Operator DEFI_SQUELETTE

1 Drank

To define the mesh of visualization of the results of a dynamic substructuring.

In the case of the cyclic dynamic substructuring, the mesh is created by means of whole or part of meshes (mesh of visualization) of the structure sector then by repeating it in a cyclic way to reconstitute total structure.

In the case of the general dynamic substructuring, the mesh is created by means of whole or part of meshes (mesh of visualization) of various substructures then by associating them so as to reconstitute total structure.

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

One can also create a squelette from another squelette which one will some nodes amalgamate interfaces according to a criterion of proximity.

Restriction: Meshes of visualization must be defined from nodes supporting of the degrees of freedom of computation (there is no interpolation of the results).

Abstract:

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

This operator creates a data structure of type squelette.

2 Syntax

```
squelette [squelette] =DEFI_SQUELETTE
```

1. Cyclic substructuring

```
          ♦/CYCLIQUE = _F (♦/MODE_CYCL = mode_cycl           [mode_cycl]

                            /MAILLAGE = mail                  [mesh]

                          ♦ NB_SECTEUR = nb_sect                    [RN]

          ♦ SECTEUR = _F ( ◊ | NET = filed,                    [l_maille]
                           | GROUP_MA = grma,                [l_gr_maille]
                             TOUT = "OUI',
                         )
```

2. Classical substructuring

```
          ♦/MODELE_GENE = mogene,                           [modele_gene]

          ♦ SOUS_STRUC = _F ( ♦ NOM = nom_sstruc,
[kN]
                            ◊ /| NET  = filed,                [l_maille]
                              | GROUP_MA=grma   ,
[l_gr_maille]
                              /TOUT  = "OUI',
                          ),
          ♦ NOM_GROUP_MA = _F ( ♦ NOM = "named",
[kN]
                              ♦ SOUS_STRUC = nomsst,                [kN]
                              ♦ GROUP_MA =grma   ,
[l_gr_maille]
                            ),
```

3. Definition by an existing squelette

```
          ♦ /SQUELETTE = squelette,                         [squelette]

          ◊ RECO_GLOBAL= _F (/TOUT = "OUI',                    [default]
                            / ♦ GROUP_NO_1 = grno1,           [group_no]
                              ♦ SOUS_STRUC_1 = nom_sstru1,          [kN]

                              ♦ GROUP_NO_2 = grno2,           [group_no]
                              ♦ SOUS_STRUC_2 = nom_sstru2,          [kN]

                              ◊ accuracy =/prec,                  [R]
                                           /1.D-3,             [default]

                              ◊ CRITERE =/"RELATIF",          [default]
                                         /"ABSOLU",

                              ◊ DIST_REFE = dist_refe,              [R]

          ◊ NOM_GROUP_MA = _F ( ♦ NOM = "named",
[kN]
                              ♦ SOUS_STRUC = nomsst,                [KN]
```

```
                        ♦ GROUP_MA = grma,                    [l_gr_maille]
                              )
                ◊ EXCLUSIF =/"OUI'
                            /"NON"
                [default]
                ◊ TITER = "title                                      [kN]

                )
```

3 Operands

3.1 cyclic Substructuring (factor key word CYCLIQUE)

3.1.1 Operand MODE_CYCL

♦MODE_CYCL = mocy

Concept mode_cycl resulting from a computation in cyclic substructuring.

3.1.2 Operand MAILLAGE/NB_SECTEUR

♦MAILLAGE = mail

Concept maillage_sdaster used to define the squelette. It S" accompanies by the key word NB_SECTEUR, integer which gives the number of repetitions of this mesh to obtain complete structure of the squelette.

3.1.3 Key word SECTEUR

♦SECTEUR

Key word factor for the creation of a squelette from result of mode_cycl type produces by MODE_ITER_CYCL [U4.52.05]. Allows to define on the basic sector the list of meshes of visualization which will be repeated in a cyclic way.

3.1.3.1 Operands TOUT / MESH / GROUP_MA all

◊ /TOUT

meshes of the mesh of the basic sector will be meshes of visualization.

