FLUENT - Supersonic Flow Over a Wedge - Step 5 * New

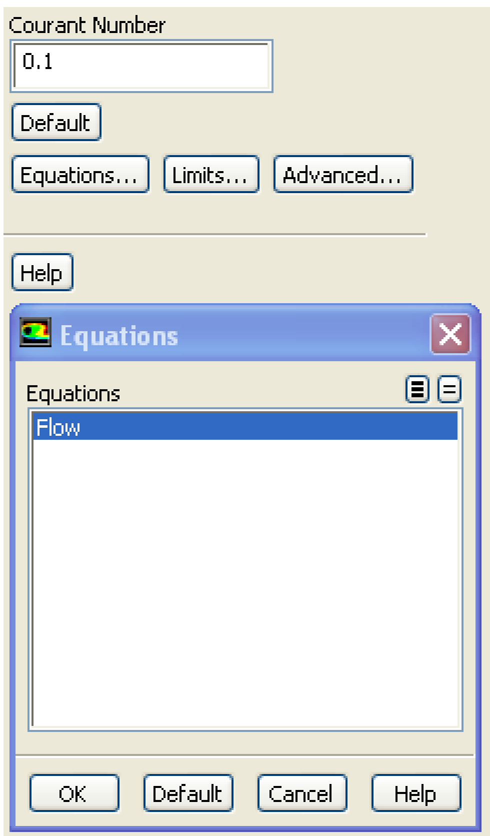
Useful Information

Click here for the FLUENT 6.3.26

Step 5: Solve!

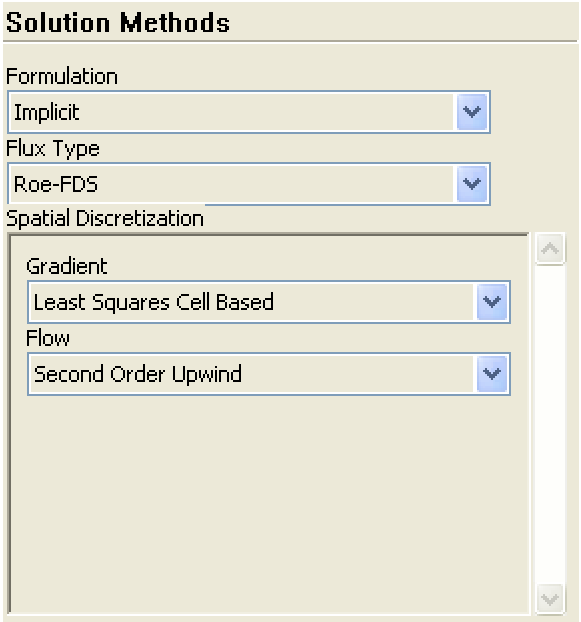
Solve > Controls or **Solutions > Solution Controls**

Click on the ***Equations*** button and select ***Flow***, then click OK. Also, set the ***Courant Number*** to 0.1.



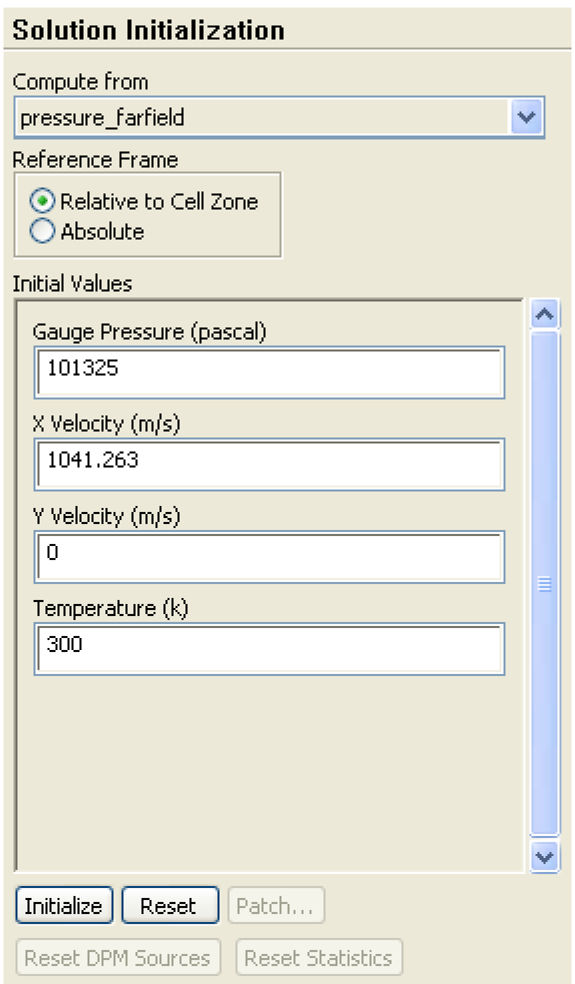
Solve > Methods or **Solutions > Solution Methods**

We'll use a second-order discretization scheme. Under ***Spatial Discretization***, set ***Flow*** to ***Second*** Order Upwind.



