# Aerodynamic analysis of the NACA 0012 airfoil

The NACA 0012 airfoil is used to perform the study of airflow around airfoil. The inlet velocity is considered to be around 0.15 Mach (51 m/s). The airfoil chord is modeled at 1 m of length which gives Reynold's number around 3.5M. The viscous model Spalart-Allmaras turbulent model is used for computation which is effective in terms of computational efficiency and modeling flow over airfoil. The structured mesh was generated with 87476 nodes refining the elements around the surface of the airfoil.

The following velocity and pressure contour shows the result for angle of attack 0 degree.
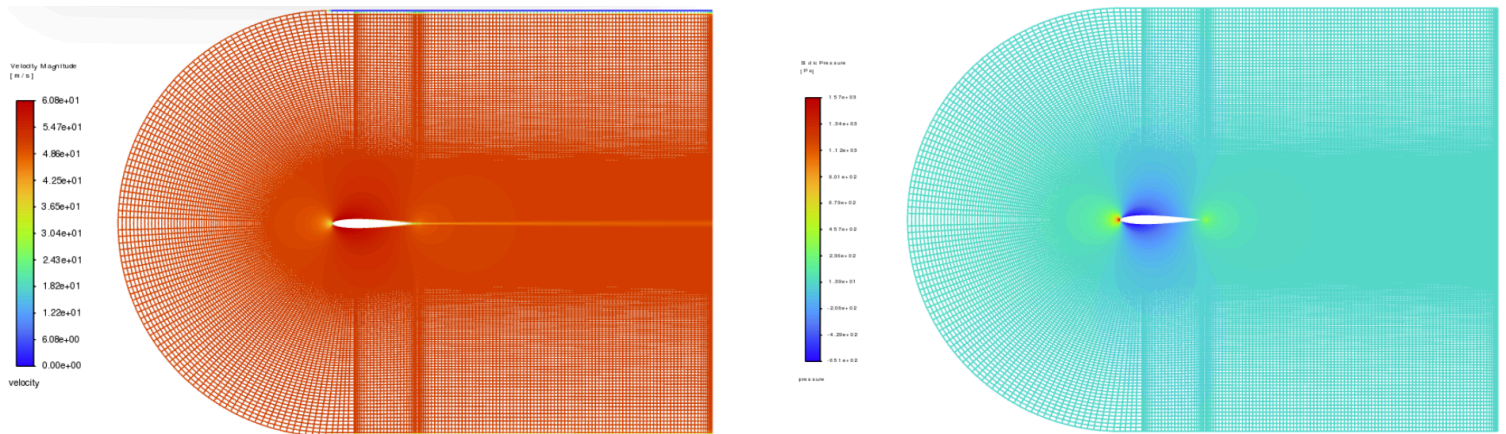
The angle of attack was varied from 0 degree to 30 degrees with increment of 5 to understand the change in lift coefficient (Cl). The following plot illustrates the change in Cl with respect to change in angle of attack.
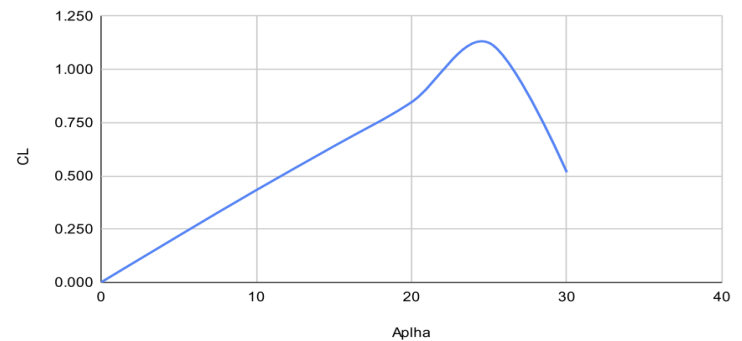
The following results show the contour plot for angle of attack 20 degrees. It is to be noted that for 0 deg AOA, the contours are very symmetric, whereas for 20 deg AOA, we see lower pressure on the upper leading edge and increase in the lift coefficient.