifies an initial concept of standard skeleton (entered by the keyword **SKELETON**) by a fusion of the nodes of the interfaces (by means of the keyword **RECO\_GLOBAL**), one can then recover groups of meshes (entered by the operand **GROUP\_MA**) in the substructure **nomsst** (entry by the operand **SOUS\_STRUC**) in their naming new of group of meshes (operand **NAME**) in the skeleton result.

## 3.5 Keyword **EXCLUSIVE**

In the case of a calculation by classical under-structuring, only. While putting **EXCLUSIF=' OUI'**, one removes the groups of meshes resulting from the initial grids in the final skeleton.

## 4 Example

The command file which follows calculates, by two methods of under-structuring, the modes of inflection of a plate embedded in its center:

- cyclic method,
- classical method.

Then by the order `DEFI_SQUELETTE`, there is creation of a grid of visualization (grid **skeleton**). After having expressed the results in physical space, grid of visualization and results are versed in a file `RESULT` with format `IDEAS`.

## 4.1 Command file

```
#
# CALCULATION BY CYCLIC SOUS-STRUCTURATION
#
# CALCULATION OF THE CYCLIC CLEAN MODES
#
mod_cy = MODE_ITER_CYCL (BASE_MODAL= bamo,
                        NB_MODE = 5,      NB_SECTEUR = 4,
                        CONNECTION = _F (RIGHT = ' DROITE', LEFT = '
GAUCHE'),
                        CALCULATION = _F (TOUT_DIAM = ' OUI', NMAX_FREQ
= 2),
                        INFORMATION      = 1)
#
# CREATION OF THE GRID OF CALCULATION
#
squel1 = DEFI_SQUELETTE (MODE_CYCL= mod_cy,
                        SECTOR = _F (GROUP_MA= 'CALCULATION'))
#
# CREATION OF THE GRID OF VISUALIZATION
#
squel2 = DEFI_SQUELETTE (MODE_CYCL= mod_cy,
                        SECTOR = _F (GROUP_MA= 'VISUAL'))
#
# RESTITUTION OF THE RESULTS ON THE GRIDS SKELETONS
#
modg11 = REST_SOUS_STRUC (RESU_GENE= mod_cy, SQUELETTE= squel1)
modg12 = REST_SOUS_STRUC (RESU_GENE= mod_cy, SQUELETTE= squel2)
#
...
# CALCULATION BY CLASSICAL SOUS-STRUCTURATION
#
# CALCULATION OF THE MACRONUTRIENT
#
macele = MACR_ELEM_DYNA (BASE_MODAL= bamo)