Solve > Initialization or **Solutions > Solution Initialization**

This is where we set the initial guess values for the iterative solution. We'll use the farfield values (M=3, p=1 atm, T=300 K) as the initial guess for the entire flowfield. Select ***farfield*** under ***Compute From***. This fills in values from the farfield boundary in the corresponding boxes. (Alternately, I could have typed in these values but I like to palm off as much grunt work as possible to the computer.)

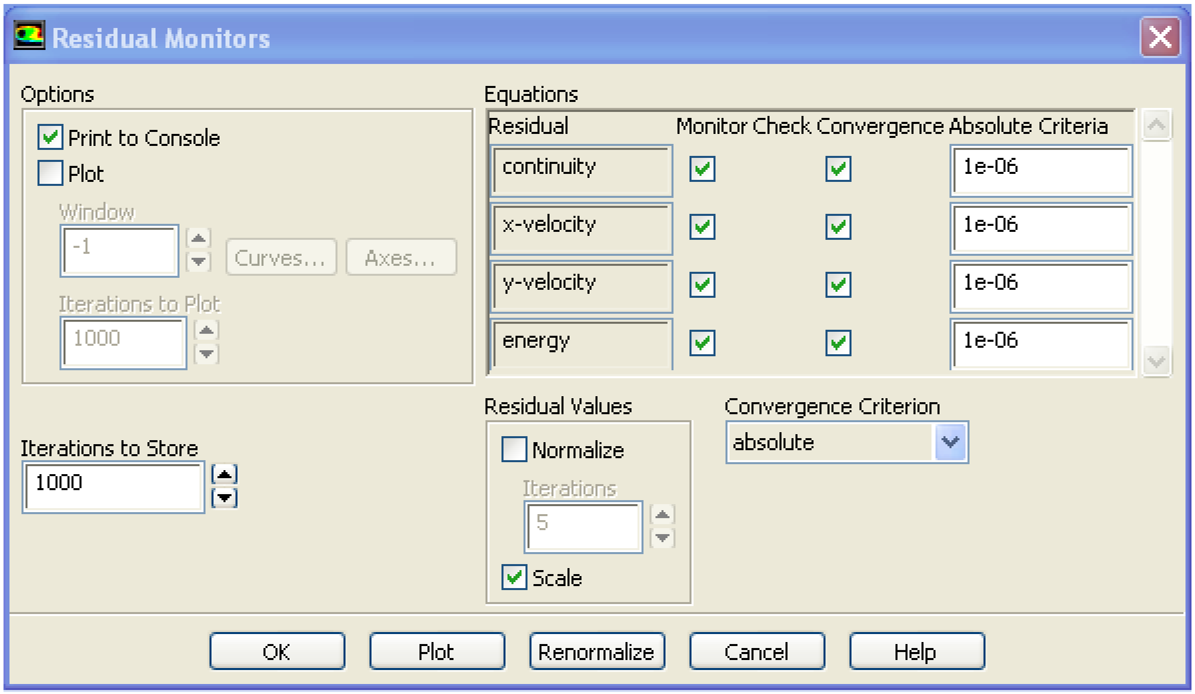


Click ***Initialize***. Now, for each cell in the mesh, M=3, p=1 atm, T=300 K. These values will of course get updated as we iterate the solution below.

FLUENT reports a residual for each governing equation being solved. The residual is a measure of how well the current solution satisfies the discrete form of each governing equation. We'll iterate the solution until the residual for each equation falls below 1e-6.

Solve > Monitors

Select ***Residuals - Print*** and click ***Edit***. Set ***Absolute Criteria*** for ***all equations***to 1e-6.



Also, click on ***Plot***. This will plot the residuals in the graphics window as they are calculated; giving you a visual feel for if/how the iterations are proceeding to convergence.

Click ***OK***.

Main Menu > File > Write > Case...

This will save your FLUENT settings and the mesh to a "case" file. Type in wedge.cas for ***Case File***. Click ***OK***.

Solve > Run Calculation...

Set the ***Number of Iterations*** to 1000. Click ***Calculate***.

The residuals for each iteration are printed out as well as plotted in the graphics window as they are calculated. The residuals after 1000 iterations are not below the convergence criterion of 1e-6 specified before. So run the solution for 1000 more iterations. The solution converges in about 1510 iterations; the residuals for all the governing equations are below 1e-6 at this point.

Save the solution to a data file:

Main Menu > File > Write > Data...

Enter wedge.dat for Data File and click OK. Check that the file has been created in your working directory. You can retrieve the current solution from this data file at any time.

Go to 6. Results

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