Project
Teams, Project definition
Due date: March 18, 2021

The course project will involve the solution of a problem using the package `OpenFOAM`. The project will be done by teams, each comprising four students or less. The teams will be formed through mutual consultation amongst yourselves. A list of topics is given below. The problems are broadly defined and detailed definition of the will be done by each team in consultation with the instructor (me). More than one team may work on a given topic.

The team composition and the first draft of the project definition should be uploaded by 18 March. Each team should make one common submission on `moodle`. The definition should give the system proposed to be studied, the range of computations proposed and the results that will be generated. I will provide feedback. The project will require intermediate submissions to show the progress being made. The schedule of such submissions will be informed to you in due course.

Topics

All systems are two-dimensional to keep computational times reasonable.

1. Optimization of the geometry of a venturi flow meter with respect to energy consumption under turbulent conditions for a given accuracy of flow measurement.

2. Optimization of the geometry of an orifice flow meter with respect to energy consumption under turbulent conditions for a given accuracy of flow measurement.

3. Flow patterns in the draining of a tank with an exit at the side under laminar and turbulent conditions.

4. Pressure drop and flow pattern for horizontal flow past a bank of vertical cylinders under turbulent conditions.

5. Effect of streamlining on the drag force on a body in a uniform flow. The front half of the body is circular and rear half may be varied to study the effect on drag.

6. Flow in a horizontal channel with the exit partially blocked by a weir under laminar and turbulent conditions.

7. Flow and pressure drop in a right angled elbow under turbulent flow conditions for varying curvature.

8. Flow pattern in a Y-junction where there is one inlet and two exits of different widths.

---

[1]D. V. Khakhar