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'
  );

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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_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.