

ABSTRACT

This case study aims to calculate the forces on the surface of a free falling object into water using OpenFOAM v1806, Code-Aster Salome-Meca. It also aims to implement 6-Dof (Degrees of Freedom) model to calculate the motion of the free falling object. Overset Mesh methodology is used to handle the dynamic of the object. An multiphase simulation with dynamic overset mesh will be performed in 2-D with 2DoF (only 2 translations allowed) model.

PROBLEM STATEMENT

For a steady free falling object (Figure 1) in gravity into water, motion and forces are calculated on the surface of the object. Then the geometry is changed to a better design and the same is done and results are compared. Forces and stability of the objects will be analyzed.

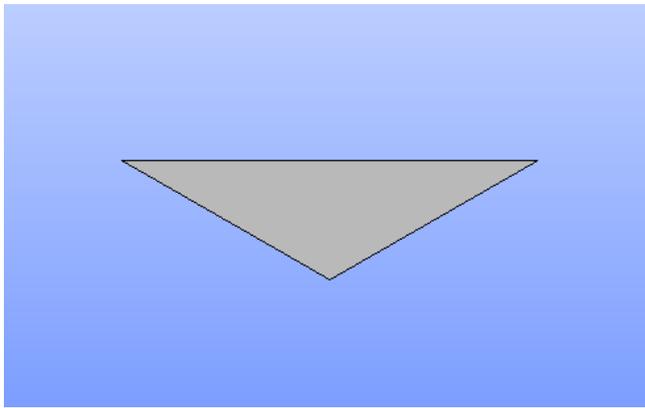


Figure-1

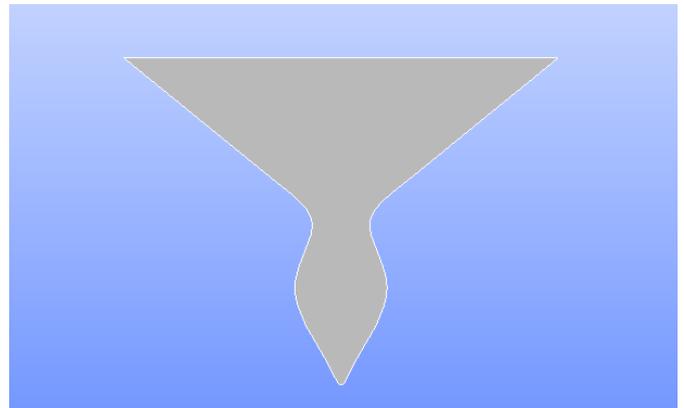


Figure-2

Following Initial Conditions will be use:

water:

$$\text{nu} = 1\text{e-}06 \text{ m}^2/\text{s}$$

$$\text{density} = 998.2 \text{ kg/m}^3$$

air:

$$\text{nu} = 1.48\text{e-}05 \text{ m}^2/\text{s}$$

$$\text{density} = 1 \text{ kg/m}^3$$

$$\text{surface Tension} = 7.34\text{e-}02$$

$$g = 9.81 \text{ m/s}^2 \text{ in } (-z) \text{ Direction}$$