

Operator ASSE_MAILLAGE

1 Drank

To assemble two meshes to form new.

The two meshes 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 meshes contain of ordinary and/or of super-meshes carrying macro - elements.

Product a data structure of mesh type .

2 Syntax

```
mac (mesh) =ASSE_MAILLAGE      (  
  
    # names of the 2 meshes to be assembled:  
    ◆MAILLAGE_1    =ma1        ,           [mesh]  
    ◆MAILLAGE_2    =ma2        ,           [mesh]  
  
    # "to restick" the 2 /OPERATION  
    meshes = ' COLLAGE',  
            ◆COLLAGE=_F      (  
                ◆GROUP_MA_1  = gma1,    [gr_maille]  
                ◆GROUP_MA_2  = gma2,    [gr_maille]),  
  
    # "to superimpose" the 2 /OPERATION  
    meshes = ' SUPERPOSE',  
  
    # to assemble meshes containing of  
    # macro-elements (substructures)  
    /OPERATION    = ' SOUS_STR',  
  
    )
```

3 Operands MAILLAGE_1 and MAILLAGE_2

◆MAILLAGE_1 = ma1, MAILLAGE_2 = ma2,

ma1 and ma2 are the names of the two meshes to be assembled.

4 Operation = "SUPERPOSE"

With this choice: "SUPERPOSE", all the entities (meshes, nodes, mesh groups and nodes groups) of the 2 meshes are preserved. The only problem with regulating relates to the name as of these entities (possible conflict of names because the 2 meshes can contain, for example, of the same nodes name).

To solve these possible problems of names:

- 1) The nodes and the meshes are always renamed. That wants to say that the user cannot know the name of the nodes and meshes mesh result. It will have in general to use (what is always advised) the names of mesh groups and nodes groups. Or it will have to print the mesh to know the selected names.
- 2) The names of the nodes groups and the mesh groups are preserved within the limit of the possible one. If 2 mesh groups (or 2 nodes groups) have the same name in the 2 meshes, the group coming from the 2nd mesh is renamed automatically and the name change is indicated in the file of message.

5 Operation = "SUPERPOSITION"

the operation "SUPERPOSITION" is used to connect 2 meshes which would have been with a grid independently in 2 distinct files (for example by 2 different teams).

If the 2 meshes are not coherent on their interface (different discretization), the user will not have another choice only to use functionality AFFE_CHAR_XXX/LIAISON_MAILLE "to bind" the degrees of freedom of the 2 meshes which will remain topologically disjointed. He will have to then use operation "SUPERPOSE".

If on the other hand, the 2 meshes were designed to be restuck, it will use the operation "SUPERPOSITION". For that, it will have to take the precaution to name the 2 mesh groups (of interface) which will make it possible to restick the 2 meshes. Moreover these 2 mesh groups must be geometrically coincident. The user will write then:

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

the gma1 mesh groups and gma2 will then be amalgamated. More precisely:

- 1) meshes of gma1 and gma2
- 2) the nodes of gma2 will be removed will remain (but will be orphan)
- 3) the nodes of gma1 will connect the 2 meshes.

Before "amalgamating" the 2 gma1 mesh groups and gma2, the program will check that the nodes of these 2 mesh groups are well coincident (with a tolerance of 0,001 time the length of the smallest stops of the 2 meshes).

The conflicts of names of the entities of the 2 meshes are regulated in the same way that for operation "SUPERPOSE" (see above).

6 Operation = "SOUS_STR"

to mix in the same model of the finite elements ordinary and macro-elements (or substructures), it is necessary to have a mesh containing at the same time the meshes ordinary ones and (super) meshes. Operator ASSE_MALLAGE / OPERATION = "SOUS_STR" allows to constitute this "mixed" mesh by assembling an ordinary mesh (or mixed) and a mesh containing of (super) meshes (coming from DEFI_MALLAGE).

The meaning of the assembly is the following:

- **All** the entities of the 2 meshes arguments `ma1` and `ma2` (meshes, super-meshes, nodes, mesh group and nodes group) are recopied in the mesh result: `mac`.
- The only shared entities are **the nodes same names**. These are the nodes which make it possible to assemble the 2 meshes.
- Processing of the entities bearing the same name:
 - nodes: the nodes of the second mesh bearing an existing name in the first mesh, 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 mesh. An alarm is emitted when the distance between the two confused nodes is higher than:

$$10^{-6} \cdot d_refe$$

where d_refe is a length characteristic of mesh:

$$d_refe = \max(d(O, N))$$

where $d(O, N)$ is the distance from the node N at the origin of the total reference.

- meshes (or super-meshes): if the mesh `ma2` contains meshes of the same name than meshes of the first mesh `ma1`, the program stops in fatal error.
- mesh group (or nodes groups): if the mesh `ma2` contains of a the same mesh group name than a group of mesh of `ma1`, this one is ignored and the program transmits an alarm message.