1.

Figure 1: Zero Angle, Pressure Contour, side view

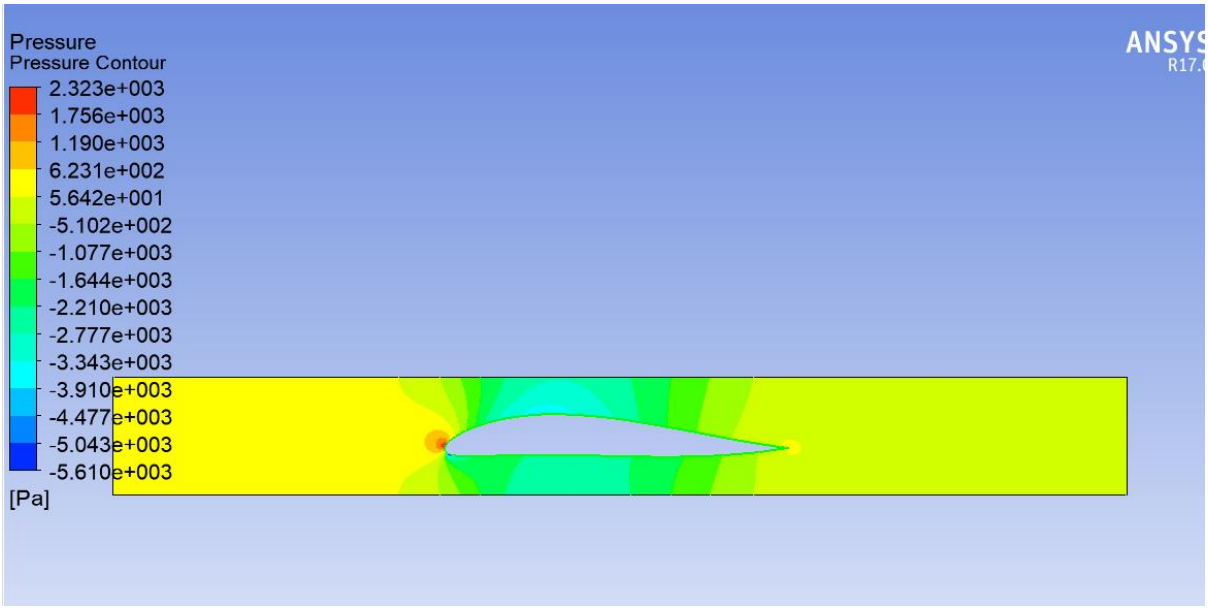


Figure 2: Zero Angle, Velocity Vector, side view

