AIM Backwards Facing Step - Verification

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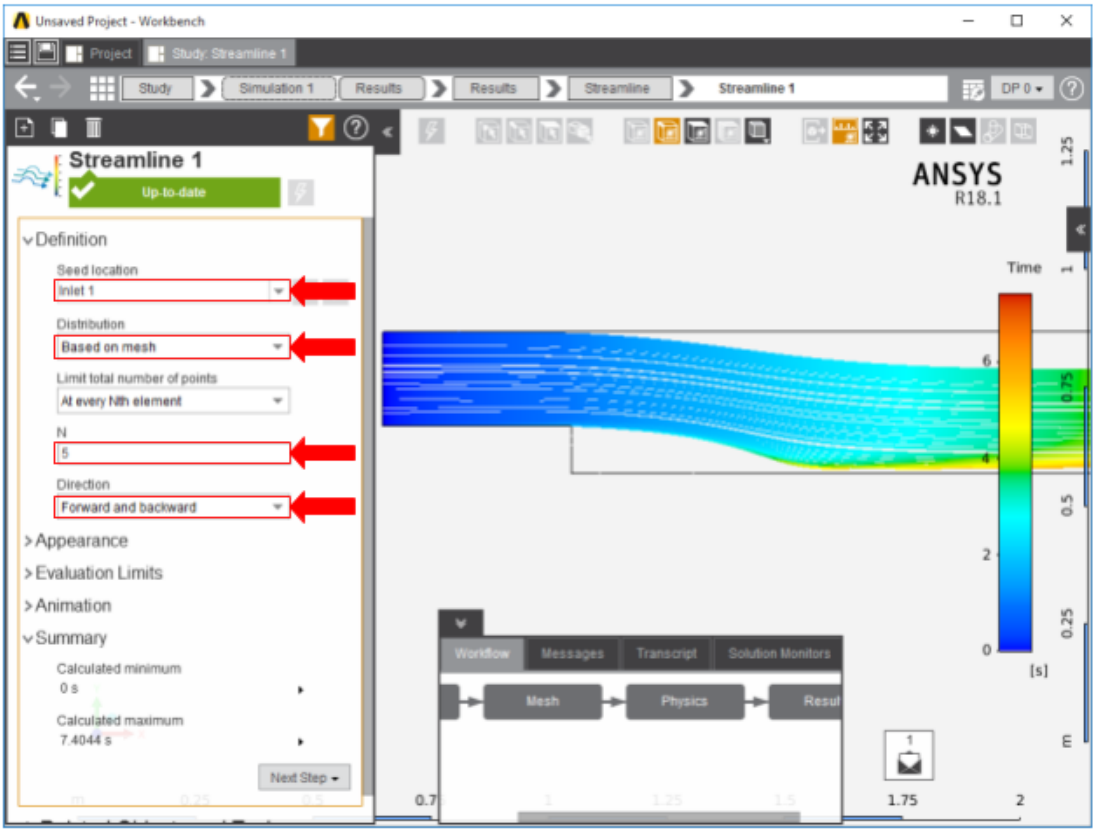
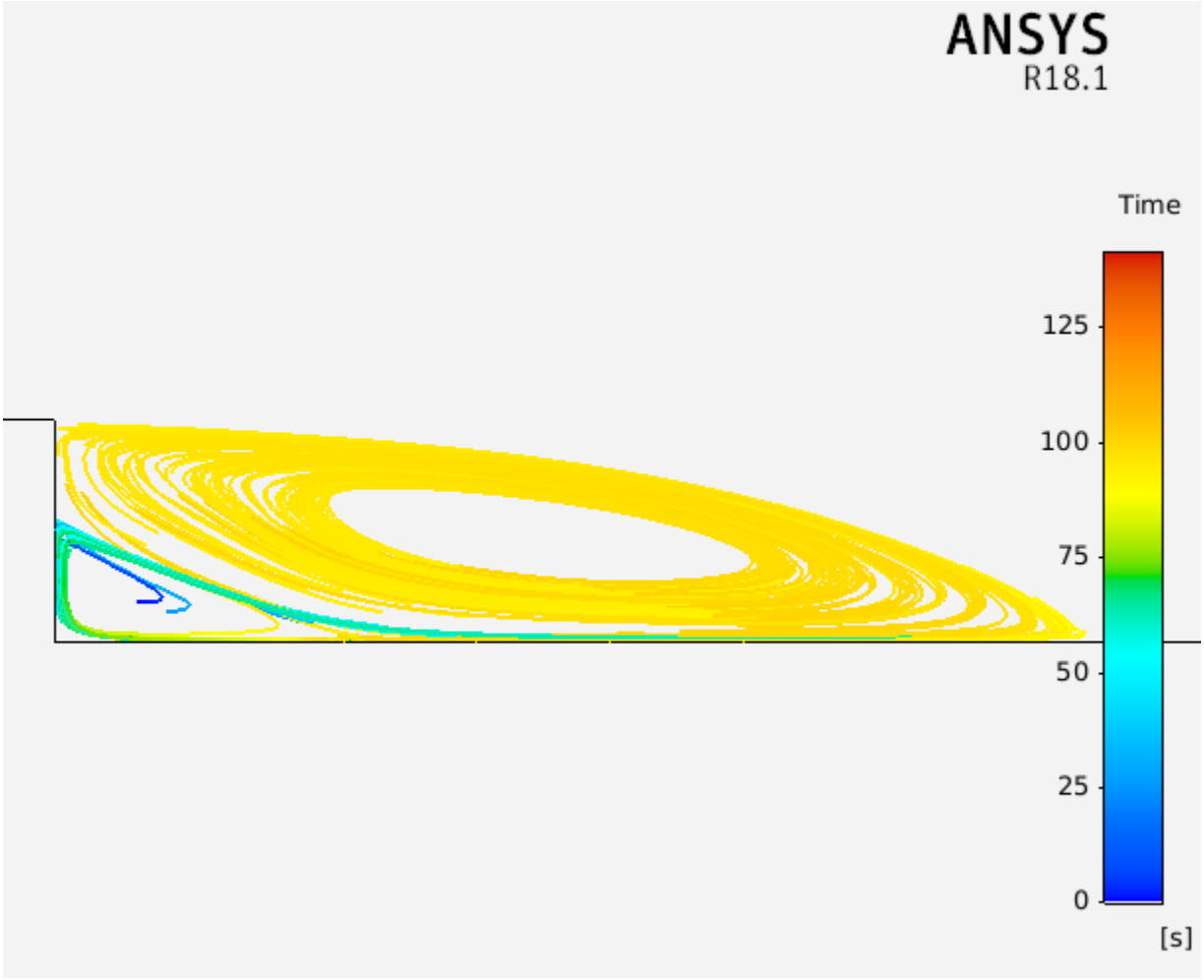
Problem Specification
1. Pre-Analysis & Start-Up
2. Geometry
3. Mesh
4. Physics Setup
5. Results
6. Verification & Validation

