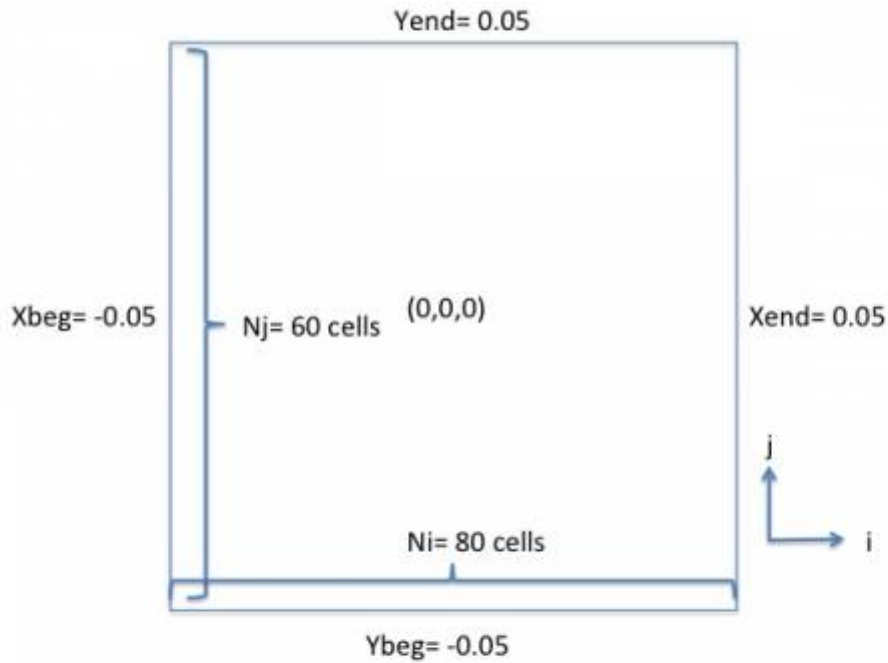


## Domain\_Features

This data set defines the domain size, the grid data, the domain decomposition features (MPI parallelisation characteristics : number of MPI processes connected to subdomains and how they are distributed over the domain) and the number of threads also used to split the domain (OpenMP parallelization).

### Full data set of the namelist

```
&Domain_Features Geometric_Layout           = 0,
                  Start_Coordinate_I_Direction = -0.05 ,
                  End_Coordinate_I_Direction   = 0.05,
                  Start_Coordinate_J_Direction = -0.05 ,
                  End_Coordinate_J_Direction   = 0.05,
                  Start_Coordinate_K_Direction = 0.00 ,
                  End_Coordinate_K_Direction   = 0.00,
                  Cells_Number_I_Direction     = 80 ,
                  Cells_Number_J_Direction     = 60 ,
                  Cells_Number_K_Direction     = 1,
                  Number_OMP_Threads           = 1,
                  MPI_Cartesian_Topology       = .false. ,
                  MPI_Graphic_Topology         = .false. ,
                  Total_Number_MPI_Processes   = 1,
                  Max_Number_MPI_Proc_I_Direction= 1 ,
                  Max_Number_MPI_Proc_J_Direction= 1,
                  Max_Number_MPI_Proc_K_Direction= 1,
                  Regular_Mesh                 = .true. /
```



In domain decomposition approach (MPI parallelization), the number of cells (Cells\_Number\_I\_Direction, Cells\_Number\_J\_Direction, Cells\_Number\_K\_Direction) is related to each subdomain , not the whole domain. Find some examples [here](#) .

## Definition of the data set

### Geometric\_Layout

- Type : integer value
- This option selects the type of geometry configuration used :
  - 0 : Cartesian geometry
    - 1: Cylindrical geometry. The axis is oriented along the K-direction. The coordinate system is  $r(i), \theta(j), z(k)$
    - 2: Cylindrical geometry. The axis is oriented along the I-direction. The coordinate system is  $r(j), \theta(k), z(i)$
    - 3: Cylindrical geometry. The axis is oriented along the J-direction. The coordinate system is  $r(k), \theta(i), z(j)$
    - Default value = 0

### Start\_Coordinate\_I\_Direction

- Type : real value
- Origin coordinate along the I-direction.

