

Domain_Features

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

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 $r(k), \theta(i), z(j)$

Start_Coordinate_I_Direction

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

Start_Coordinate_J_Direction

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

Start_Coordinate_K_Direction

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

End_Coordinate_I_Direction

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

End_Coordinate_J_Direction

- Type : real value
- End coordinate along the J-direction.

End_Coordinate_K_Direction

- Type : real value
- End coordinate along the K-direction.

Cells_Number_I_Direction

- Type : integer value
- Number of cells along the I-direction, excluding the ghost-cells)

Cells_Number_J_Direction

- Type : integer value
- Number of cells along the J-direction, excluding the ghost-cells)

Cells_Number_K_Direction

- Type : integer value
- Number of cells along the K-direction, excluding the ghost-cells)

Number_OMP_Threads

- integer value
- Number of Threads for OpenMP parallelization

MPI_Cartesian_Topology

- Type : Boolean value
- Select the MPI cartesian topology for the domain decomposition method (same number of subdomains along a given direction)
- ===== MPI_Topology_Topology =====
- Type : Boolean value
- Select the MPI graphic topology for the domain decomposition method (the number of subdomain along a given direction is variable)

Total_Number_MPI_Processes

- Type : integer value
- Total number of MPI processes used in the domain decomposition method

Max_Number_MPI_Proc_I_Direction

- Type : integer value

- Number of MPI processes along the I-direction (maximum number for the graphic topology)

Max_Number_MPI_Proc_J_Direction

- Type : integer value
- Number of MPI processes along the J-direction (maximum number for the graphic topology)

Max_Number_MPI_Proc_K_Direction

- Type : integer value
- Number of MPI processes along the K-direction (maximum number for the graphic topology)

Regular_Mesh

- Type : boolean value
- if .true., the mesh size is regular along each direction and the grid is directly built by the code. In opposite way, the grid is irregular and the cell distribution is read in the specific files `maillx_XXXXX.d`, `mailly_XXXXX.d` and `maillz_XXXXX.d` (XXXXX 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`.

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

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