Verification

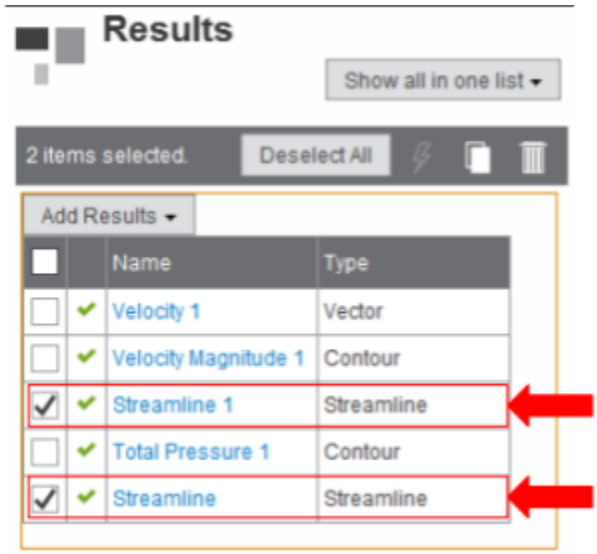
Since so many study cases have been done for this problem, it is easiest to validate our simulation against those cases. In this tutorial, "Backward-Facing Step Flows for Various Expansion Ratios at Low and Moderate Reynolds Numbers" by G. Biswas, M. Breuer, and F. Durst will be our study case, and the streamlines will be compared to the simulation. In order to plot a streamline in AIM, select **Streamline** from the **Add** drop down menu. Select the **Inlet** as the **Seed location**, change the **Distribution** to **Based on mesh**, change **N** to 5, and change the **Direction** to **Forward and backward**.



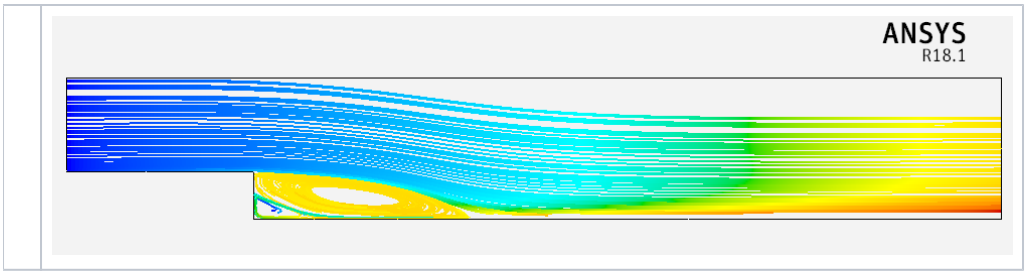
A second steamline will be created to show the recirculation behind the step, using a plane located inside the recirculation region as the **Seed location**. Return to the **Results** task, select the small step wall using the **Face selection** tool, and then create a plane by pressing the **Add Plane** button. Using the blue arrow, drag the plane to a location downstream of the step, about 1.5 times the step height away from the step. Return to the **Results** task and select **Streamline** from the **Add** drop down menu. Select the newly created **Plane** as the **seed location**, change the **Distribution** to **Based on mesh**, change **N** to 2, and change the **Direction** to **Forward and backward**. The following image is a zoomed in picture of the eddy found at the corner of the step.



The two streamlines can now be combined by traveling to the result list within the Results tab. Check off the boxes for the two streamlines to get the enchanced streamline image.



A streamline plot from the study case and from the simulation are shown below. It can be seen that the simulated flow behaved just as we had expected it to in our problem specification and the case study.



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