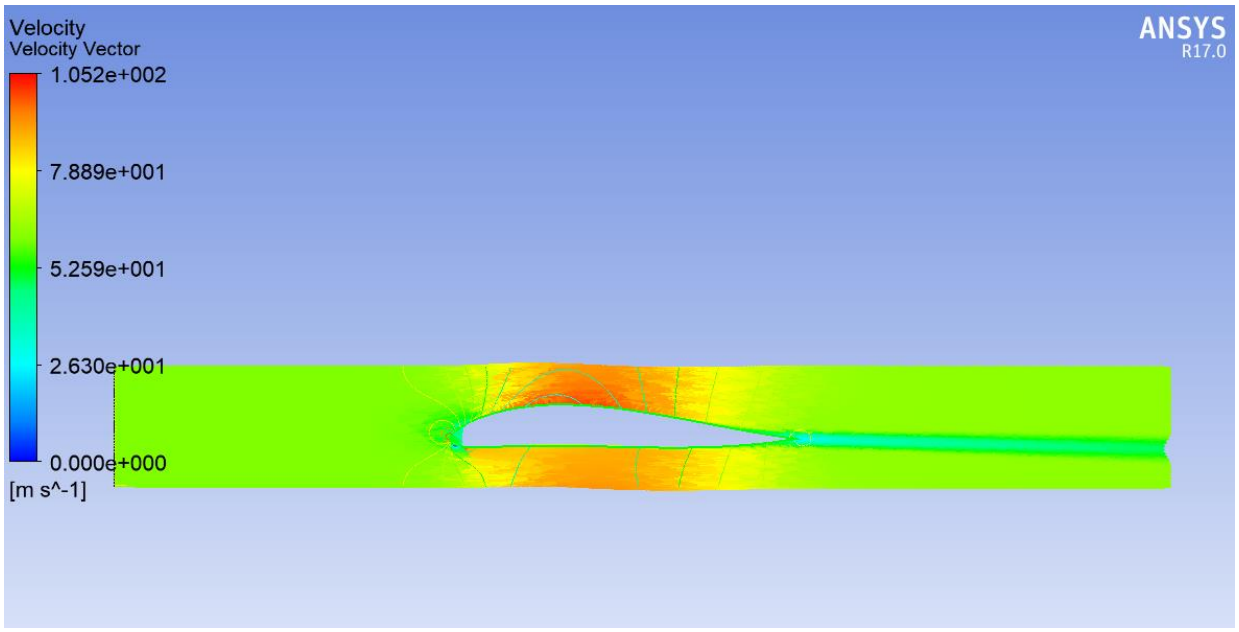


Figure 3: Zero Angle, Streamlines, side view

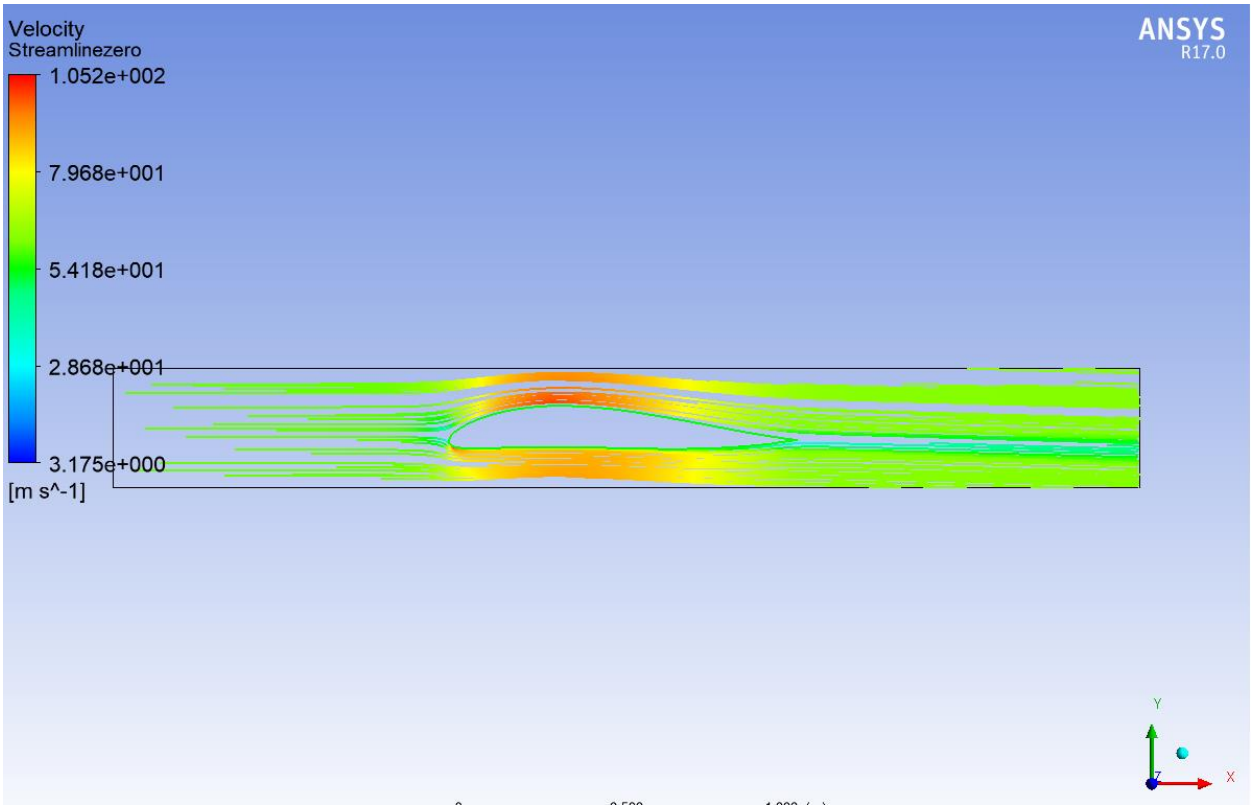


