FLUENT - Unsteady Flow Past a Cylinder - Problem Specification

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Problem Specification
1. Create Geometry in GAMBIT
2. Mesh Geometry in GAMBIT
3. Specify Boundary Types in GAMBIT
4. Set Up Problem in FLUENT
5. Solve!
6. Analyze Results
7. Validate the Results

Problem Specification

The purpose of this tutorial is to illustrate the setup and solution of an unsteady flow past a circular cylinder and to study the vortex shedding phenomenon. Flow past a circular cylinder is one of the classical problems of fluid mechanics. For this problem, we will be looking at Reynolds number of 150.

$$Re = \frac{\rho V D}{\mu}$$

We know D = 2 m. To obtain Re = 150, we can arbitrarily set , V and . For our case, let's set = 75 kg/m ^{3} , V = 1 m/s and = 1 kg/ms.

Preliminary Analysis

For Re = 150, we are looking at unsteady flow with periodic vortex shedding. What will be the shedding frequency of this flow? How will the vortex shedding looks like?

Let's start the modeling in our quest to find out the answer!

We'll create the geometry and mesh in GAMBIT which is the preprocessor for FLUENT, and then read the mesh into FLUENT and solve for the flow solution.

Go to Step 1: Create Geometry in GAMBIT

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