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. \( \Omega \) 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

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 $n_bF$ is the same one for all the number of revolutions.

3.3 Operand `VITE_ROTA`

List number of revolutions $\Omega$ in $\text{rad/s}$.

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

```bash
# 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=LI_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.
```