# Section 10 Feb 2009

For pipe, what boundary condition we are using?
Wall
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Inlet Outlet

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Wall

Compared to pipe which is internal flow, flow past cylinder is a external flow.

For boundary condition, we are imposing free stream condition. Determine how far we need to go.

If we go far enough from cylinder, we will impose zero gradient (not really right). We want to set it such that the boundary conditions will not affect the flow near cylinder.

We have a cylinder, outer boundary is going to look like this.

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| Normal Gradient<br>\\\<br>\\\<br>--- |
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10R 40R

Experience tell that the distance from cylinder is shown above. We dont want to create too big of the model to waste unnecessary computing power.

Only use fine mesh in region of interest and region where activity is a lot.

Region around cylinder and also at the wake.

Not much action happen on the front part. That's why we use grading on the front part.

Modeling:

First create the cylinder with two arcs because they are going to be mesh differently.

Create back cylinder arc of radius 1. -90 to 90 back. 90 to -90 front.

Create outer boundary. Create arc of 10 times cylinder. Use copy edges scale by 10.

Then create back outer boundary. Create vertex. then create vertices. (Use display grid)

middle mouse to translate. Right click to zoom in out.

Then create radius of influence. How faces connect to each other determine the topology.

Create arc from -45 to 45. The 45 to -45. The split edge at 90 deg. Create arc in counter clockwise direction. When split edge, change to cylindrical.

Each edge has opposite edge to it for regular mesh.

Look at the project button at create vertex. Project vertex!!! (project vertex instead of split edges!!)