Figure 4: +7-degree Angle, Pressure Contour, side view

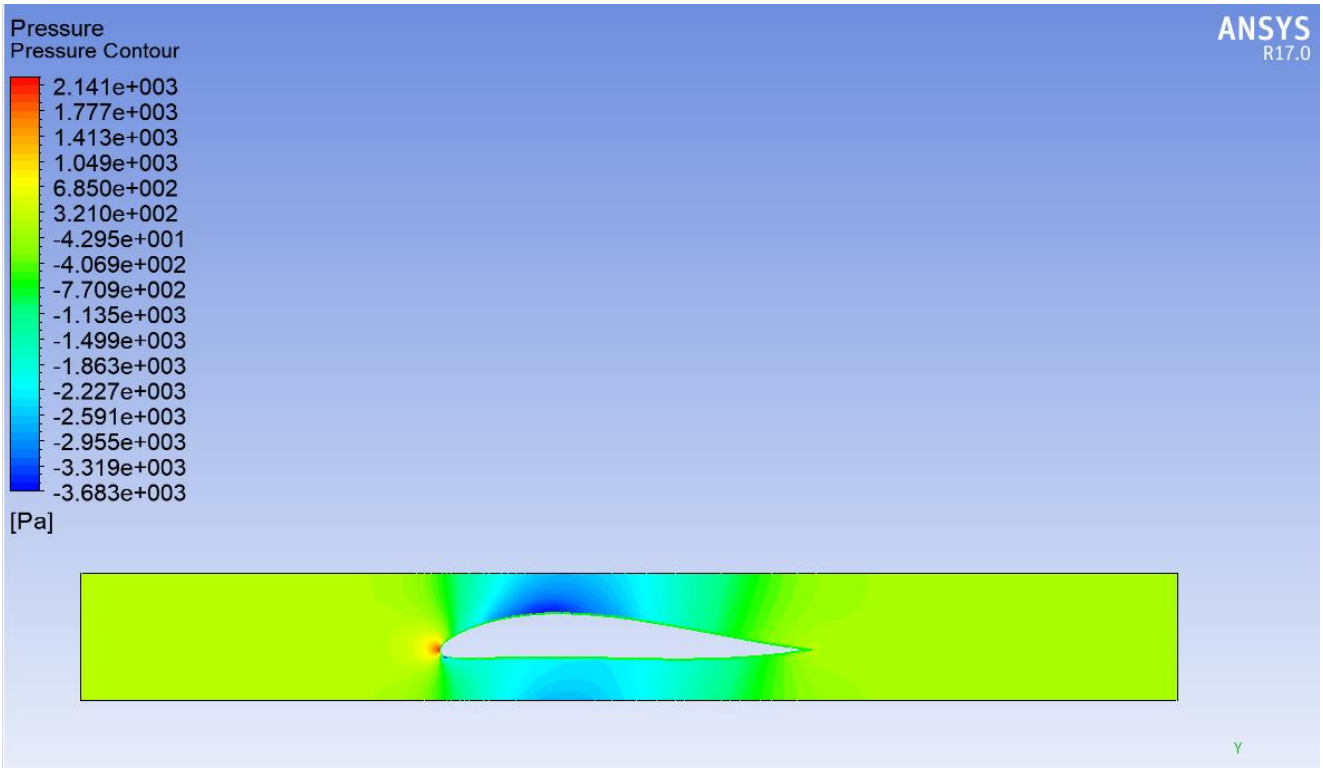


Figure 5: +7-degree