- Default value must be set by the user

### **Start\_Coordinate\_J\_Direction**

- Type : real value
- Origin coordinate along the J-direction.
- Default value must be set by the user

### **Start\_Coordinate\_K\_Direction**

- Type : real value
- Origin coordinate along the K-direction.
- Default value must be set by the user

### **End\_Coordinate\_I\_Direction**

- Type : real value
- End coordinate along the I-direction.
- Default value must be set by the user

### **End\_Coordinate\_J\_Direction**

- Type : real value
- End coordinate along the J-direction.
- Default value must be set by the user

### **End\_Coordinate\_K\_Direction**

- Type : real value
- End coordinate along the K-direction.
- Default value must be set by the user

### **Cells\_Number\_I\_Direction**

- Type : integer value
- Number of cells along the I-direction (excluding the ghost-cells).  
In decomposition domain approach (MPI parallelization), the number of cells is related to each subdomain , not the whole domain.
- Default value= 0

### **Cells\_Number\_J\_Direction**

- Type : integer value
- Number of cells along the J-direction (excluding the ghost-cells).  
In decomposition domain approach (MPI parallelization), the number of cells is related to each

subdomain , not the whole domain.

- Default value= 0

## Cells\_Number\_K\_Direction

- Type : integer value
- Number of cells along the K-direction (excluding the ghost-cells)  
In decomposition domain approach (MPI parallelization), the number of cells is related to each subdomain , not the whole domain.
- Default value= 0

## Number\_OMP\_Threads

- integer value ( **Not for the release SUNFLUIDH\_EDU** ).
- Number of Threads for OpenMP parallelization
- Default value= 1

## MPI\_Cartesian\_Topology

- Type : Boolean value ( **Not for the release SUNFLUIDH\_EDU** ).
- Select the MPI cartesian topology for the domain decomposition method (same number of subdomains along a given direction)
- Default value= .false.

## MPI\_Graphic\_Topology

- Type : Boolean value ( **Not for the release SUNFLUIDH\_EDU** ).
- Select the MPI graphic topology for the domain decomposition method (the number of subdomain along a given direction is variable)
- Default value= .false.

## Total\_Number\_MPI\_Processes

- Type : integer value ( **Not for the release SUNFLUIDH\_EDU** ).
- Total number of MPI processes used in the domain decomposition method
- Default value= 1

## Max\_Number\_MPI\_Proc\_I\_Direction

- Type : integer value ( **Not for the release SUNFLUIDH\_EDU** ).
- Number of MPI processes along the I-direction (maximum number for the graphic topology)
- Default value= 1

## Max\_Number\_MPI\_Proc\_J\_Direction

- Type : integer value ( **Not for the release SUNFLUIDH\_EDU** ).
- Number of MPI processes along the J-direction (maximum number for the graphic topology)
- Default value= 1

## Max\_Number\_MPI\_Proc\_K\_Direction

- Type : integer value ( **Not for the release SUNFLUIDH\_EDU** ).
- Number of MPI processes along the K-direction (maximum number for the graphic topology)
- Default value= 1

## Regular\_Mesh

- Type : boolean value
- if .true., the mesh size is regular along each direction and the gris is directly built by the code.
- If .false., the grid is irregular and the cell distribution is read in the specific files maillx\_XXXX.d, mailly\_XXXX.d and maillz\_XXXX.d (XXXX corresponds to the subdomain/MPI-process number if the MPI domain-decomposition is used). These files are created from the mesh builder named meshgen.x.
- Default value= .true.

From:

<https://sunfluidh.limsi.fr/> - **Documentation du code de simulation numérique SUNFLUIDH**

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