Steady Flow Past a Cylinder - Mesh (Older version)

Authors: John Singleton and Rajesh Bhaskaran, Cornell University

THIS IS AN OLDER VERSION. PLEASE USE CURRENT VERSION OF THIS PAGE.

Mesh

In this section the geometry will be meshed with 18,432 elements. The geometry will be given 192 circumferential divisions and 96 radial divisions. Mapped face meshing will be used and biasing will be used in order to significantly increase the number of elements located close to the cylinder.

Launch Mesher

(Double Click) Mesh

Mapped Face Meshing

(Right Click) Mesh > Insert > Mapped Face Meshing
Set ***Geometry*** to both portions of the surface body. You will have to hold down control in the selection process in order to highlight both halves. Click ***Update***.

Circumferential Edge Sizing

(Right Click) Mesh > Insert > Sizing
Set ***Geometry*** to both edges of the surface body. You will have to use the edge selection filter and you will have to hold down control in the selection process in order to highlight both halves. Set ***Type*** to ***Number of Divisions***, set ***Number of Divisions*** to 96 and set ***Behavior*** to ***Hard***. Click ***Update*** to generate the new mesh.

Radial Edge Sizing 1 (Top Half)

(Right Click) Mesh > Insert > Sizing
Set ***Geometry*** to the top half of the bisecting line. Set ***Type*** to ***Number of Divisions***, set ***Number of Divisions*** to 96 and set ***Behavior*** to ***Hard***. Then, set ***Bias Type*** to the first option and set ***Bias Factor*** to 460. These selections are shown in the image below.

Details of "Edge Sizing 2" - Sizing

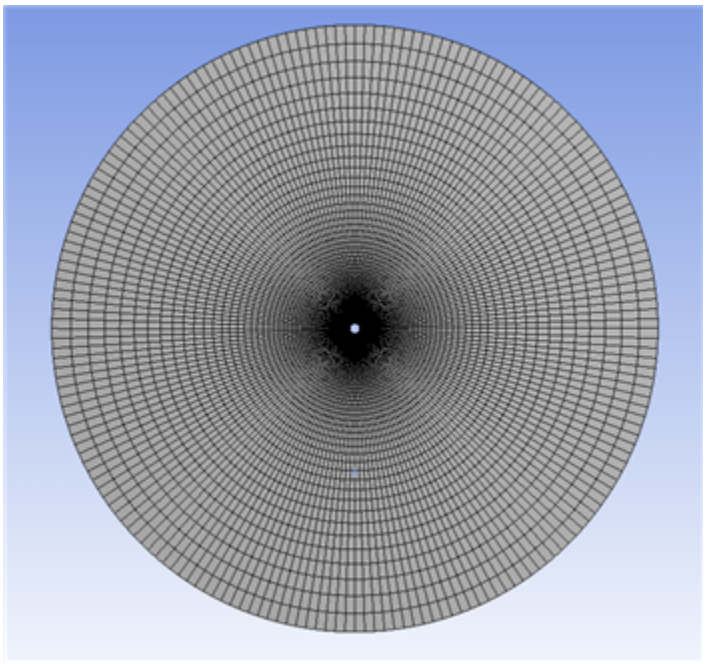
Scope	
Scoping Method	Geometry Selection
Geometry	1 Edge
Definition	
Suppressed	No
Type	Number of Divisions
Number of Divisions	96
Behavior	Hard
Bias Type	_____ ___ _ _
Bias Factor	460.

Radial Edge Sizing 2 (Bottom Half)

(Right Click) Mesh > Insert > Sizing
Set ***Geometry*** to the bottom half of the bisecting line. Set ***Type*** to ***Number of Divisions***, set ***Number of Divisions*** to 96 and set ***Behavior*** to ***Hard***. Then, set ***Bias Type*** to the second option and set ***Bias Factor*** to 460. These selections are shown in the image below.

Details of "Edge Sizing 3" - Sizing	
Scope	
Scoping Method	Geometry Selection
Geometry	1 Edge
Definition	
Suppressed	No
Type	Number of Divisions
Number of Divisions	96
Behavior	Hard
Bias Type	_ _ ___ _____
Bias Factor	460.

Then, click ***Update*** to generate the new mesh. You should obtain the mesh, that is shown below.