Angle, Velocity Vector, side view

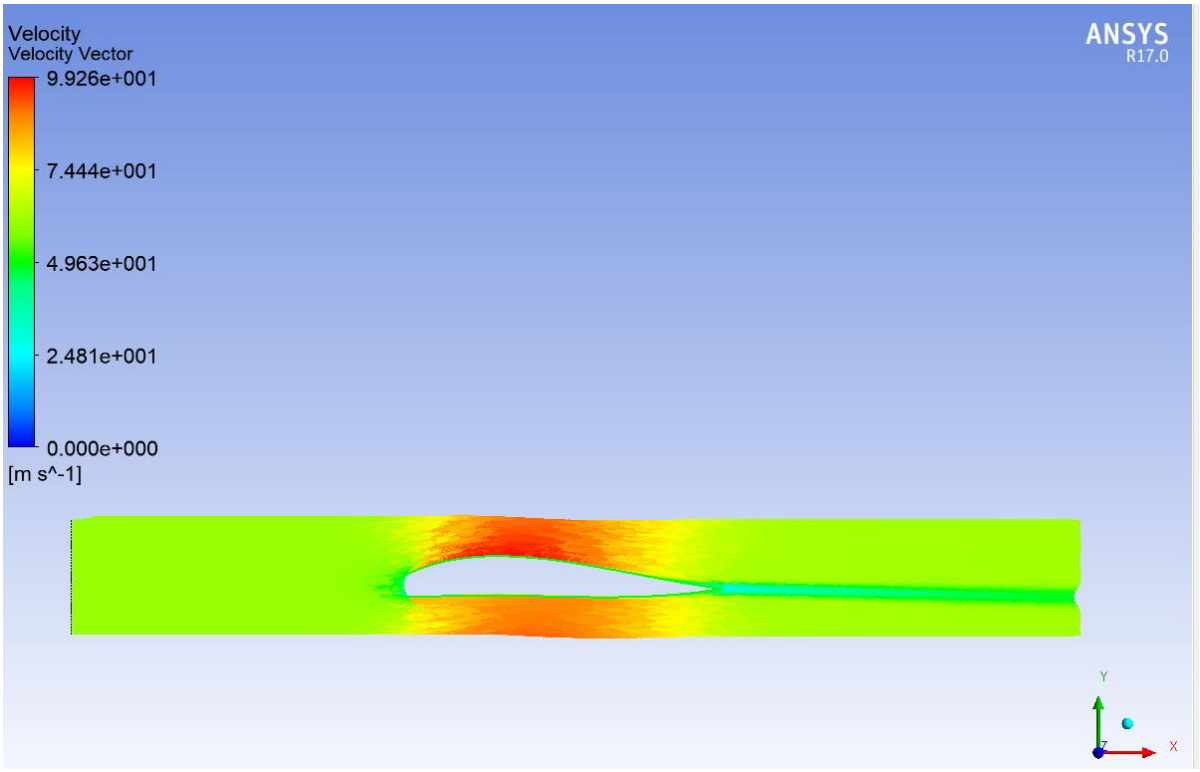


Figure 6: +7-degree Angle, Streamlines, side view

