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_*.
2 Syntax

```plaintext
    cmass  [matr_asse_*) = COMB_MATR_ASSE  
        ◊ 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] 

        ♦ / 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_DEPL_C] 
        / [matr_asse_TEMP_C] 
        / [matr_asse_PRES_R] 
        / [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_DEPL_C] [*] - > DEPL_C
    [matr_asse_TEMP_C] [*] - > TEMP_C
    [matr_asse_PRES_R] [*] - > PRES_C
    [matr_asse_PRES_C] [*] - > PRES_C

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

3.1 Keyword MATR_ASSE

◊ MATR_ASSE

It is possible to crush an object matr_asse with the result of the operation. In this case, it is obligatory to specify here which object is re-used.

3.2 Keyword COMB_R

/ COMB_R

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

3.2.1 Operand PART

◊ PART = / ‘REAL’,

/ ‘IMAG’,

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

3.2.2 Operand MATR_ASSE

◊ MATR_ASSE = m

Name of the concept matr_asse*_ to combine.

3.2.3 Operand COEF_R

◊ COEF_R = R

Real coefficient to apply to the concept argument of MATR_ASSE.

3.3 Keyword COMB_C

/ COMB_C = 

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

3.3.1 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 $\langle$module, phase$\rangle$ with “MP MOD, pH “ where MOD and pH are real numbers (pH in degrees).

3.3.2 Operand MATR_ASSE

◊ MATR_ASSE = m

Name of the concept matr_asse*_ to combine.

3.3.3 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.

3.4 **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.

3.5 **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’,
```

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MATR_ASSE = mat_C,
COEF_R = 1.,
}