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## Operator CALC\_CHAM\_FLUI

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### 1 Goal

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To calculate fields of fluid potential associated with the theory of the added mass [R4.07.03], The fields are induced by a fluid true, incompressible, at rest or in potential flow, on a structure in 3D.

The terms of these fields are calculated on the basis of modal structure in the vacuum.

The calculation of the terms of the matrices is carried out by resolution of the equations of LAPLACE within the framework of one **thermal analogy**. The calculated temperature plays the part of a pressure in the fluid field. Care thus should be taken to define fluid material by characteristics **thermics**, and to affect a model **thermics** with the part of the grid which represents the fluid.

Thanks to this operator, one can determine for example, the pressure created by the fluid on the structure vibrating according to one of his own modes.

The test FDLV114b propose an example of implementation on a cylindrical case of tank.

Product a structure of data of the type `evol_ther`.

## 2 Syntax

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```
Chamflui = CALC_CHAM_FLUI (
    ♦ RIGI_THER = rther [matr_asse_temp_r],
    ♦ EXCIT = _F (
        ♦ LOAD = CH [char_ther,
                    char_cine_ther],
        ♦ FONC_MULT = fmult [function,
                             tablecloth,
                             formula],
    ),
    ♦ POTENTIAL = / 'DEPL',
                  / 'QUICKLY',
                  / 'CLOSE' [DEFECT],
    ♦ DIST_REFE = 1.E-2 [DEFECT],
    ♦ MODE_MECA = modes [mode_meca],
    ♦ COEF_MULT = 1.0 [DEFECT],
)
```

## 3 Operands

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### 3.1 Operand RIGI\_THER

◆ RIGI\_THER = rigi\_ther

Thermal matrix of stiffness corresponding to the potential of the fluid. It is built while associating with  $\rho c_p$  affected material with the fluid model density of the fluid.

### 3.2 Key word factor EXCIT

#### 3.2.1 Operand LOAD

◆ LOAD = CH

Thermal loading corresponding to the boundary conditions on the fluid  
For example in the event of calculation of the type POTENTIAL = "NEAR":  
TEMP\_IMPO (TEMP=0.0) corresponds to a worthless pressure on this surface.

#### 3.2.2 Operand FONCT\_MULT

◆ FONC\_MULT = fmult

Function or multiplicative formula modulating the loading

### 3.3 Operand POTENTIAL

◆ POTENTIAL = / 'DEPL',  
/ 'QUICKLY',  
/ 'CLOSE' [DEFECT],

Choice of the type of desired potential.

### 3.4 Operand DIST\_REFE

◇ DIST\_REFE = 1.E-2 [DEFECT],

Distance from reference to be informed when one does a calculation dsur a generalized model. This distance is a geometrical absolute criterion intended to recopy values of structural displacements in a thermal fluid model, in order to solve there the equation of Laplace of the field of non stationary pressure. By default, it is equal to  $10^{-2}$  Mr.

### 3.5 Operand MODE\_MECA

◆ MODE\_MECA = mode

Modes on which one calculates the fluid potential

#### 3.5.1 Operand COEF\_MULT

◆ COEF\_MULT = 1.0 [DEFECT],

Real coefficient allowing, possibly, to put on the scale the potential result