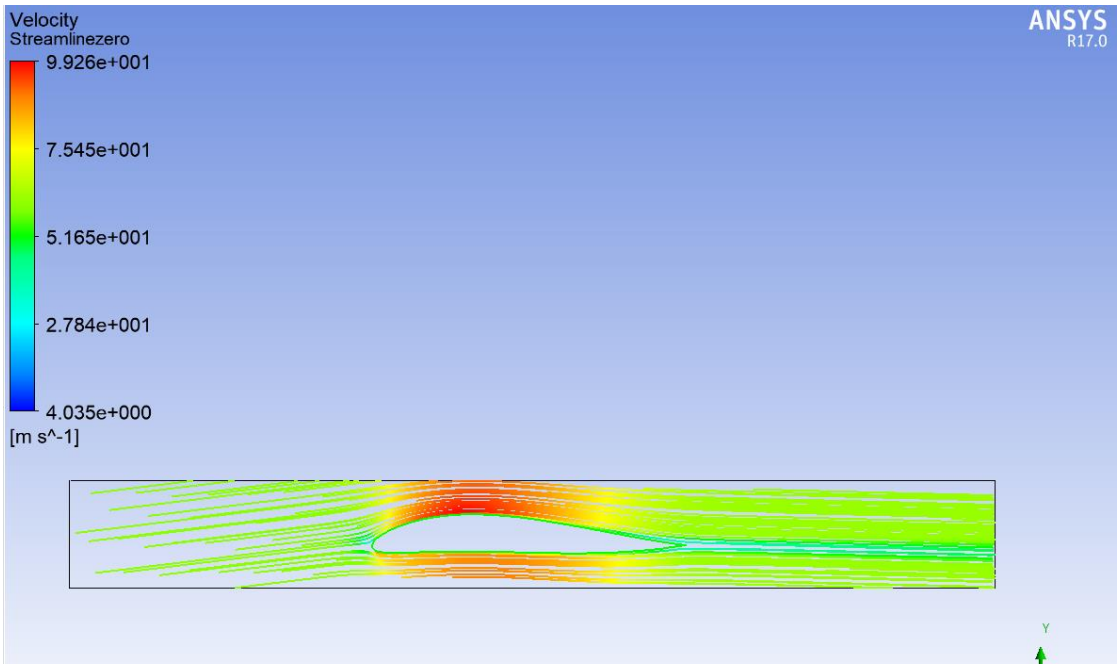


Figure 7: -7-degree Angle, Pressure Contour, side view

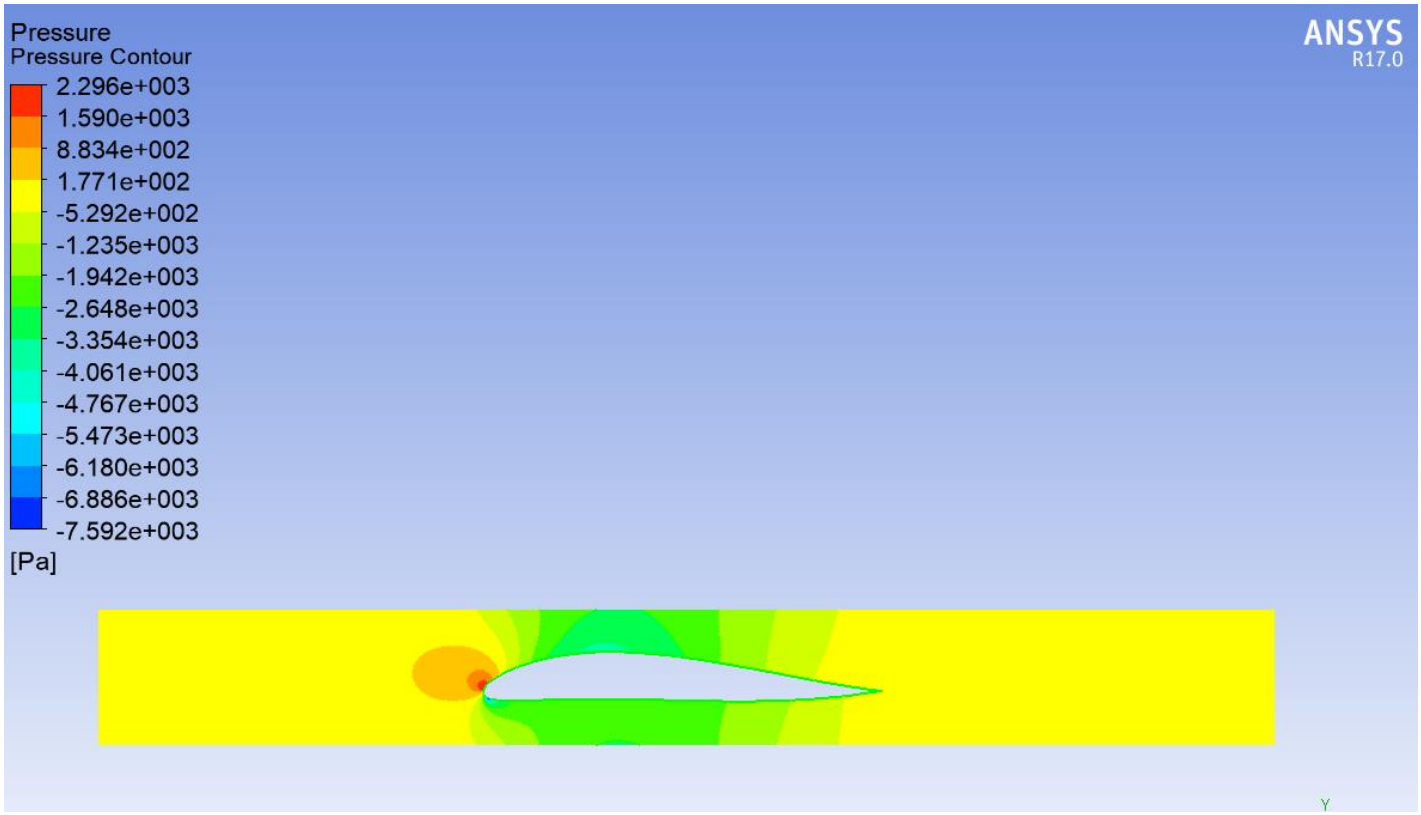


