Code_Aster

Titre : Opérateur CREA_ELEM_SSD
Responsable : ANDRIAMBOLOLONA Harinaivo

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Clé : U4.65.11 Révision :
190162116c10

Operator `CREA_ELEM_SSD`

1   Goal

This operator aims to facilitate the task of the user for the creation of a dynamic macronutrient. `CREA_ELEM_SSD` calculate the basic vectors of projection, defines the interfaces and creates the dynamic macronutrient.

It produces a concept of the type `macr_elem_dyna`.

The dynamic macronutrient creates is ready to be assembled with other dynamic macronutrient in order to obtain a generalized model. The creation of this generalized model can be made with the operator `ASSE_ELEM_SSD`.

This operator does not have the role to be able to create all the possible macronutrients. He makes it possible to create the real standard macronutrients which correspond in the majority of the cases. The basic vectors of these macronutrients are of type `CLASSIC` or many basic vectors of `RITZ` with modes of interface.

For particular bases of projection, the user is invited to manually create them using the standard operators.

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2 Syntax

```
macel [macr_elem_dyna] = CREA_ELEM_SSD (

    ♦ MODEL      = model,              [model]
    ◊ NUME_DDL   = naked,              [nume_ddl]
    ♦ CHAM_MATER = chmat,              [cham_mater]
    ◊ CARA_ELEM  = carele,             [cara_elem]

    ◊ LOAD    = chg,            /   [char_meca]
                                /   [char_ther]
                                /   [char_acou]

    ♦ INTERFACE  = _F (
        ♦ NAME = 'nintf',              [KN]
        ♦ TYPE =  / 'MNEAL',
                  / 'CRAIGB',
                  / 'CB_HARMO',
        / ◊ GROUP_NO = gnoeu,          [l_gr_noeud]
        / ◊ MASK = l_ddl,          [l_ddl]
        ◊ FREQ =  / 1.             [DEFECT]
                  / ifreq,         [R]
      ),

    ♦ BASE_MODALE= _F (
        ♦ TYPE =  / 'CLASSICAL',
                  / 'RITZ',
            So STANDARD == 'RITZ':
              ◊ TYPE_MODE =/ 'INTERFACE'       [DEFECT]
                           / 'STATIC'
                If TYPE_MODE == 'INTERFACE':
                  ◊ NMAX_MODE_INTF = / 10      [DEFECT]
                                     / nmint, [I]
      ),

    ◊  CALC_FREQ = F (
        ◊ STOP_ERREUR = / 'YES'       [DEFECT]
                        / 'NOT'
        ◊ OPTION =  / 'PLUS_PETITE'  [DEFECT]
                    / 'BAND'
                    / 'CENTER'
                    / 'WITHOUT'
    One chooses OPTION = 'WITHOUT' if one does not want to use
    normal modes.
    If not, to see keyword factor CALC_FREQ of CALC_MODES
       [U4.52.02] for the options of calculation of normal modes.
      ),

    ◊ SOLVEUR    = _F (see U4.50.01)
    ◊ INFORMATION   =/1,          [DEFECT]
            / 2,
  ),
```

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3   Course of calculation

This operator allows to easily create a real dynamic macronutrient (without damping) by informing only the mechanical characteristics of the model and the interfaces associated with the substructure.

It connects the following operations:
• creation of the matrices of rigidity and mass of the substructure,
• calculation of the normal modes of the substructure,
• definition of the interfaces associated with the substructure,
• calculation of the static modes or the modes of interface,
• definition of the base of projection,
• calculation of the dynamic macronutrient.

For his implementation, the user can take as a starting point the modelings "E" and "F" of the case test SDLD106. These modelings correspond respectively to modelings "B" and "D" of the same case test.

3.1   Operand MODEL

♦ MODEL = model

model : the model which contains the elements constituting the substructure.

3.2   Operand NUME_DDL

◊ NUME_DDL = naked

naked : classification of the degrees of freedom assigned to the substructure.

Note:

> *This classification is necessary if one wants to calculate the answer of the assembled structure due to a loading applied to the substructure for example. One needs classification in order to be able to assemble the elementary vector according to the classification of the degrees of freedom of the substructure.*
> *One writes then: NUME_DDL = CO ('digital'), where digital indicate the classification which one wishes given to the degrees of freedom of the substructure.*

3.3   Operand CHAM_MATER

♦ CHAM_MATER = chmat

chmat : name of the material field where the characteristics of materials are defined.

