Operator **COMB_MATR_ASSE**

1 **Goal**

To combine linearly, with real or complex coefficients, of the concepts of the type `matr_asse_*`.

This operator also allows to carry out linear combinations by considering only the real or imaginary part of a matrix with complex coefficients (extraction of the real or complex part of a matrix).

All concepts of the type `matr_asse_*` to combine, must divide **same classification**, i.e. the two matrices will have been assembled by the operator **ASSE_MATRICE** with the same concept argument for the keyword `NUME_DDL` (cf [U4.61.11]).

Product a structure of data of the type `matr_asse_*`. 

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2 Syntax

cmass [matr_asse_*] = COMB_MATR_ASSE 
  
  ♦ / COMB_R = _F ( 
  ♦   ♦ PART = / ‘REAL’, 
  ♦   / ‘IMAG’, 
  ♦   ♦ MATR_ASSE = m , / [matr_asse_DEPL_R] 
  ♦   / [matr_asse_TEMP_R] 
  ♦   / [matr_asse_PRES_R] 
  ♦   / [matr_asse_DEPL_C] 
  ♦   / [matr_asse_TEMP_C] 
  ♦   / [matr_asse_PRES_C] 
  ♦   / [matr_asse_GENE_R] 
  ♦   / [matr_asse_GENE_C] 
  ♦   ♦ COEF_R = R , [R] 
  ♦   
  ♦ / COMB_C = _F ( 
  ♦   ♦ MATR_ASSE = m , / [matr_asse_DEPL_R] 
  ♦   / [matr_asse_TEMP_R] 
  ♦   / [matr_asse_PRES_R] 
  ♦   / [matr_asse_DEPL_C] 
  ♦   / [matr_asse_TEMP_C] 
  ♦   / [matr_asse_PRES_C] 
  ♦   / [matr_asse_GENE_R] 
  ♦   / [matr_asse_GENE_C] 
  ♦   ♦ / COEF_R = R , [R] 
  ♦   / COEF_C = C , [C] 
  ♦   
  ♦ / CALC_AMOR_GENE = _F ( 
  ♦   / AMOR_REDUIT = lR8, [l_R] 
  ♦   / LIST_AMOR = lisr8, [listr8] 
  ♦   / MASS_GENE = masgen, [matr_asse_GENE_R] 
  ♦   / RIGI_GENE = riggen, [matr_asse_GENE_R] 
  ♦   ), 
  ♦   ♦ SANS_CMP = ‘LAGR’, 
  ♦   
  ♦ if COMB_R and MATR_ASSE: 
  ♦     [matr_asse_DEPL_R] then [*] - > DEPL_R 
  ♦     [matr_asse_TEMP_R] [*] - > TEMP_R 
  ♦     [matr_asse_PRES_R] [*] - > PRES_R 
  ♦     [matr_asse_DEPL_C] [*] - > DEPL_R 
  ♦     [matr_asse_TEMP_C] [*] - > TEMP_R 
  ♦     [matr_asse_PRES_C] [*] - > PRES_R 
  ♦     [matr_asse_GENE_R] [*] - > GENE_R 
  
  ♦ if COMB_C and MATR_ASSE: 
  ♦     [matr_asse_DEPL_R] then [*] - > DEPL_C 
  ♦     [matr_asse_TEMP_R] [*] - > TEMP_C 
  ♦     [matr_asse_PRES_R] [*] - > PRES_C 
  ♦     [matr_asse_DEPL_C] [*] - > DEPL_C 
  ♦     [matr_asse_TEMP_C] [*] - > TEMP_C 
  ♦     [matr_asse_PRES_C] [*] - > PRES_C 
  ♦     [matr_asse_GENE_R] [*] - > GENE_C

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if CALC_AMOR_GENE:
    [matr_asse_GENE_R] then [*] -> GENE_R
3 Operands

3.1 Keyword COMB_R

/ COMB_R

Description of the terms of the linear combination producing a matrix with real coefficients.

3.1.1 Operand PART

◊ PART = / 'REAL',
/ 'IMAG',

To carry out extractions or linear combinations of part (S) imaginary (S) or real (S) of complex matrices.

3.1.2 Operand MATR_ASSE

◊ MATR_ASSE = m

Name of the concept matr_asse_* to combine.

3.1.3 Operand COEF_R

◊ COEF_R = R

Real coefficient to apply to the concept argument of MATR_ASSE.

3.2 Keyword COMB_C

/ COMB_C =

Description of the terms of the linear combination producing a matrix with complex coefficients.

3.2.1 Recall on the syntax of the complex values

The complex values can be declared in two different ways:

• in the form $a + ib$ with syntax "IH, has, B " where has and B are real numbers,
• in the form $\text{\{module, phase\}}$ with "$\text{MP MOD, pH \ " where MOD and pH are real numbers}$ (pH in degrees).

3.2.2 Operand MATR_ASSE

◊ MATR_ASSE = m

Name of the concept matr_asse_* to combine.

3.2.3 Operands COEF_R/COEF_C

◊ / COEF_R = R

Real coefficient to apply to the concept argument of MATR_ASSE.

/ COEF_C = C

Coefficient complexes to apply to the concept argument of MATR_ASSE.

3.3 Keyword CALC_AMOR_GENE
This keyword makes it possible to build an object of the type matr_asse_gene_R corresponding to the matrix of damping of Basile starting from a list of reduced depreciation, (keyword AMOR_REDUIT or LIST_AMOR).

MASS_GENE = masgen, RIGI_GENE = riggen,

masgen and riggen are the 2 generalized matrices of mass and rigidity.

3.4 Operand SANS_CMP = ‘LAGR’

This operand causes to put in the “zero” terms of the assembled matrix result corresponding to the lines and the columns of the degrees of freedom of Lagrange.

4 Examples of use

4.1 Classical linear combination

mat_rs = COMB_MATR_ASSE (COMB_C = (_F (MATR_ASSE = mat_1, COEF_R = 1.),
                               _F (MATR_ASSE = mat_2, COEF_C = ('IH’, 0. , 1. ,)),),)

The produced concept mat_rs is of the type matr_asse_*_C (complex):

mat_rs = mat_1 + I mat_2

4.2 Recopy of a concept of the type matr_asse_*_R

mat_sauv = COMB_MATR_ASSE (COMB_R = _F (MATR_ASSE = mat_1, COEF_R = 1.))

4.3 Difference enters COMB_C and COMB_R:

mat_R = COMB_MATR_ASSE (COMB_R = _F (MATR_ASSE = mat_1, COEF_R = 1.))

# mat_R is with real coefficients               mat_R = mat_1
mat_C = COMB_MATR_ASSE (COMB_C = _F (MATR_ASSE = mat_1, COEF_R = 1.))

# mat_C is with complex coefficients, but the imaginary part is worthless   mat_C = mat_1 + I. [0].

4.4 Extraction of the real part of a matrix of the type matr_asse_*_C

mat_R = COMB_MATR_ASSE (COMB_R = _F (PART = ‘REAL’,
                                  MATR_ASSE = mat_C, COEF_R = 1. ,)),

}