2D Steady Convection - Verification & Validation

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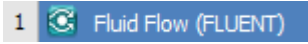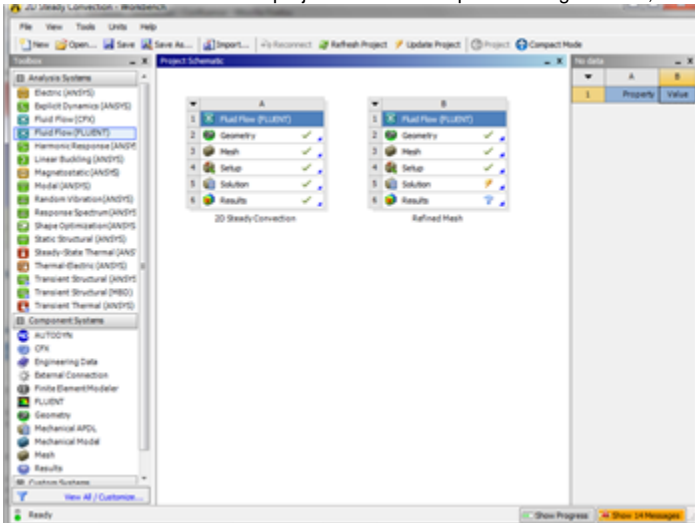
Verification & Validation

Create Another Instance of the Project

Return to the *Project Schematic* Window. Right click on the ***Fluid Flow (FLUENT)*** box ![Fluid Flow (FLUENT)], and select ***Duplicate***. This will create another instance of the project. When the duplicate box generates, rename it `Refined Mesh`


Refine the Mesh

Open up the mesher of the newly created project by double clicking ![3 Mesh] box of *Refined Mesh*. We want to refine the mesh by increasing the number of elements. To accomplish this, expand ***Mesh*** in the *Outline* window, and click ***Edge Sizing***. If you followed the tutorial, this should be an element sizing of the horizontal lines of the domain. Decrease the ***Element Size*** from `0.1` to `.025`. Next, click ***Edge Sizing 2***, the divisional edge sizing of the outlet and inlet. Increase the ***Number of Divisions*** to {{80)) divisions. In the menu bar, select ***Mesh > Generate Mesh***. After the Mesh Generates, close the mesher.

Connect The Unrefined Mesh's Solution

Return to the project schematic. We want to be able to compare the Unrefined Mesh's results to those of the Refined Mesh. To accomplish, click and drag the Solution Box ![5 Solution] of the *2D Steady Convection* project instance to the Results Box of the *Refined Mesh* Project instance. See the picture below for clarification.
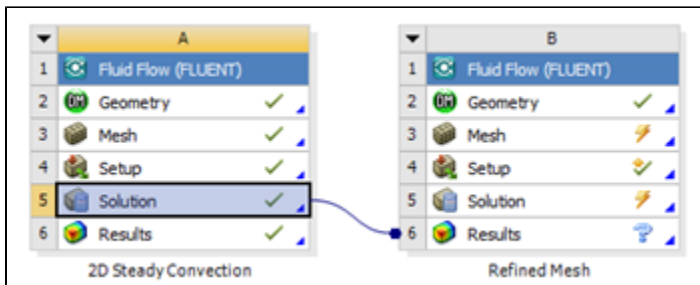
Next, press **Update Project** to update the project.

View Results

Next, open the Post Processor of the *Refined Mesh* project instance by double clicking **Results** . In the *Outline*, select the ***Temperature Along Centerline*** chart we made earlier. Next, In the *Details of Temperature Along Centerline* window, go to the ***Line Display*** tab. You should see there are two data series on the graph. Select ***Series 1 for Refined Mesh***, change ***Line Style*** to ***Dot***, and press ***Apply***. You should now see two plotted lines on the plot, as below.
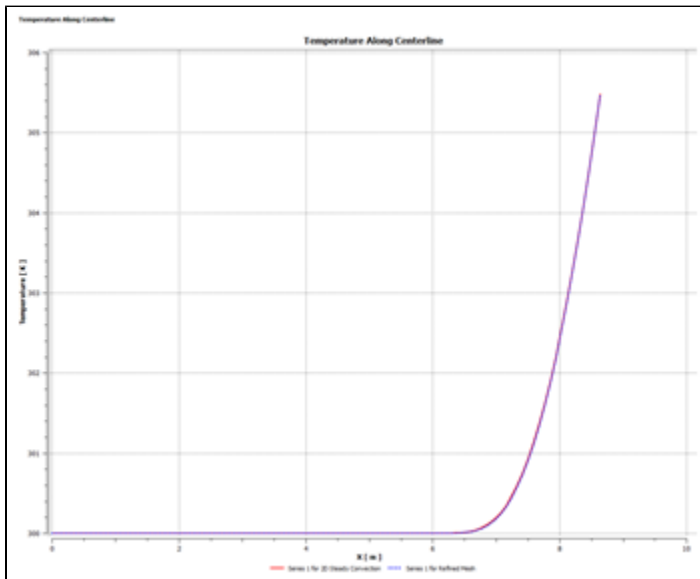
[Click here to enlarge]

Repeat this process for the ***Temperature Along Outlet*** chart.
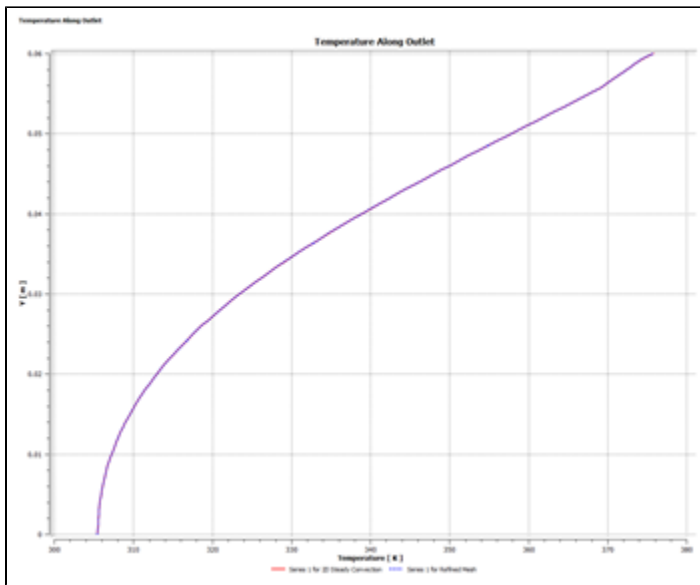
Click here to enlarge

Because the data does not diverge as we refine the mesh, we have validated our results. We are done with the simulation.

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