# Operator IMPR_MAIL_ YACS

## 1 Drank

the object of this command is to recover (*via* YACS) the data of the fluid mesh to the interface fluid-structure and to generate the files meshes corresponding to the native format of mesh of *Code_Aster*. This operator is used by the macro-command CALC_IFS_DNL (*cf* U7.06.01 documentation) which allows computations fluid-structures coupled in nonlinear transient regime. For that, one comes to couple *Code_Aster*, for the structure part, in *Code_Saturne*, for the fluid field, thanks to supervisor YACS of Salomé.

# Contents

1 But1....
2 Syntaxe3....
3 Principle of fonctionnement4....
4 Key word UNITE_MAILLAGE4....
5 Key word TYPE_MAILLAGE4....

# 2 Syntax

```
IMPR_MAIL_YACS    (

   ◊UNITE_MAILLAGE=/          30 ,                          [DEFAULT]
                           /ulmail   ,

   ♦  TYPE_MAILLAGE=/            "SOMMET",
                              /"MILIEU",

   ◊INFO=/              1   ,
[DEFAULT]
                        /2  ,

   )
```

# 3 Principle of operation

the method of coupling for the interaction fluid-structure based on *Code_Aster* and *Code_Saturne* require the data exchange between these codes. Indeed, it is not about a monolithic approach where all the coupled problem would be solved in a single computer code: one couples two codes, each one being confined with his speciality. This coupling is managed by the command CALC_IFS_DNL (U7.06.01).
All the data to be exchanged use protocol YACS of Salomé.
These data can be of two different nature:

- parameters of smalls (of the scalars, for example),
- fields (meshes, displacements, velocities or forces with the interfaces, for example).

In order to keep a good modularity, favourable with the evolutions, different operators were thus developed, each one treating one of the types of data to be exchanged.
The scalar data are handled by RECU_PARA_YACS (U7.08.01), the fields by ENV_CINE_YACS (U7.07.01) and MODI_CHAR_YACS (U7.08.02) or the operator IMPR_MAIL_YACS who recover, *via* YACS, the fluid meshes of the interfaces. All these commands are called by CALC_IFS_DNL.

To be able to exchange the fields with the interface fluid-structure, the incompatible meshes being and the technical of spatial discretization being even different (EF in *Code_Aster* and VF in *Code_Saturne*), of the intermediate stages of projections must be introduced.
Being given that these stages of projections are done everything in *Code_Aster* (with operator PROJ_CHAMP), it is essential to recover the definition of the fluid mesh to the interface fluid-structure. Operator IMPR_MAIL_YACS allows that, by data exchange with YACS, and it generates in output a file containing the mesh of the fluid interface, with the native format *Code_Aster*.
This mesh can then be read again classically with LIRE_MAILLAGE.

In practice, macro-command CALC_IFS_DNL makes two distinct calls with IMPR_MAIL_YACS. Indeed, for projections of fields, one must have two meshes for the interface with the fluid field: mesh of the nodes tops and that of the nodes mediums of the sides.

# 4 Key word UNITE_MAILLAGE

This key word makes it possible to choose the logical number of unit ulmail corresponding to mesh file which will be generated. The value by default is 30.

# 5 Key word TYPE_MAILLAGE

This key word makes it possible to define which nature of mesh is considered:

- mesh of the nodes tops (TYPE_MAILLAGE = "SOMMET"),
- or that of the nodes mediums of the sides (TYPE_MAILLAGE = "MILIEU").

In operator CALC_IFS_DNL, one uses successively these two options and that generates thus two mesh different (it is thus necessary well to specify two distinct logical units).
The first mesh is used for to project the fields defined in the nodes tops, therefore the kinematical fields, the second to project the forces coming from the fluid and which are definite constant by face.