Operator ASSE_MAILLAGE

1 Goal

To assemble two grids to form new.

The two grids to be assembled can come from the operators: LIRE_MAILLAGE [U4.21.01], DEFI_MAILLAGE [U4.23.01], ASSE_MAILLAGE [U4.23.03],...

I.e. they can contain ordinary meshes or super-meshs carrying macro - elements.

Product a structure of data of the type grid.
2 Syntax

```plaintext
mac (sd_maillage) = ASSE_MAILLAGE (

# names of two grids to be assembled:
♦ MAILLAGE_1 = ma1, [grid]
♦ MAILLAGE_2 = ma2, [grid]

# type of operation to be realized on the two grids
♦ OPERATION = / 'JOINING', # to restick
       / 'SUPERIMPOSES', # to superimpose
       / 'SOUS_STR', # pour to assemble
                # grids containing
                # macronutrients

    # If OPERATION=' COLLAGE'
    ♦ COLLAGE= _F (  
      ♦ GROUP_MA_1 = gma1, [gr_maille]
      ♦ GROUP_MA_2 = gma2, [gr_maille]),

```
3 Operands MAILLAGE_1 and MAILLAGE_2

- MAILLAGE_1 = ma1, MAILLAGE_2 = ma2,
  ma1 and ma2 are the names of the two grids to be assembled.

4 Operand OPERATION = 'SUPERIMPOSES'

With choice ‘SUPERIMPOSES’, all the entities (meshs, nodes, groups of meshes and groups of nodes) of two grids are preserved. The only problem to be regulated relates to the name as of these entities (possible conflict of names because them two grids can contain, for example, of the same nodes name).

To solve these possible problems of names:
1) The nodes and the meshs are always famous. That wants to say that the user cannot know the name of the nodes and meshs of the grid result. It will have in general to use (what is always advised) the names of groups of meshs and groups of nodes. Or it will have to print the grid to know the selected names.
2) The names of the groups of nodes and the groups of meshs are preserved within the limit of the possible one. If two groups of meshs (or two groups of nodes) have the same name in two grids, the group coming from the 2nd grid is famous automatically and the name change is indicated in the file of message.

5 Operand OPERATION = 'JOINING'

The operation ‘JOINING’ is used to connect two grids which would have been with a grid independently in two distinct files (for example by two different teams).

If them two grids are not coherent on their interface (different discretization), the user will not have another choice only to use the functionality AFFE_CHAR_*/LIAISON_MAIL to bind the degrees of freedom of two grids which will remain topologically disjoined. It will have to then use the operation ‘SUPERIMPOSES’.

If on the other hand, them two grids were designed to be restuck, it will use the operation ‘JOINING’. For that, it will have to take the precaution to name them two groups of meshes (of interface) which will make it possible to restick them two grids. Moreover these two groups of meshes must be geometrically coincidents. The user will write then:

OPERATION=' COLLAGE', COLLAGE= _F (GROUP_MA_1=' gma1', GROUP_MA_2=' gma2'),

Groups of meshs gma1 and gma2 will then be amalgamated. More precisely:
1) meshs of gma1 and gma2 will be removed,
2) nodes of gma2 will remain (but will be orphan),
3) nodes of gma1 will connect them two grids.

Before amalgamating them two groups of meshs gma1 and gma2, it code will check that the nodes of these two groups of meshes are well coincidents (with a tolerance of 0,001 time the length of smallest edge two grids).

Conflicts of names of the entities of two grids are regulated in the same way that for the operation ‘SUPERIMPOSES’ (see above).
6 Operand OPERATION = ‘SOUS_STR’

To mix in the same model of the ordinary finite elements and macronutrients (or substructures), it is necessary to have a grid containing at the same time ordinary meshes and super-meshes. The operator ASSE_MAILLAGE / OPERATION = ‘SOUS_STR’ allows to constitute this “mixed” grid by assembling an ordinary grid (or mixed) and a grid containing of the super-meshes (coming from DEFI_MAILLAGE).

The direction of the assembly is the following:

- All entities of two grids arguments ma1 and ma2 (meshes, super-meshes, nodes, group of meshes and group of nodes) are recopied in the grid result: mac.
- The only shared entities are them nodes of same names. These are the nodes which make it possible to assemble them two grids.
- Treatment of the entities bearing the same name:
  - nodes: the nodes of the second grid bearing an existing name in the first grid are not added: it is supposed that they are the same ones. The coordinates of the preserved node are those of the node of the first grid. An alarm is emitted when the distance between the two confused nodes is higher than:
    \[10^{-6} \cdot d_{\text{refe}}\]
    where \(d_{\text{refe}}\) is a length characteristic of the grid:
    \[d_{\text{refe}} = \max(d(O,N))\]
    where \(d(O,N)\) is the distance from the node \(N\) at the origin of the total reference mark.
  - meshes (or super-meshes): if grid ma2 of the same meshes name contains than meshes of the first grid ma1, it code stop in fatal error.
  - group of meshes (or groups of nodes): if grid ma2 a group contains of of the same meshes name than a group of mesh of ma1, this one is ignored and it code a message of alarm emits.