Operator CALC_CHAM_ELEM

1 Goal

To calculate an elementary field at the points of Gauss containing the coordinates and the weight of the points of Gauss.

To calculate an elementary field of heat flux and acoustic pressure, starting from already calculated fields of type cham_no_*.

To put at the format of a field to the nodes by elements the values of certain parameters material and certain characteristics of beam.

2 Syntax

```
chamel    [cham_elem_*] = CALC_CHAM_ELEM
      (  ♦  MODEL     =  Mo,                          [model]
         ◊  CARA_ELEM    =  carac  ,                     [cara_elem]
         ◊  INST         =  /  inst,                     [R]
                            /  0. ,                        [DEFECT]

            #  Selection of the meshs concerned with calculation
            ◊  /  ALL=  'YES',                          [DEFECT]
               /  GROUP_MA = l_grma,                    [l_gr_maille]


            #  thermal options:

            /  OPTION =  /  'FLUX_ELNO',
                         /  'FLUX_ELGA',
               ♦  TEMP = temp,                          [cham_no_TEMP_R]
               ♦  CHAM_MATER   =  chmater,              [cham_mater]
               ◊  MODE_FOURIER =  /  nh,                [I]
                                  /  0,                 [DEFECT]

            #  acoustic options:

            /  OPTION =  /  'PRAC_ELNO',
               ♦  CLOSE = near,                         [cham_no_PRAC_R]

            #  calculation of the coordinates and the weights of the points
      of Gauss

            /  OPTION=   'COOR_ELGA',

            #  working of data materials and characteristics of beam for
      POST_ROCHE

            /  OPTION=   'ROCH_ELNO',
            );
```

type of produced field: [cham_elem_*] with:

If OPTION: then [*] - >

```
#  thermal options:

            FLUX_ELGA                                 FLUX_R
            FLUX_ELNO                                 FLUX_R

#  acoustic options:

            PRAC_ELNO                                 PRAC_R

#  other options

            COOR_ELGA                                 GEOM_R
            ROCH_ELNO                                 ROCH_R
```

3 Operands

3.1 Operands MODEL / CARA_ELEM / CHAM_MATER

♦ MODEL = Mo,

Name of the model on which the option is calculated.

◊ CARA_ELEM = carac,

Elementary characteristics associated with the model Mo, if it contains elements of structure or if the isoparametric elements are affected of a local reference mark of anisotropy.

Only for the option ROCH_ELNO :

♦ CHAM_MATER = chmat,

Material field. Must contain givenES rubber bands and the material POST_ROCHE.

3.1 Selection of the meshs concerned with calculation

Keywords ALL = 'YES' and GROUP_MA allow the user to choose the meshs on which it wishes to do his elementary calculations of postprocessing.

/ ALL = 'YES'

All the meshs (carrying finite elements) will be treated. It is the value by default.

/ GROUP_MA = l_grma

Only meshs included in l_grma will be treated.

3.2 Operand INST

◊ INST

Value of the moment allowing to evaluate possible functions in the parameters materials for the calculation of the heat flux.

3.3 Thermal options

The options of elementary calculation in thermics can be calculated starting from a field of temperature:

♦ TEMP = temp

For these calculations one needs the material field associated with the model Mo :

♦ CHAM_MATER = chmater,

The options available are:

| 'FLUX_ELGA',
| 'FLUX_ELNO',
Their significance is given in [U4.81.04].

In the case of modelings AXIS_FOURIER and PLAN_FOURIER, one can specify the number of harmonic by the keyword : MODE_FOURIER.

3.4 Acoustic options

The options of elementary calculation in acoustics can be calculated starting from a complex field of pressure:

♦ CLOSE = near

The option available is:

| 'PRAC_ELNO'

Calculation of the real and imaginary parts of the field of pressure by element to the nodes.

3.5 Option COOR_ELGA

Calculation of the coordinates and the weights of the points of Gauss of each element.

3.6 Option ROCH_ELNO

This option puts in the form of a field at the nodes by element the values of certain parameters material and certain characteristics of beam. The field of exit comprises 10 components described in the following table:

Components	Correspondence
E	Young modulus
K_FACT	Parameter FACTOR of POST_ROCHE
N_EXPO	Parameter EXHIBITOR of POST_ROCHE
With	Surface of the section of beam (circular)
I	Inertia of the section of beam (circular)
R	Ray external of the section of beam (circular)
EP	Thickness of the pipe
I2	Value of inertia to the other nodes of the same mesh
R2	Value of the ray to the other nodes of the same mesh
EP2	Value thickness to the other nodes of the same mesh

This option is used for the specific needs of the macro-order POST_ROCHE.
Attention, the parameter E does not have to be a function.

4 Examples of calculations with CALC_CHAM_ELEM

4.1 Flow with the nodes starting from the field of temperature temp as an axisymmetric FOURIER mode 1

```
epsno = CALC_CHAM_ELEM

          (  MODEL =   moaxfour,     TEMP = temp,
             CHAM_MATER=  chmater,
             OPTION =  'FLUX_ELNO', MODE_FOURIER = 1,
          );
```