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```
==============================================================================
==============================================================================
            MAIN INPUT DATA FILE : 2D CHANNEL FLOW
                                   INCOMPRESSIBLE
                                   ISOTHERM

            DIMENSIONLESS LAYOUT :

                 Length scale     : h (the channel height)
                 Reynolds number    Re_h= rho_0.U_0.h/nu= 100

                 dimensionless quantities :
                   velocity U*      = U/U_0
                   kinetic viscosity= 1/Re_h

                 dimensionless domain : Lx/h= 10

                 Initialisation = uniform velocity field
                 inlet flowrate = uniform profil

INCOMPRESSIBLE DOWNSTEP FLOW


-----------------------------------------

---> inflow                   outflow --->

-----------------------------------------
J
^
|
|
---->I
==============================================================================
==============================================================================
&Version File_Version="VERSION2.0"/
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                     GENERAL LAYOUT
                     (DIMENSIONLESS)
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
&Fluid_Properties         Reference_Dynamic_Viscosity = 1.00D-02,
Reference_Density= 1.0 /

&Velocity_Initialization  I_Velocity_Reference_Value  = 1.0 ,
J_Velocity_Reference_Value = 0.0 , K_Velocity_Reference_Value = 0.0 /
==============================================================================
                    DOMAIN FEATURES
                     (DIMENSIONLESS)
==============================================================================
```

```
&Domain_Features Start_Coordinate_I_Direction= 0.00 ,
End_Coordinate_I_Direction= 10.00,
                 Start_Coordinate_J_Direction= 0.00 ,
End_Coordinate_J_Direction= 1.00,
                 Start_Coordinate_K_Direction= 0.00 ,
End_Coordinate_K_Direction= 0.00,
                 Cells_Number_I_Direction= 256 ,Cells_Number_J_Direction= 64
,Cells_Number_K_Direction= 1,
                 Regular_Mesh= .true. /
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
              DEFINITION OF BOUNDARY CONDITIONS
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
==============================================================================
=
                 WALL BOUNDARY CONDITION SETUP
                     (DIMENSIONLESS)
==============================================================================
=
Not really necesaary (Default wall boundary conditions for the velocity are
used)

==============================================================================
=
               INLET AND OUTLET  BOUNDARY CONDITIONS
                     (DIMENSIONLESS)
==============================================================================
=
Keep in mind that the domain is enclosed by default.
Here the inlet and outlet conditions are located at the ends of the domain.
They replace the walls by default over the insterested areas.

&Inlet_Boundary_Conditions  Type_of_BC= "INLET", Direction_Normal_Plan= 1 ,
Flow_Direction= 1 ,
                            Plan_Location_Coordinate=  0.0    ,
                            Start_Coordinate_of_First_Span =  0.00  ,
End_Coordinate_of_First_Span = 1.00 ,
                            Start_Coordinate_of_Second_Span= 0.0    ,
End_Coordinate_of_Second_Span= 0.0  ,
                            Normal_Velocity_Reference_Value= 1.0  ,
                            End_of_Data_Block= .true. /

Outlet : Mass flowrate conservation

&Outlet_Boundary_Conditions  Type_of_BC= "OUTLET", Direction_Normal_Plan= 1
, Flow_Direction= 1 ,
                             Plan_Location_Coordinate=  10.0   ,
                             Start_Coordinate_of_First_Span =  0.00  ,
```

```
End_Coordinate_of_First_Span = 1.00 ,
                              Start_Coordinate_of_Second_Span= 0.0    ,
End_Coordinate_of_Second_Span= 0.0  ,
                              End_of_Data_Block= .true. /
==============================================================================
=
                BORDER BOUNDARY CONDITIONS
==============================================================================
=
!--- No new boundary conditions are defined at the ends of the domain :
walls by default are preserved, the inlet and outlet previously are defined
above)

&Border_Domain_Boundary_Conditions West_Border= 0 , East_Border= 0 ,
Back_Border= 0 , Front_Border= 0 , North_Border = 0 , South_Border = 0 /
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                    NUMERICAL METHODS
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
          For Navier-Stokes Equations  : Numerical scheme --> BDF2 - Spatial
discretization --> 2nd order centered scheme
                                          convection flux ---> conservative
form
          For Poisson's equation       : Iterative method --> SOR coupled
with a multigrid method.

Parameters of the multigrid method :

&Numerical_Methods  Numerical_Scheme= 1 ,
                    Convective_Flux_Discretization_Type = 1
                    Numerical_Method_Poisson_Equation= 1,
                    Number_max_Grid= 4 , Number_max_Cycle= 10 ,
Number_Iteration= 15 ,
                    Relaxation_Coefficient = 1.80 , Convergence_Criterion =
1.D-08 /
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                    SIMULATION MANAGEMENT
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
The numerical time step is imposed

&Simulation_Management    Restart_Parameter= 0 ,
                          Steady_Flow_Stopping_Criterion_Enabled = .true. ,
Steady_Flow_Stopping_Criterion = 1.D-16,
                          Temporal_Iterations_Number = 100000
, Final_Time = 5.D+02  ,
                          TimeStep_Type = 0 ,
                          Timestep_Max = 1.D-03 ,
                          Simulation_Backup_Rate                 = 1000   ,
```

```
Simulation_Checking_Rate = 101 /
================================================================================
=
                     PROBES MANAGEMENT
================================================================================
=

                                                        Probes order    U    ,
V     , W      , T      , P      , RHO
&Probe_Quantities_Enabled  Temporal_Series_For_Quantity_Enabled(:) = .true.,
.true., .false., .false., .true. , .false. /

&Probe_Location  Xi= 3.0 , Xj= 0.5 , Xk= 0.0  /
&Probe_Location  Xi= 6.0 , Xj= 0.5 , Xk= 0.0 , End_of_Data_Block= .true. /
&Simulation_Management   Probe_Recording_Rate = 1 /

================================================================================
=
           FIELDS RECORDING DECLARATION
================================================================================
=
&Field_Recording_Setup    Precision_On_Instantaneous_Fields= 2 /

!--- Snapshots

&Simulation_Management    Fields_Recording_Rate = 5.D+01  /
&Instantaneous_Fields_Listing  Name_of_Field = "U     " , Recording_Enabled
= .true.  /      First velocity component
&Instantaneous_Fields_Listing  Name_of_Field = "V     " , Recording_Enabled
= .true. , End_of_Data_Block= .true  /      Second velocity component

!--- Statistics
```

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