◊ / | NET = filed

List of meshes of visualization of the basic sector.

| GROUP_MA = grma

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

3.2 Classical substructuring

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 squelette.

3.2.2 Key word SOUS_STRUC

♦ SOUS_STRUC

Key word factor for the creation of a squelette following a computation by classical dynamic substructuring.

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

3.2.2.1 Operand NOM

◊ NOM = nom_struc

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

3.2.2.2 Operands TOUT / MESH / GROUP_MA all

◊ /TOUT

meshes of the mesh of the substructure will be meshes of visualization.

◊ / | NET = filed

List of meshes of visualization of the substructure.

| GROUP_MA = grma

List of the mesh groups of visualization of the substructure.

3.3 Key keys SQUELETTE and RECO_GLOBAL

key word SQUELETTE defines an initial concept of standard squelette where one will amalgamate the nodes of the interfaces by key word RECO_GLOBAL, either all these nodes (TOUT = "OUI'), or selectively a nodes group grno1 (operand GROUP_NO_1) of the substructure nom_sstru1 (operand SOUS_STRUC_1) with a nodes group grno2 (operand GROUP_NO_2) of the substructure nom_sstru2 (operand SOUS_STRUC_2).
These substructures must belong to the concept of the modele_gene type informed by operand MODELE_GENE.
The squelette modified by fusion will be result of operator DEFI_SQUELETTE.

3.3.1 Operands DIST_REFE / CRITERE / accuracy

fusion will be made according to a criterion of proximity either absolute (compared to dist_ref) or relative (compared to dist_ref*prec).

3.4 Key word NOM_GROUP_MA

If one modifies an initial concept of standard squelette (entered by key word SQUELETTE) by a fusion of the nodes of the interfaces (by means of key word RECO_GLOBAL), one can then recover mesh groups (entered by operand GROUP_MA) in substructure the nomsst (entered by operand SOUS_STRUC) in their naming new of mesh group (operand NOM) in the squelette result.

3.5 Key word EXCLUSIF

In the case of a computation per classical substructuring, only. By putting EXCLUSIF=' OUI', one removes the mesh groups resulting from the initial meshes in the final squelette.

4 Example

the command file which follows calculates, by two methods of substructuring, the modes of bending of a plate embedded in its center:

- cyclic method,
- classical method.

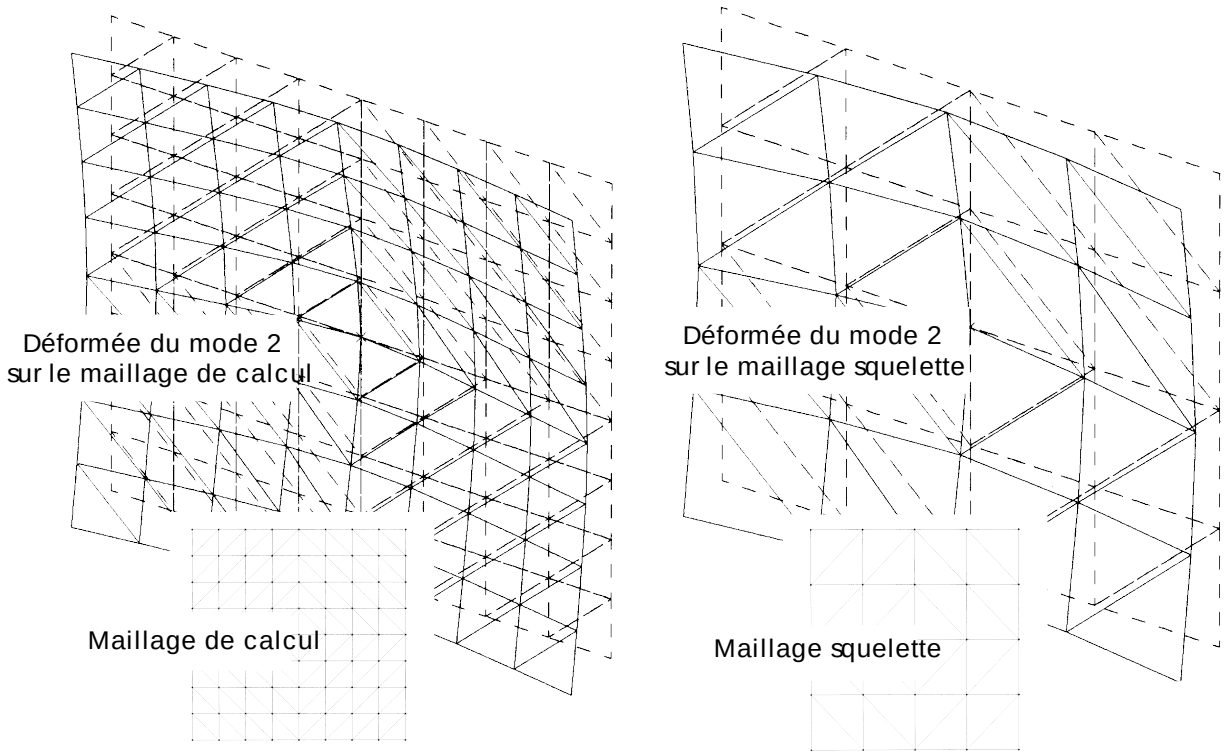
Then by the command DEFI_SQUELETTE, there is creation of a mesh of visualization (mesh **squelette**). After having expressed the results in physical space, mesh of visualization and results are versed in a results file with the format IDEAS.

