FLUENT - Compressible Flow in a Nozzle- Step 5 *New

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Step 5: Solution

> (i) **Useful Information**
>
> These instructions are for FLUENT 12. Click here for instructions for FLUENT 6.3.26.

Now we will set the solve settings for this problem and then solve using an iterative approximation process.

Under Solution > Solution Methods

We'll just use the defaults. Note that a second-order Upwind scheme will be used. Click *OK*.

Set Initial Guess

Main Menu > Solve > Initialization

As you may recall from the previous tutorials, this is where we set the initial guess values for the iterative solution. We'll set these values to be the ones at the inlet, so under *Compute From* select *inlet.*This will automatically set the initial values for all the cells. You can also type the values by hand and the results will be equivalent.

Solution Initialization

Compute from

Reference Frame

- (•) Relative to Cell Zone
- ( ) Absolute

Initial Values

Gauge Pressure (pascal)

99348

Axial Velocity (m/s)

58.1723

Radial Velocity (m/s)

0

Temperature (k)

298.3188

| Initialize | Reset | Patch... |

| Reset DPM Sources | Reset Statistics |

Click *Initialize*. This completes the initialization.

Set Convergence Criteria

FLUENT reports a residual for each governing equation being solved during the iterative process. 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.

Main Menu > Solve > Monitors or **Under Solution > Monitors** select **Residual > Edit**

Change the residual under *Convergence Criterion* for *continuity*, *x-velocity*, *y-velocity* and *energy* to 1e-6.

Also, under **Options** select **Plot** if is not selected yet. This will plot the residuals in the graphics window as they are calculated.
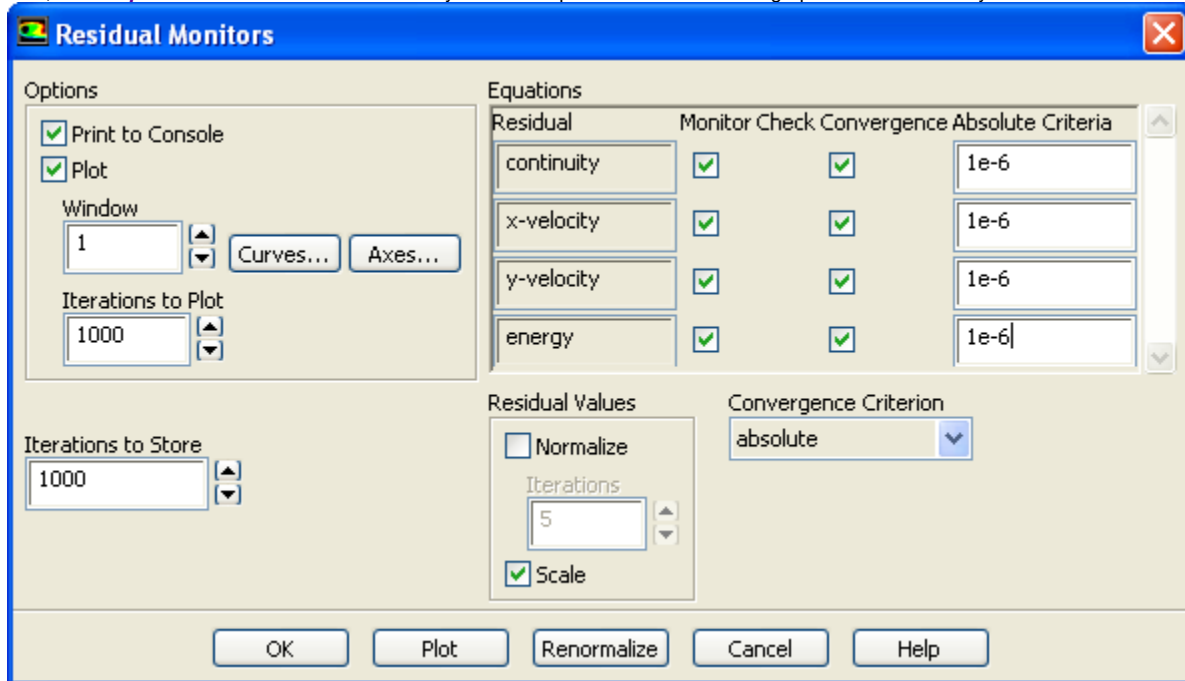
Click **OK**.

Iterate Until Convergence

Main Menu > Solve > Run calculation or **Under Solution > Run Calculation**

In the *Iterate Window* that comes up, change the **Number of Iterations** to 500. Click **Calculate**.

The residuals are printed out as well as plotted in the graphics window for each iteration.

Save the case and data after you have obtained a converged solution by going to **File > Write > Case & Data**

Go to Step 6: Results

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