# Operator CALC_MODE_ROTATION

## 1 and the

Drank Compute the modes frequencies of the system following according to rotational speeds,

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

Where $M$ is the mass matrix of the system, $C(\Omega)$ is an asymmetric matrix, function rotational speed $\Omega$, including the gyroscopic effect (skew-symmetric) represented by the matrix $G$, and the characteristic of damping of the bearings represented by the matrix $C$, and $K$ is the stiffness matrix of the system.

The data necessary for this macro are:

1) matrixes: $K$, $C$, $G$ and $M$
2) a list rotational speed

This operator returns a list of concept mode_meca_c, a concept for each rotational speed. She calls on command MODE_ITER_SIMULT.

# 2 Syntax

```
CALC_MODE_ROTATION   (

# Stiffness matrix
                     ♦MATR_RIGI=K
[matr_asse_depl_r]

# Mass matrix
                     ♦MATR_MASS=M                          [matr_asse_depl_r]

# Stamps damping
                     ♦MATR_AMOR=C
[matr_asse_depl_r]

# Stamps gyroscopic
                     ♦MATR_GYRO=G
[matr_asse_depl_r]

# Lists rotational speeds
                     ♦VITE_ROTA=List                          [R]

# Choice of method
                     ♦METHODE=/              "QZ"             [DEFAULT]
                              /   "SORENSEN"

# modal Type of computation
                     ◊CALC_FREQ=_F            (
                        ◊OPTION=/            "CENTER"
                                 /   "TAPE"
                                 /   "PLUS_PETITE"     [DEFAULT]
                        ◊NMAX_FRAQ=nbF                        [R]
                                   )
# For final checks
                     ◊VERI_MODE=_F            (
                        ◊STOP_ERREUR=/             "OUI'      [DEFAULT]
                                     /   "NON"
                        ◊SEUIL=/1.E-6                         [DEFAULT]
                                     /r             [R]
                        ◊PREC_SHIFT=/0.05                     [DEFAULT]
                                     /prs                     [R]
                        ◊STURM=/                   "YES"      [DEFAULT]
                                     /   "NON"
                     );
```

# 3 Operands

## 3.1 Operands MATR_RIGI/MATR_MASS/ MATR_AMOR/MATR_GYRO/INFO/ METHODE/OPTION

They have the same meaning as in command MODE_ITER_SIMULT [U4.52.03].

## 3.2 Key word CALC_FREQ

Plays the same part as in command MODE_ITER_SIMULT [U4.52.03], has the same internal key keys with the same default values.

**Note:**

*The number of modes $nbF$ is the same one for all rotational speeds.*

## 3.3 Operand VITE_ROTA

Lists rotational speeds $\Omega$ which is the same list which was used during the computation of the modes of the system in rotation by the command CALC_MODE_ROTATION . For better following the modes, this list presents the beach velocities:

- Initial rotational speed: Omega_min
- final Rotational speed : Omega_max
- No rotational speed: Delta_omega

the unit is in $rad/s$ .

## 3.4 Operand Key word VERI_MODE

the internal operands have the same meaning as in of the same key word name, in command MODE_ITER_SIMULT [U4.52.03].

## 3.5 Operand Key word MODES

This key word factor makes it possible to require the computation of the modes for each velocity (for each occurrence).

# 4 Example

# Computation of the modes in Lmod=CALC_MODE_ROTATION

```
rotation (MATR_RIGI = STIFFNESS,
                        MATR_MASS  = MASSE,
                        MATR_AMOR=AMOR,
                        MATR_GYRO   =GYASS,
                        VITE_ROTA=L_VITROT,
                        METHODE  =Methode,
                        CALC_FREQ=_F (OPTION=' PLUS_PETITE', NMAX_FREQ=nbF),
                        VERI_MODE=_F (STOP_ERREUR=' NON'));
```

CALC_MODE_ROTATION returns an array (table_contenor) containing the modal bases calculated for each rotational speed.

The mode_meca_c product are named as follows: mod_0,… mod_i. .mod_nbV, $i$ is the index rotational speed in VITE_ROTA .