3.4   Operand CARA_ELEM

◊ CARA_ELEM = carele

carele : elementary characteristics of the elements of beam, hull or of the discrete elements if the substructure contains some.

3.5   Operand LOAD

◊ LOAD = chg

chg : loading applied to the substructure.

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3.6 Keyword INTERFACE

The keyword factor INTERFACE allows to define the interfaces associated with the substructure. The keywords associated with this keyword factor are identical to the keyword factor INTERFACE of the operator DEFI_INTERF_DYNA [U4.64.01]. One seizes also here the value of the frequency used for the calculation of the harmonic constrained modes. The value by default, for this frequency is equal to 1.

The rule of overload is observed. If the value of the frequency differs between the various interfaces then one informs the user using an alarm which specifies the value of the frequency actually taken into account.

3.7 Keyword BASE_MODALE

The keyword factor BASE_MODALE allows to specify the basic type on which the substructure is projected.

3.7.1 Operand TYPE

This operand defines the type of the base of projection.

♦ STANDARD = / 'CLASSICAL'
          / 'RITZ'

A base of the type CLASSIC consists of normal modes and constrained modes or modes of fastener according to the type of the interface. The calculation of the normal modes is done according to the indications provided in the keyword factor CALC_FREQ.

3.7.2 Operand TYPE_MODE

◊ TYPE_MODE =/ 'INTERFACE'   [DEFECT]
             / 'STATIC'

The option TYPE = 'RITZ' allows to specify the type of modes to be added to the normal modes. The user can choose modes of the type STATICS (static statements with the degrees of freedom of the nodes of interface) or of type INTERFACE (modes of interface). For the typical case where one does not wish to use normal modes, one chooses OPTION = 'WITHOUT' in the keyword CALC_FREQ.

3.7.3 Operand NMAX_MODE_INTF

◊ NMAX_MODE_INTF = / 10   [DEFECT]
                   / nmintf

NMAX_MODE_INTF corresponds to the number of modes of interface to take into account. They here are considered nmintf first modes of interface (nmintf > 0).

3.8 Keyword CALC_FREQ

This keyword factor makes it possible to choose the frequential contents of the normal modes. The operands associated with this keyword factor are identical to those defined for CALC_MODES [U4.52.02]. A characteristic for the option BAND, the operand **FREQ** allows to seize a list of frequency and one carries out modal calculations on the various intervals of the list.
One chooses OPTION = 'WITHOUT' if one does not wish to calculate normal modes.

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The keyword STOP_ERREUR allows to indicate to the operator if it must stop ('YES') or to continue ('NOT') if one of the criteria of quality control of the calculated modes is not checked. This keyword is equivalent to the keyword STOP_ERREUR keyword factor VERI_MODE of CALC_MODES.

Note:

> *In order to not overload the order, this keyword factor does not make it possible to seize the parameters COEF_DIM_ESPACE, NMAX_ITER_SHIFT, PREC_SHIFT, SEUIL_FREQ and STOP FREQ_VIDE. On the other hand, the user can seize the dimension of the subspace (DIM_SOUS_ESPACE) where necessary. The values chosen for the calculation of the normal modes are the values by default of these parameters in CALC_MODES.*

3.9 Keyword SOLVEUR

Optional keyword, to see [U4.50.01].

3.10 Operand INFORMATION

This operand makes it possible more or less to print information on the macronutrient creates in the file 'MESSAGE'.

4 Example of use

This example is extracted from the case SDLS106e test.

```
MACEL1 = CREA_ELEM_SSD (
                MODEL = MODELE1,
                LOAD = CHARGE_1,
                CHAM_MATER = CHAMAT1,
                CARA_ELEM = PARAM1,
                INTERFACE = _F (NAME = 'LEFT',
                                TYPE = 'CRAIGB',
                                GROUP_NO = 'LEFT',
                                MASK = ('DX', 'DY'),),
                BASE_MODALE = _F (STANDARD = 'RITZ',
                                NMAX_MODE_INTF = 20,),
                CALC_FREQ = _F (NMAX_FREQ = 6,),
                )
```