4.1 Command file

```
#
#  CALCUL PAR SUBSTRUCTURING CYCLIQUE
#
#  CALCUL OF CYCLIC EIGEN MODES
#
mod_cy  = MODE_ITER_CYCL (BASE_MODALE= bamo,
                          NB_MODE = 5,     NB_SECTEUR = 4,
                          LIAISON = _F (RIGHT = ' DROITE', GAUCHE = '
GAUCHE'),
                          CALCUL  = _F (TOUT_DIAM  = ' OUI', NMAX_FREQ = 2),
                          INFO       = 1)
#
#  CREATION OF MAILLAGE OF CALCUL
#
squel1  = DEFI_SQUELETTE (MODE_CYCL= mod_cy,
                          SECTEUR  = _F (GROUP_MA= "CALCUL"))
#
#  CREATION OF MAILLAGE OF VISUALIZATION
#
squel2  = DEFI_SQUELETTE (MODE_CYCL= mod_cy,
                          SECTEUR  = _F (GROUP_MA= "VISUAL"))
#
#  RESTITUTION OF the RESULTS ON the MESHES SQUELETTES
#
modgl1  = REST_SOUS_STRUC (RESU_GENE= mod_cy, SQUELETTE= squel1)
modgl2  = REST_SOUS_STRUC (RESU_GENE= mod_cy, SQUELETTE= squel2)
#
...

#  CALCUL PAR SUBSTRUCTURING CLASSIQUE
#
#  CALCUL OF MACRO-ELEMENT
#
macele   = MACR_ELEM_DYNA (BASE_MODALE= bamo)
#
#  CALCUL OF Generalized model
#
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 MAILLAGE OF VISUALIZATION

squel    = DEFI_SQUELETTE (MODELE_GENE=MODEGE
                     SOUS_STRUC=_F (NOM = ' CARRE1',
                                    GROUP_MA= "VISUAL"),
                     SOUS_STRUC=_F (NOM = ' CARRE2',
                                    GROUP_MA= "VISUAL"),
                     SOUS_STRUC=_F (NOM = ' CARRE3',
                                    GROUP_MA= "VISUAL"),
                     SOUS_STRUC=_F (NOM = ' CARRE4',
                                    GROUP_MA= "VISUAL"))
#
#  RESTITUTION OF the RESULTS ON The mesh SQUELETTE
#
modglo   = REST_SOUS_STRUC (RESU_GENE= resgen,
                            SQUELETTE= squel)
#
```

4.2 Results graphic



One presents above the meshes of computation and **squelette** of the plate embedded with respectively the modal deformed shapes of the second mode.