

ANSYS Steady Flow over a Cylinder - Preanalysis & Startup

Author(s): Sebastian Vecchi, ANSYS Inc.

Problem Specification

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

Pre-Analysis & Start Up

Solution Domain

For an external flow problem like this, one needs to determine where to place the outer boundary. A square domain will be used for this simulation. The effects that the cylinder has on the flow extend far downstream. Thus, the distance to the outlet end boundary will be much larger than the distance to the inlet boundary.

Boundary Conditions

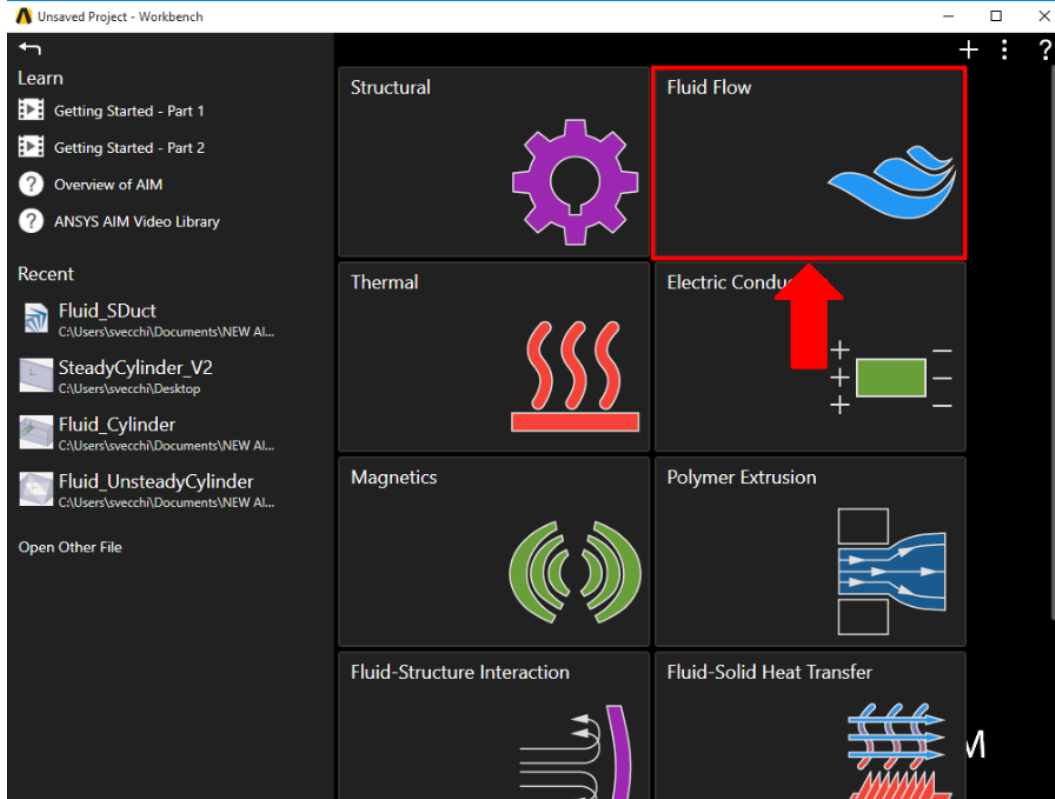
First, we will specify a velocity inlet boundary condition. We will set the left side of the outer boundary as a velocity inlet with a velocity of 1 m/s in the x direction. Next, we will use a pressure outlet boundary condition for the right side of the outer boundary with a gauge pressure of 0 Pa. Lastly, we will apply a no slip boundary condition to the cylinder wall. The aforementioned boundary conditions are illustrated below.

Start-Up

A few words on the formatting on the following instructions:

1. Notes that require you to perform an action are colored in blue
2. General information is colored in black, but does not require any action
3. Words that are **bolded** are labels for items found in ANSYS AIM
4. Most important notes are colored in red

Now that we have the pre-calculations, we are ready begin simulating in ANSYS AIM. Open ANSYS AIM by going to [Start > All Apps > ANSYS 18.1 > ANSYS AIM 18.1](#). Once you are at the starting page of AIM select the **Fluid Flow** template as shown below.



You will be prompted by the **Fluid Flow** template to either **Define new geometry**, **Import geometry file**, or **Connect to active CAD session**. Select **Define new geometry** and press **Next**. Do not select any **Additional flow** physics; instead, continue to the model editor by selecting **Finish**.

Go to Step 2: Geometry

[Go to all ANSYS AIM Learning Modules](#)