Abstract

This Report aim to describe the turbulent flow field through a Nozzle over an simple Convex Surface geometry by using the Gmsh and OPENFoam Softwares.It also demostrate the Coanda Effect by comparing the flow field over Convex Surface to the flow field over Blunt Surface Geometry.The Coanda effect is the phenomena in which a jet flow attaches itself to a nearby surface and remains attached even when the surface curves away from the initial jet direction. In free surroundings, a jet of fluid entrains and mixes with its surroundings as it flows away from a Nozzle.

Problem statement

For a steady state turbulent flow , Analyze the airflow over convex surface Geometry(FIgure 1).use a suitable turbulence model.calculate the pressure along the convex surace Geometry.Now replace the convex surface geometry with a blunt body(cube) and compare the pressure along the surface of two Geometries.
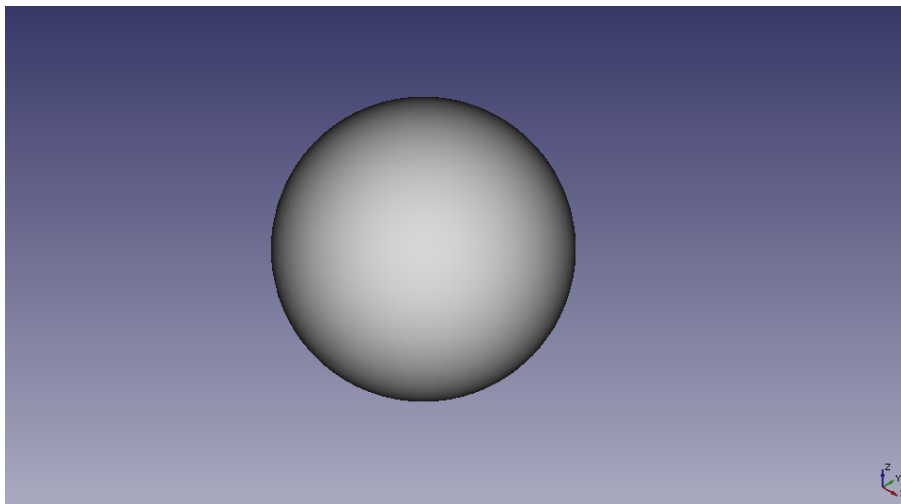

Figure 1

Following are the initial conditions that you will need to solve the problem:

p(internal field) = 1 atm;

Fluid velocity through nozzle, V = 40 m/s;

Density = 1.225 kg/m3;

nu = 1.5e-5;

Include plots and pictures in the report wherever necessary.