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. \( \Omega \) represents 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 \texttt{mode_meca_c}: a concept for each number of revolutions. She calls on the order \texttt{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 SORENSSEN 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_ROTATIONNR (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.

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