

Operator CALC_VECT_ELEM

1 Goal

To calculate a set of elementary vectors which one will be able to assemble with ASSE_VECTEUR.

The possible options of calculation are:

`'CHAR_MECA'` , `'CHAR_THER'` , `'CHAR_ACOU'`.

Product a structure of data of the type `vect_elem_*`.

2 Syntax

```

vel [vect_elem_*]      = CALC_VECT_ELEM

( ♦ / OPTION = 'CHAR_MECA',

    ♦ | ◇ CHAM_MATER = chmat ,           [cham_mater]
      ◇ CARA_ELEM = caract ,           [cara_elem]
      ♦ LOAD = lchar ,                 [l_char_meca]
      ◇ INST = / tps ,                 [R]
      / 0.0 ,                          [DEFECT]
      ◇ MODE_FOURIER = / nh ,          [I]
      / 0 ,                             [DEFECT]

    # case of a model containing of
    # under - structures:

    | ♦ MODEL = Mo ,                   [model]
      ♦ SOUS_STRUC = _F (
        ♦ CAS_CHARGE = nocas ,         [K8]
        ♦ / ALL = 'YES' ,
        / SUPER_MAILLE = lmail ,      [l_maille] )

  / ♦ OPTION = 'CHAR_THER' ,
    ◇ CARA_ELEM = caract ,             [cara_elem]
    ♦ LOAD = lchar ,                   [l_char_ther]

  / ♦ OPTION = 'CHAR_ACOU' ,
    ♦ CHAM_MATER = chmat ,             [cham_mater]
    ♦ LOAD = lchar ,                   [l_char_acou]

)

If OPTION 'CHAR_THER' then [*] □ TEMP_R
          'CHAR_MECA' DEPL_R
          'CHAR_ACOU' PRES_R

```

3 General information

This order is used to calculate a set of elementary vectors (correspondent with a selected option). The concept created of type `vect_elem_*` could be then assembled by the operator `ASSE_VECTEUR` [U4.42.03] to give a second member of the type `cham_no`.

The options available are:

<code>`CHAR_MECA'</code>	to obtain the second member of a mechanical problem,
<code>`CHAR_THER'</code>	to obtain the second member of a thermal problem,
<code>`CHAR_ACOU'</code>	to obtain the second member of an acoustic problem,

4 Operands

4.1 Operand `LOAD`

◆ `LOAD = lchar`

The list of the loads `lchar` must be coherent with the selected option:

- “mechanical” loads for the option ``CHAR_MECA'`,
- “thermal” loads for the option ``CHAR_THER'`,
- “acoustic” loads for the option ``CHAR_ACOU'`.

This argument is obligatory.

It gives access all the data concerning the “loading” of the system. It is necessary that all the loads of the list are based on the same model.

4.2 Operand INST

◇ INST = tps

The parameter tps (moment of calculation) is used as soon as the loading depends on time. In particular when there exists a loading of dilation (AFFE_MATERIAU/AFFE_VARC/TEMP).

4.3 Operand CHAM_MATER

◇ CHAM_MATER

Name of the material field where the material characteristics of the elements are defined. This argument is necessary into thermomechanical for the loadings gravity, rotation, dilation and in acoustics.

4.4 Operand CARA_ELEM

◇ CARA_ELEM = carac

This concept of the type cara_elem is necessary if there exists in the model of the elements of structure (beam, plate, hull or of the discrete elements).

4.5 Operand MODE_FOURIER

◇ MODE_FOURIER = nh

Positive or null entirety indicating the harmonic of FOURIER on whom one calculates the elementary vector for an axisymmetric model 2D. By default, nh = 0.

nh intervenes only for one loading where there exists thermal dilation.

4.6 Operands necessary to calculations with static under-structuring

- ◆ MODEL = Mo

This keyword is obligatory to find the substructures affected by the loading: Mo is the name of the model which carries the substructures.

- ◆ SOUS_STRUC

This keyword factor makes it possible to specify which are the loadings to be used for under - structures. In its absence, the loadings on under structures are worthless.

These loadings are added to the loadings "finite elements" which can be applied to the rest of the model.

- ◆ CAS_CHARGE = nocas

nocas is the name of the loading case to be used. See operator MACR_ELEM_STAT [U4.62.01].

- ◆ / ALL = 'YES'

This keyword makes it possible to affect the loading nocas with all under structures of the model.

- ◆ / SUPER_MAILLE = l_mail

This keyword factor makes it possible not to affect the loading nocas that with some under - structures.

5 Examples

- Mechanical loading at the moment T = 12. of a structure affected by a thermal evolution:

```
vel = CALC_VECT_ELEM (OPTION = 'CHAR_MECA',  
                     CHAM_MATER = chmat, LOAD = ch_force, INST = 12. ,)
```

- Calculation of the second member for a problem of linear thermics stationary:

```
vel = CALC_VECT_ELEM (OPTION = 'CHAR_THER', LOAD = ch_ther)
```

- Calculation of the mechanical loading of a structure containing of the static substructures:

```
vel = CALC_VECT_ELEM (OPTION = 'CHAR_MECA',  
                     LOAD = ch_meca,  
                     MODEL = Mo, SOUS_STRUC= _F (CAS_CHARGE = 'ch_f1', TOUT= 'YES'))
```