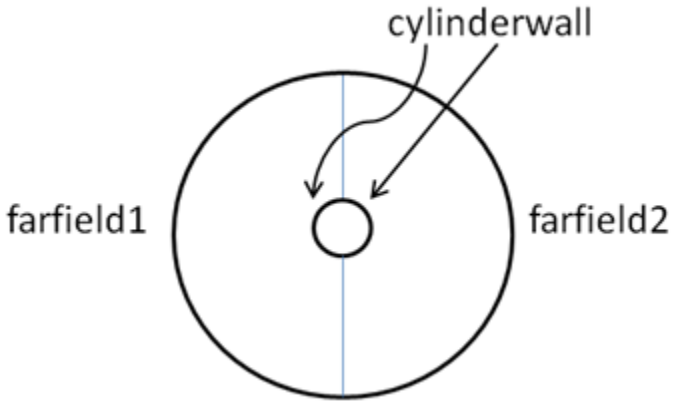
Click Here For Higher Resolution

Verify Mesh Size

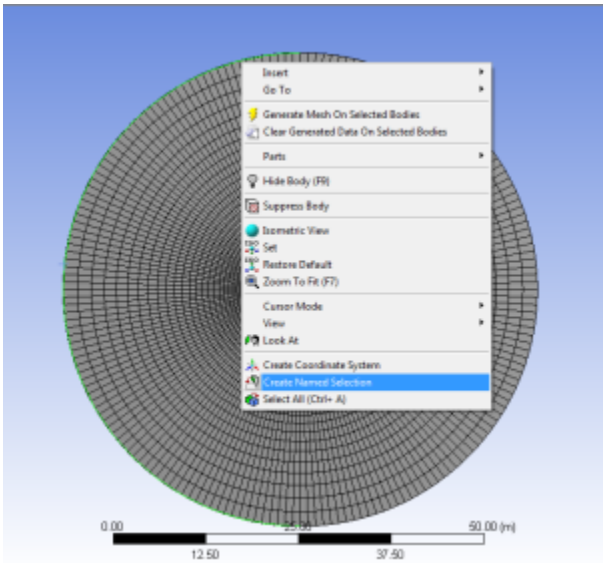
(Click) Mesh > (Expand) Statistics
You should have 18,624 nodes and 18,432 elements.

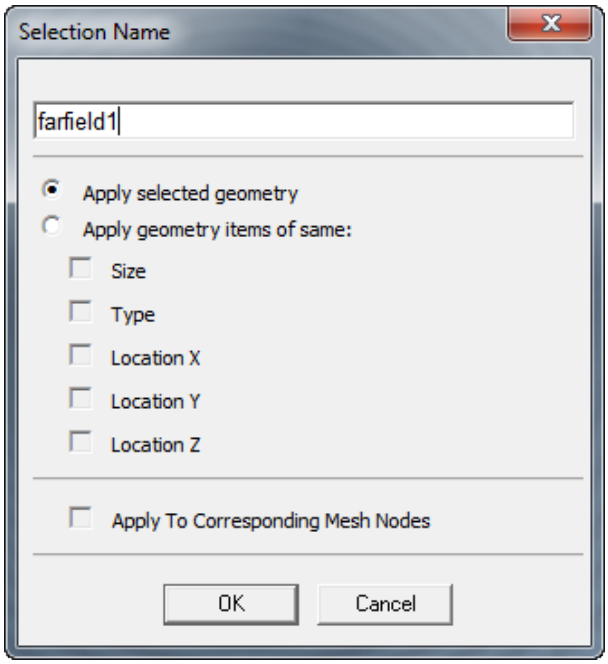
Create Named Selections

In this section the various parts of the geometry will be named according to the image below.



First create a named selection for the left half of the outer boundary and call it "farfield1". To create the named selection, choose the edge selection filter  ,Then choose the left half of the outer boundary. After the edge is chosen, it should appear to be green. Then right click and select "Create Named Selection". In the new window that appears, type in farfield1 and select "OK" to confirm.





Next, similarly create a named selection for the right half of the outer boundary and call it "farfield2". Create a named selection for both sides of the inner circle(cylinder) and call it "cylinderwall". When creating the third named selection, make sure that you included both halves of the circle. You will have to hold down **control** to select both edges.

Lastly, create a named selection for the flow domain. Select the face of the flow domain between the cylinder wall and farfield1 and farfield2 and call it "flowdomain".

Save Project; Close ANSYS Mesher.

Go to Step 4: Physics Setup

Go to all FLUENT Learning Modules