#
# CALCULATION OF THE MODEL GENERALIZES
#
modege = DEFI_MODELE_GENE (
    SOUS_STRUC=_F (NOM=' CARRE1',
                  MACR_ELEM_DYNA= macele),
    SOUS_STRUC=_F (NOM=' CARRE2',
                  MACR_ELEM_DYNA= macele,
                  ANGL_NAUT= (90. , 0. , 0.)),
    SOUS_STRUC= (NOM=' CARRE3',
                  MACR_ELEM_DYNA= macele,
                  ANGL_NAUT= (180. , 0. , 0.)),
    SOUS_STRUC= (NOM=' CARRE4',
                  MACR_ELEM_DYNA= macele,
                  ANGL_NAUT= (270. , 0. , 0.)),
    LIAISON=_F (SOUS_STRUC_1=' CARRE1',
               SOUS_STRUC_2=' CARRE2',
```

```
                INTERFACE_1 = ' GAUCHE',
                INTERFACE_2 = ' DROITE'),
LIAISON=_F (SOUS_STRUC_1=' CARRE2',
            SOUS_STRUC_2=' CARRE3',
            INTERFACE_1 = ' GAUCHE',
            INTERFACE_2 = ' DROITE'),
LIAISON=_F (SOUS_STRUC_1=' CARRE3',
            SOUS_STRUC_2=' CARRE4',
            INTERFACE_1 = ' GAUCHE',
            INTERFACE_2 = ' DROITE'),
LIAISON=_F (SOUS_STRUC_1=' CARRE4',
            SOUS_STRUC_2=' CARRE1',
            INTERFACE_1 = ' GAUCHE',
            INTERFACE_2=' DROITE'))

#
...

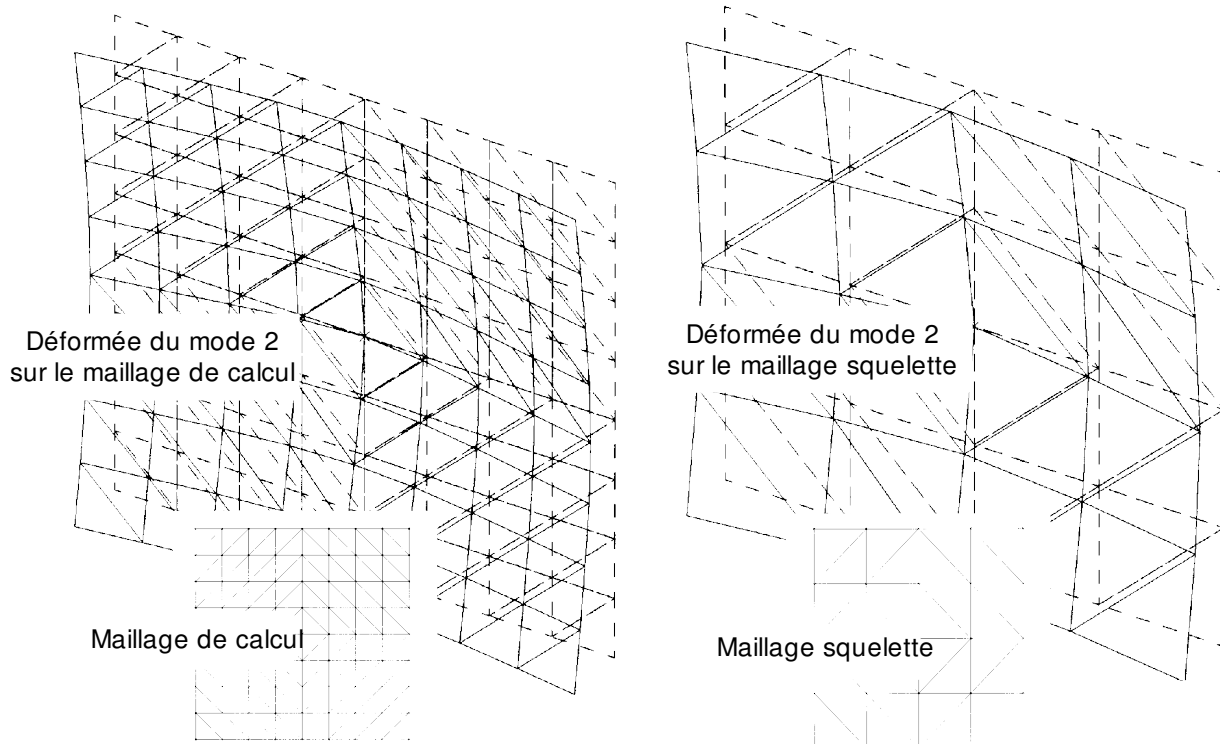
# CREATION OF THE GRID OF VISUALIZATION

squel      = DEFI_SQUELETTE (MODELE_GENE=MODEGE
                        SOUS_STRUC=_F (NAME = ' CARRE1',
                                        GROUP_MA= 'VISUAL'),
                        SOUS_STRUC=_F (NAME = ' CARRE2',
                                        GROUP_MA= 'VISUAL'),
                        SOUS_STRUC=_F (NAME = ' CARRE3',
                                        GROUP_MA= 'VISUAL'),
                        SOUS_STRUC=_F (NAME = ' CARRE4',
                                        GROUP_MA= 'VISUAL'))

#
# RESTITUTION OF THE RESULTS ON THE GRID SKELETON
#
modglo     = REST_SOUS_STRUC (RESU_GENE= resgen,
                            SQUELETTE= squel)

#
```

## 4.2 Graphic results



One presents the grids of calculation above and **skeleton** plate embedded with respectively the modal deformations of the second mode.