ABSTRACT

The report aims to validate the Stokes' Law for frictional or drag force on spherical objects for laminar flow using the software ANSYS and OpenFOAM. This is aimed to be achieve by comparing the numerical results obtained for Stokes' Law and the analytical results obtained from OpenFOAM. Multiple samples will be created and will be compared against their respective results. Though Stokes' Law is simple and only applicable for laminar flow, it has many important applications such as study of motion of microorganisms, water droplet falling from cloud, etc. This makes it necessary to analyse it find the good working range of this law.

PROBLEM STATEMENT

For a **steady state laminar flow,** analyse the motion of the fluid around the spherical body (Figure 1) for many test cases for the same geometry of sphere and different values for terminal velocity. All the test cases will be compared with their respective models by consideration of drag force on the body. The percentage error due to assumptions of Stokes' Law will be calculated. Through the comparison of errors for different models, the valid range of application of law can be found.

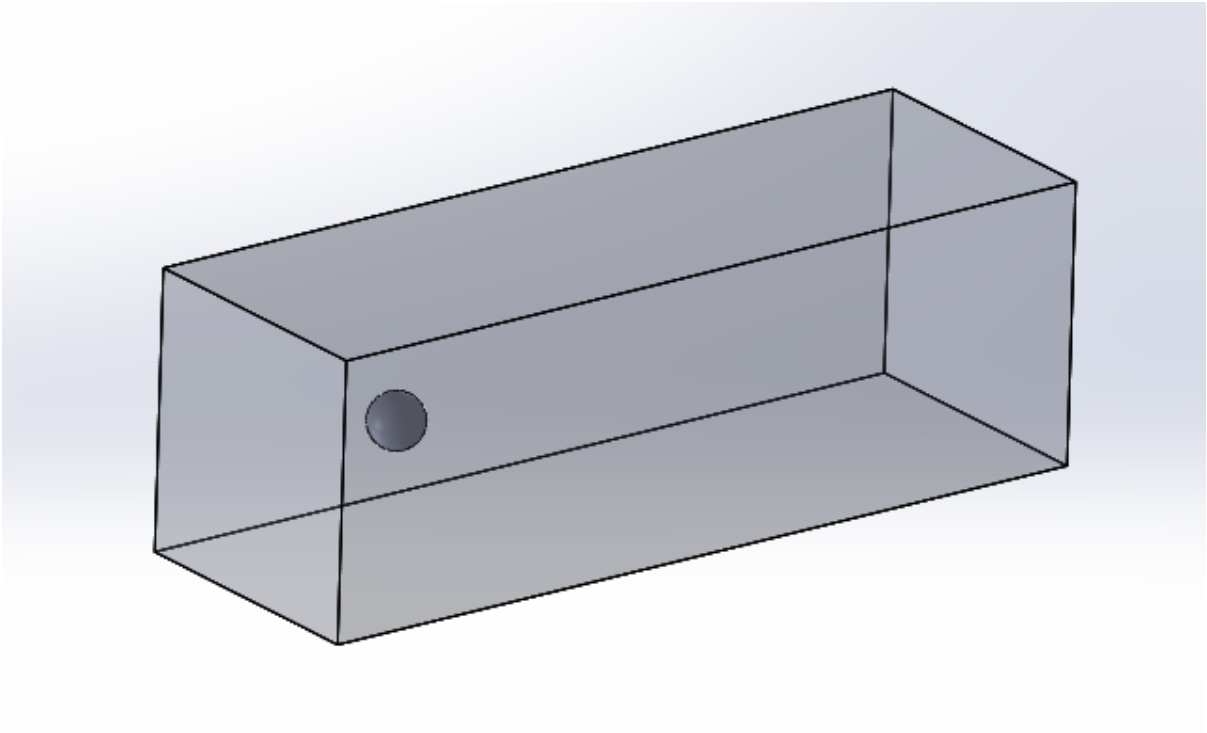

Figure 1