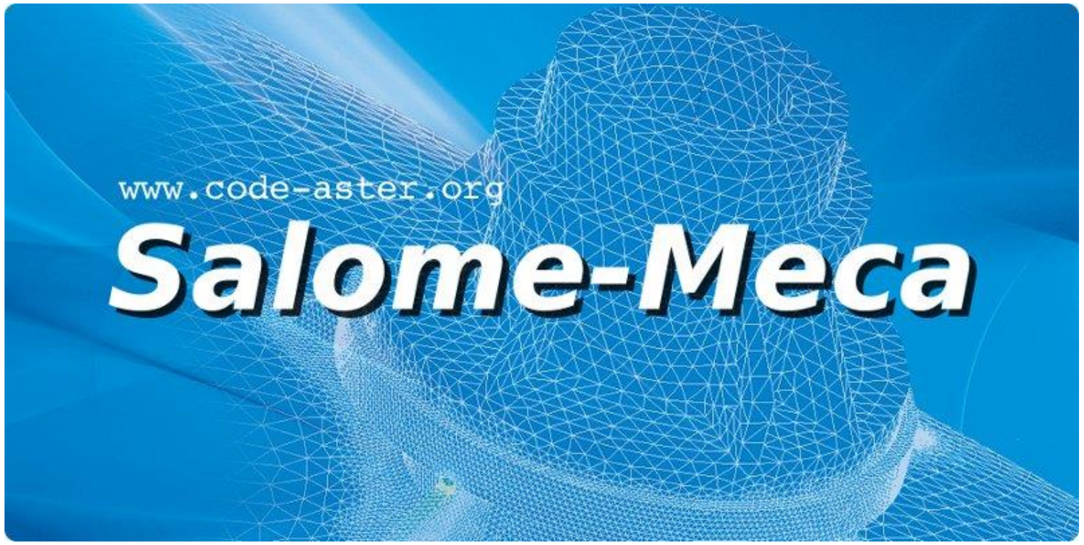
Development in code_aster
Creating a command



Code_Aster, Salome-Meca course material

What is a command ?

Different types of command

- Procedures `PROC` that return no result

  `DEBUG, IMPR_RESU`
- Operators `OPER` that return exactly one result

  `STAT_NON_LINE, CALC_CHAMP`

Each command has its own syntax description

- In `code_aster/Cata/Commands/*.py`
- See the presentation of Commands Syntax for details

OPER & PROC are written in Fortran

- The main subroutine is `op00NN.F90` defined by `op=NN` in the catalog file

The supervisor:

- connects the Python command to the fortran operator
- gives access to the values of the keywords

Passing the keywords values

[d6.03.01]

Get the result name returned by the command

```
call getres( result, type_of_the_result, command )
```

Get the number of occurrences of a factor keyword

```
call getfac( 'FACT', number_of_occurrences )
```

Get the number of values provided by a simple keyword

```
call getvr8( 'FACT', 'SIMP', iocc, nbval=0, nbret=size)
```

size will be a negative number (see documentation), the number of values to read is –size

Types: getvis (integer), getvr8 (float), getvc8 (complex), getvtx (string), getvid (objects)

`FACT=' '` for first level keywords

Fill an array with the values of a simple keyword

```
size = -size
call getvr8( 'FACT', 'SIMP', iocc, nbval=size, vect=vector)
```

Or for a scalar:

```
call getvr8( 'FACT', 'SIMP', iocc, scal=value)
```

Exercise

```
cd $HOME/dev/codeaster/src
hg pull -r da378d codeaster_push
hg update -C da378d
```

Create a command, called MODI_MAIL, that translate a mesh by a vector.

- Inputs:
  - `MAILLAGE`: The mesh to translate (maillage_sdaster object)
  - `TRANSLATION`: a factor keyword with a unique simple keyword `VECTEUR` which gives the translation vector provided by 3 float numbers
  - `INFO`: Verbosity flag. Optional, 1 or 2, default is 1.
- Output
  - The same mesh, changed in place
- Optional improvements
  - Support of 2D and 3D translation vector (2 or 3 values)
  - Use a `INFO` keyword to print, for example, a message with the number of nodes of the mesh
  - Support TRANSLATION or ROTATION

Exercise: howto

You will change the mesh coordinates in place.

You must know the *maillage_sdaster* datastructure [d4.06.01]

- Where are stored the coordinates of a mesh ?
- How to access the coordinates of the i-th node ?

Use case

```
DEBUT()

mesh = LIRE_MAILLAGE(FORMAT='MED')

mesh = MODI_MAIL(reuse=mesh,
                 MAILLAGE=mesh,
                 TRANSLATION=_F(VECTEUR= (1., 2., 3.),),)

# check that the coordinates were correctly changed
TEST_RESU(…)

FIN()
```

Skeleton of modi_mail.py

```
MODI_MAIL=OPER(
    nom="MODI_MAIL",
    op=190,
    sd_prod=maillage_sdaster,
    fr=tr("Modifier un maillage par translation"),

    reentrant='o',

    MAILLAGE=TODO,
    TRANSLATION=TODO,

    INFO=SIMP(statut='f', typ='I', defaut=1, into=(1, 2)),
)
```

Skeleton of op0190.F90 (1)

```
subroutine op0190()
    ...
!   read the input mesh name: maillage_sdaster, see d6.03.01, §2.1.1
    call getvid(..., nbret=iret)
    ASSERT(iret == 1)

!   read the mesh result (must be identical to the input), see d6.03.01,
  §2.1.5
    call getres(...)
    ASSERT(mesh == mesh0)

!   check that TRANSLATION exists, see d6.03.01, §2.1.6
    call getfac('TRANSLATION', nbocc)
    ASSERT(nbocc == 1)

!   get the size of the translation vector for a dynamic allocation, see
  d6.03.01, §2.1.1
    call getvr8(..., nbret=dim)
    dim = -dim
    ASSERT( 2 <= dim .and. dim <= 3)
```

Skeleton of op0190.F90 (2)

```
!    allocate the vector of size 'dim'
     AS_ALLOCATE(...)

!    read the translation vector values
     call getvr8(..., nbval=dim, vect=...)

!    name of the jeveux vector containing the coordinates of the mesh
!    see d4.06.01 for the COORDO object and d4.06.05 for its VALE vector
     ...
     vect_coord = ...

!    get the address and the size of this vector
     call jeveuo(...)
     call jelira(...)
     nbnode = size / 3

!    translate the mesh
!    loop on the nodes
     ...
```

End of presentation

Is something missing or unclear in this document?

Or feeling happy to have read such a clear tutorial?

Please, we welcome any feedbacks about Code_Aster training materials.

Do not hesitate to share with us your comments on the Code_Aster forum dedicated thread.