

FLUENT - Supersonic Flow Over a Wedge- Step 7

Problem Specification

1. Pre-Analysis & Start-up
2. Geometry
3. Mesh
4. Setup (Physics)
5. Solution
6. Results
7. **Verification & Validation**



Site Under Construction

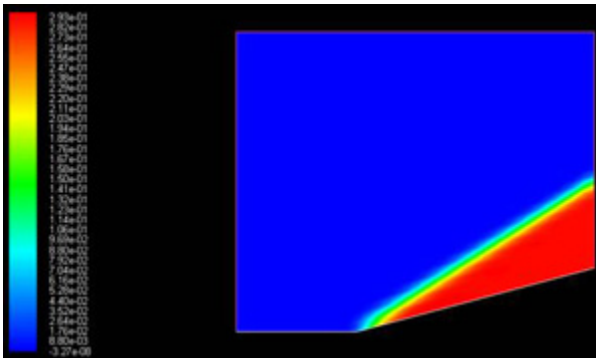
Please bare with us as we update this site to include instructions for the newest version of FLUENT.

Step 7: Verify Results

Comparing Solution for Coarse, Medium and Fine Mesh

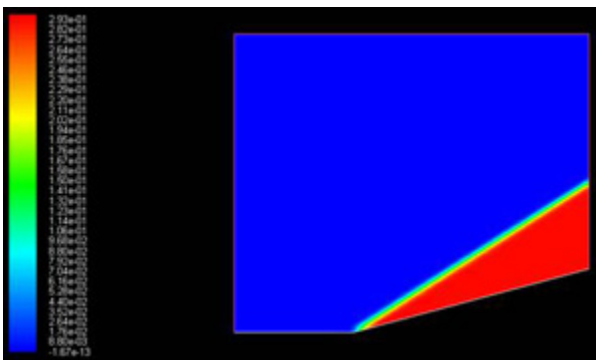
Now that we observed the result that we are supposed to obtain, we can continue to compare the results with different mesh density. We start with creating fine and course mesh in Gambit, then obtain the solution using Fluent.

Contours of pressure coefficient for coarse mesh



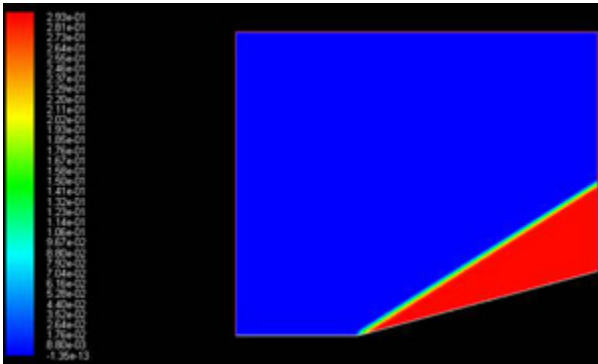
[Higher Resolution Image](#)

Contours of pressure coefficient for medium mesh



[Higher Resolution Image](#)

Contours of pressure coefficient for fine mesh

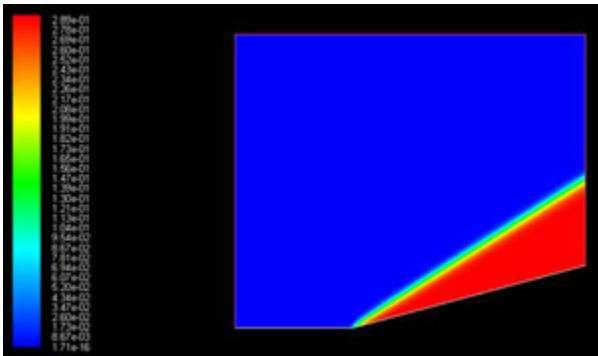


[Higher Resolution Image](#)

From the comparison of pressure coefficient for different mesh density, we see that the pressure coefficient values are still the same. However, the shockwave gets thinner as the mesh gets more refined. This suggests the solution is more accurate as the mesh is more refined.

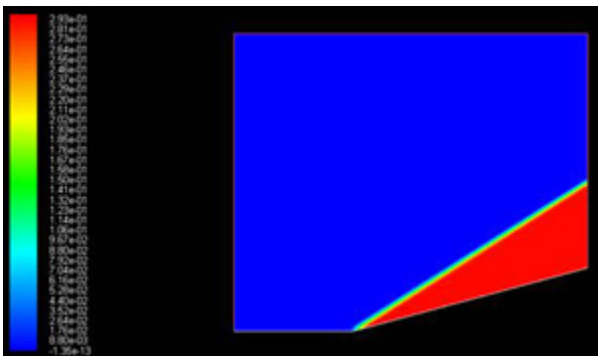
Comparing Solutions Solved Using First Order and Second Order Method

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 values of pressure coefficient. The oblique shockwave is thinner using the second order method. This suggests that the second order method provides a more accurate simulation of the supersonic flow over a wedge. In general, the second order discretization method will provide a more accurate solution, but it is more difficult to obtain a 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 the second order discretization method.

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