

## Operator CALC\_VECT\_ELEM

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### 1 Goal

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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 = carac , [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 = carac , [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

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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

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### 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.

## 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 in mechanics for the loadings gravity and rotation and in acoustics.

Notice : in mechanics loadings of type dilation induced by the variables of order (or any other effect of the variables of order) are not calculated by this operator. The operator should be used CALCULATION for that.

## 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.

## 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

- 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'))
```