Operator CALC_MODE_ROTATION

1 Goal

To calculate the modes and the frequencies of the system following according to the number of revolutions,

$$M\ddot{\delta}+(C+\Omega G)\dot{\delta}+K\delta=0$$

Where M is the matrix of mass of the system, C is a matrix of damping, G is the matrix of gyroscopy (antisymmetric), and K is the matrix of stiffness of the system. Ω represent the number of revolutions.

The data necessary for this macro are:

1) matrices: K, C, G and M
2) A list number of revolutions

This operator returns a list of concept mode_meca_c : a concept for each number of revolutions. She calls on the order CALC_MODES.

2 Syntax

```
CALC_MODE_ROTATION  (

# Matrix of rigidity
                    ♦  MATR_RIGI =   K                    [matr_asse_depl_r]

# Matrix masses
                    ♦  MATR_MASS=    M                    [matr_asse_depl_r]

# Matrix damping
                    ♦  MATR_AMOR =   C                    [matr_asse_depl_r]

# Gyroscopic matrix
                    ♦  MATR_GYRO =   G                    [matr_asse_depl_r]

# List number of revolutions
                    ♦  VITE_ROTA =   List                 [R]

# Choice of the method
                    ♦  METHOD =   /   'QZ'              [DEFECT]
                                  /   'SORENSEN'

# Type of modal calculation
                    ◊  CALC_FREQ =   _F  (
                       ◊  OPTION    =   /   'CENTER'
                                        /   'PLUS_PETITE' [DEFECT]
                       ◊  NMAX_FREQ =   nbF               [I]
                       ◊  SEUIL_FREQ=   /1.E-2            [DEFECT]
                                        /f_seuil          [R]
                                        )
# For final checks
                    ◊  VERI_MODE =   _F  (
                       ◊  STOP_ERREUR  =   /   'YES'      [DEFECT]
                                           /   'NOT'
                       ◊  THRESHOLD        =   /  1.E-6     [DEFECT]
                                           /   R          [R]
                       ◊  PREC_SHIFT   =   /   0.05       [DEFECT]
                                           /   prs        [R]
                       ◊  STURM  =         /   'YES'      [DEFECT]
                                           /   'NOT'
                    );
```

3 Operands

3.1 Operands MATR_RIGI/MATR_MASS/ MATR_AMOR/MATR_GYRO/INFORMATION/METHOD/OPTION

They have the same meaning as in the order CALC_MODES [U4.52.02].

Note:
Because of presence of the matrices of damping and gyroscopy, only methods QZ *and* SORENSEN *are usable*.

3.2 Keyword CALC_FREQ

Play the same part as in the order CALC_MODES [U4.52.02], has the same internal keywords with the same values by default.

Note:
The number of modes nbF *is the same one for all the number of revolutions.*

3.3 Operand VITE_ROTA

List number of revolutions Ω in rad/s.

3.4 Operand Keyword VERI_MODE

The internal operands have the same meaning as in of the same keyword name of order CALC_MODES [U4.52.02].

4 Example

Calculation of the first 5 modes in rotation by using the method QZ:

```
Lmod=CALC_MODE_ROTATIONR (MATR_RIGI = RIGIDITY,
                          MATR_MASS  = MASS,
                          MATR_AMOR=AMOR,
                          MATR_GYRO   =GYASS,
                          VITE_ROTA=L_VITROT,
                          METHOD  = 'QZ',
                          CALC_FREQ=_F (OPTION=' PLUS_PETITE', NMAX_FREQ=5),
                          VERI_MODE=_F (STOP_ERREUR=' NON'));
```

CALC_MODE_ROTATION return a table (table_contenor) containing the modal bases calculated for each number of revolutions.

mode_meca_c product are named as follows: mod_0,… mod_i. .mod_nbV, i is the index number of revolutions in VITE_ROTA .