FLUENT - Supersonic Flow Over a Wedge- Step 7

Site Under Construction

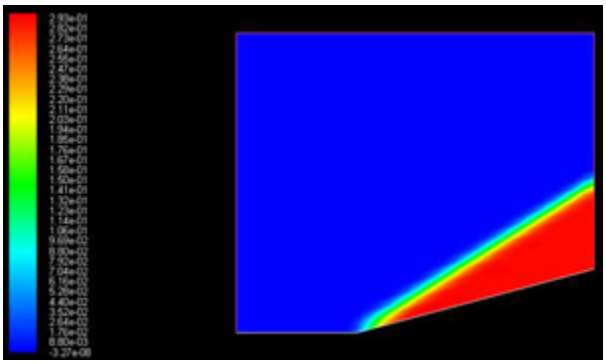
Please bare with us as we update this site to include instructions for the newest version of FLUENT.

Step 7: Verify Results

Comparing Solution for Coarse, Medium and Fine Mesh

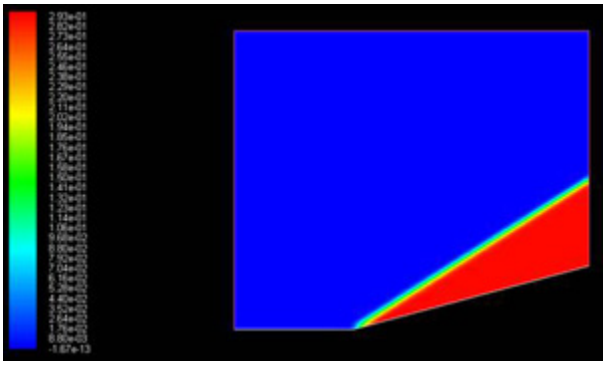
Now that we observed the result that we are supposed to obtain, we can continue to compare the results with different mesh density. We start with creating fine and course mesh in Gambit, then obtain the solution using Fluent.

Contours of pressure coefficient for coarse mesh



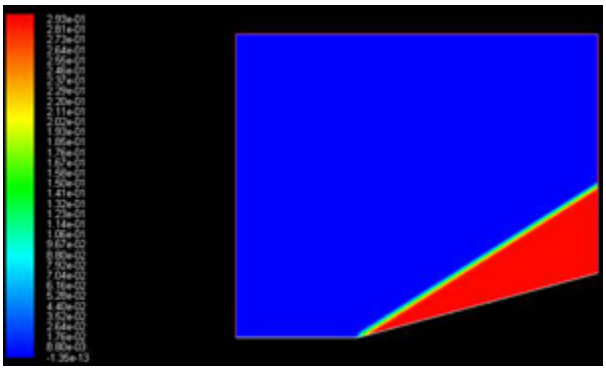
Higher Resolution Image

Contours of pressure coefficient for medium mesh



Higher Resolution Image

Contours of pressure coefficient for fine mesh

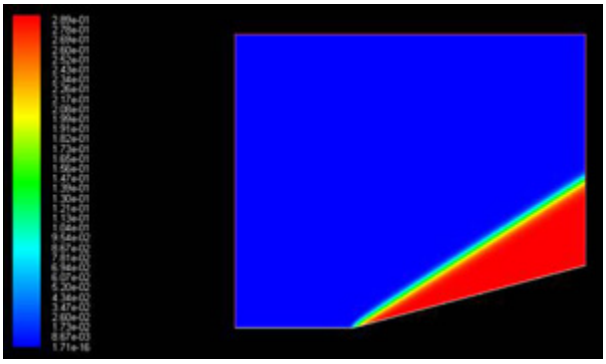


Higher Resolution Image

From the comparison of pressure coefficient for diffent mesh density, we see that the pressure coeffient values are still the same. However, the shockwave get thinner as the mesh get more refine. This suggest the solution is more accurate as the mesh is more refine.

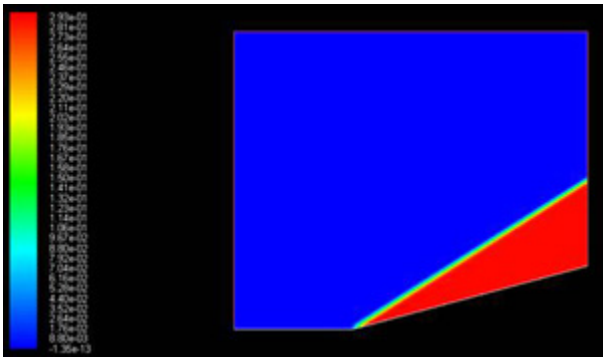
Comparing Solutions Solved Using First Order and Second Order Method

Contours of pressure coefficient for first order discretization method



Higher Resolution Image

Contours of pressure coefficient using second order discretization method



Higher Resolution Image

From comparison, both methods provide slightly different value of pressure coefficient. The oblique shockwave is thinner using second order method. This suggest that the second order method provide a more accurate simulation of the super sonic flow over wedge. In general, second order discretization method will provide more accurate solution, but it is more difficult to obtain converged solution if the geometry is complex. So it is a good practice to start with a first order solution and then continue solving the problem using second order discretization method.

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