

FLUENT - Supersonic Flow Over a Wedge- Step 1

Problem Specification

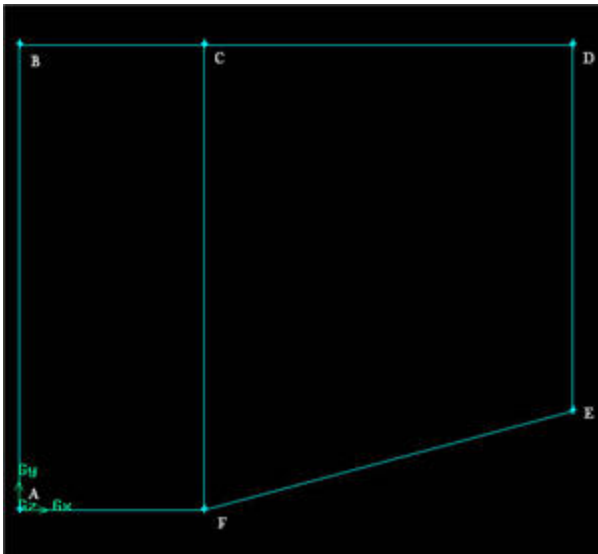
1. **Pre-Analysis & Start-up**
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Step 1: Create Geometry in GAMBIT

This tutorial leads you through the steps for generating a mesh in GAMBIT for a wedge geometry. The generated mesh can then be read into FLUENT for fluid flow simulation.

In an external flow such as that over a wedge, we need to define a farfield boundary and mesh the region between the wedge and the farfield boundary. It is a good idea to place the farfield boundary well away from the wedge to reduce interference with the shock that we want to observe.

The overall boundary is shown below.



Where ABCDE is the farfield boundary and FE is the wedge.

Start GAMBIT

Create a new directory called *wedge* and start *GAMBIT* from that directory by typing `gambit -id wedge` at the command prompt.

Under **Main Menu**, select **Solver > FLUENT 5/6** since the mesh to be created is to be used in FLUENT 6.0.

Create Vertices

The coordinates needed for the mesh are shown below

| Label | x | y | z |
|-------|-----|-------|---|
| A | 0 | 0 | 0 |
| B | 0 | 1.259 | 0 |
| C | 0.5 | 1.259 | 0 |
| D | 1.5 | 1.259 | 0 |

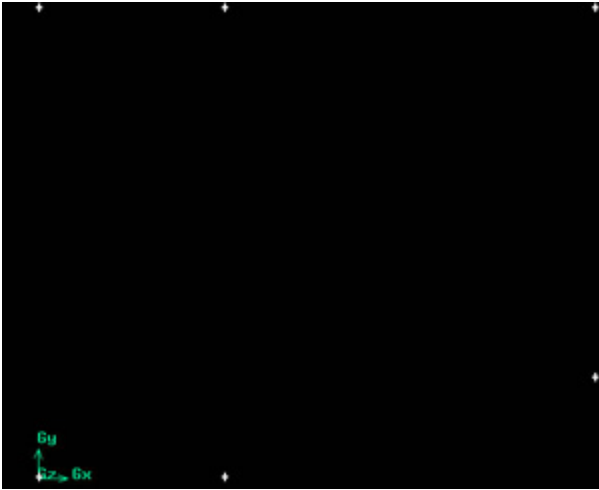
| | | | |
|---|---------|-----------|---|
| E | 1. 5 | 0.26 8 | 0 |
| F | 0. 5 | 0 | 0 |

Using bottom up approach, we start by creating vertices of the geometry using the coordinate given.

Operation Toolpad > Geometry Command Button  **> Vertex Command Button**  **> Create Vertex** 

Create the vertices by entering the coordinates under **Global** and the label under **Label**:




Click the **FIT TO WINDOW** button to scale the display so that you can see all the vertices. The resulting image should look like this:



[Higher Resolution Image](#)

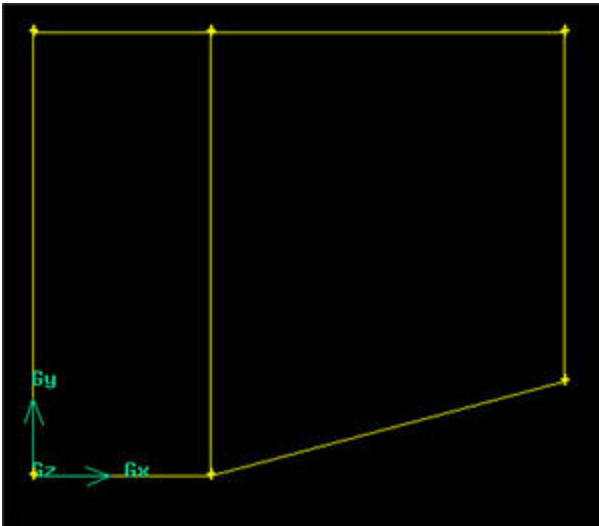
Create Edges

Now we can create the edges using the vertices created.

Operation Toolpad > Geometry Command Button  **> Edge Command Button**  **> Create Edge** 

Create the edge AB by selecting the vertex A followed by vertex B. Enter AB for **Label**. Click **Apply**. GAMBIT will create the edge. You will see a message saying something like "Created edge: AB" in the *Transcript* window.

Similarly, create the edges BC, CD, DE, EF, FA and CF. Click on the  to select the vertices from the list and move them to the picked list. You can also hold the shift button and mouse click the vertices for selection. The resulting image should look like this.



[Higher Resolution Image](#)

Create Faces

The edges we have created can be joined together to form faces. We will need to define two faces.

Operation Toolpad > Geometry Command Button  **> Face Command Button**  **> Form Face** 

This brings up the *Create Face From Wireframe* menu. Recall that we had selected vertices in order to create edges. Similarly, we will select edges in order to form a face.

We will call two faces face1 and face2. To create the face1, select the edges AB, BC, CF, and FA. Enter face1 for the label and click **Apply**. GAMBIT will tell you that it has "Created face: face1" in the transcript window.

Similarly, create the face face2 by selecting CD, DE, EF and CF.

We are now ready to mesh the geometry.

Go to [Step 2: Geometry](#)

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