Figure 8: -7-degree Angle, Velocity Vector, side view

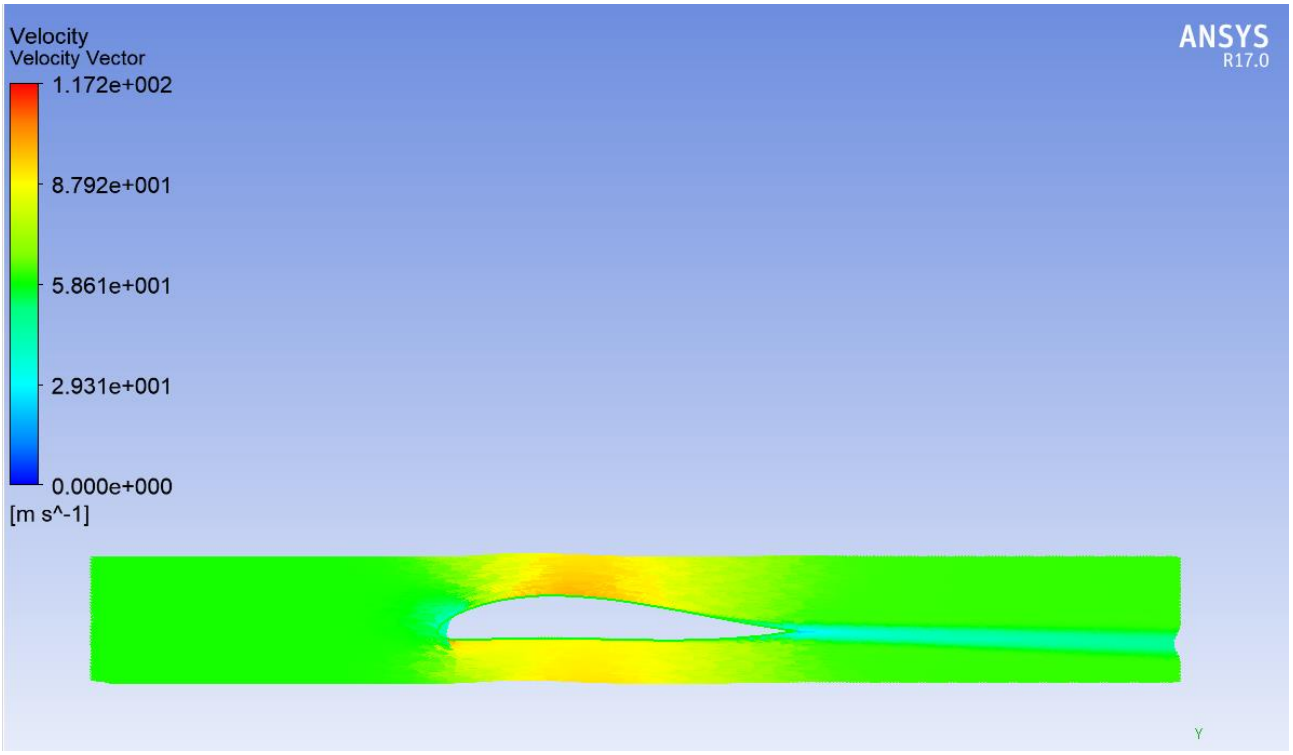
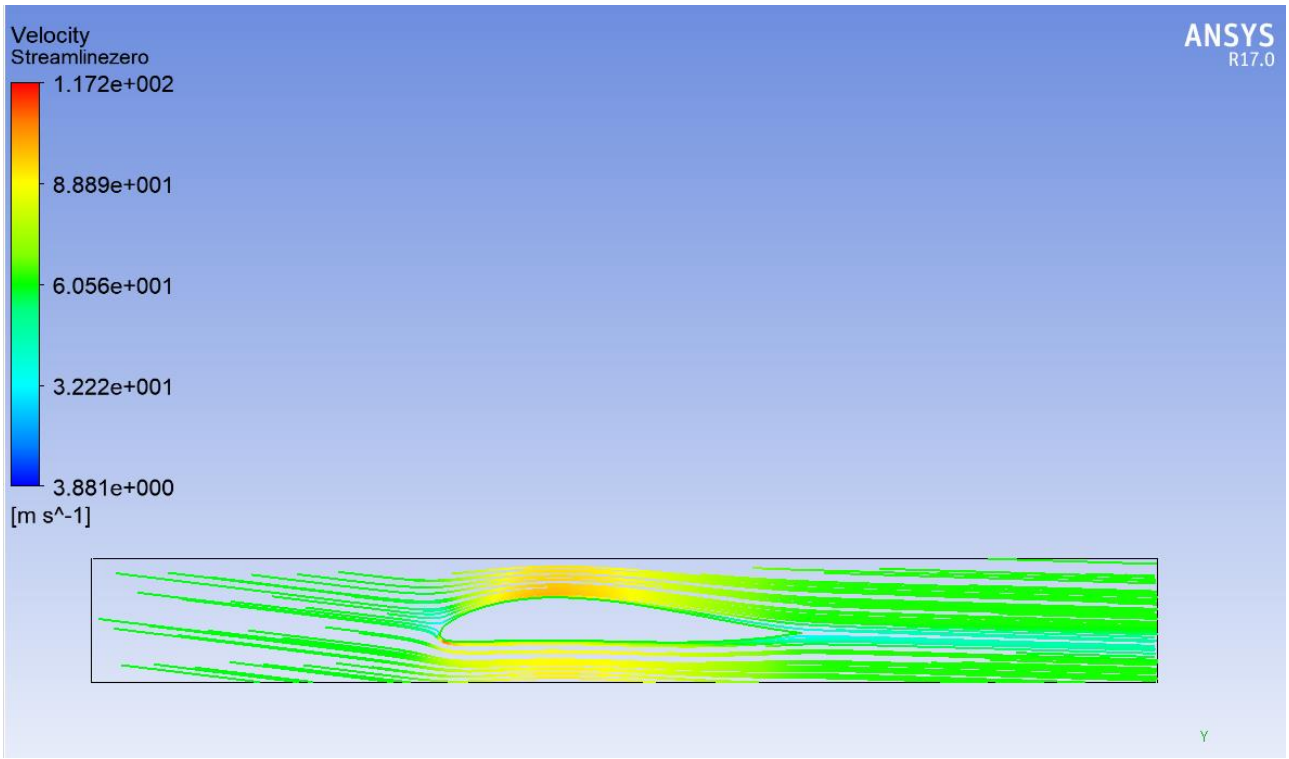


Figure 9: -7-degree Angle, Streamlines, side view



2. Figure 10: Zero Angle, Pressure vs Streamwise direction (x-direction)

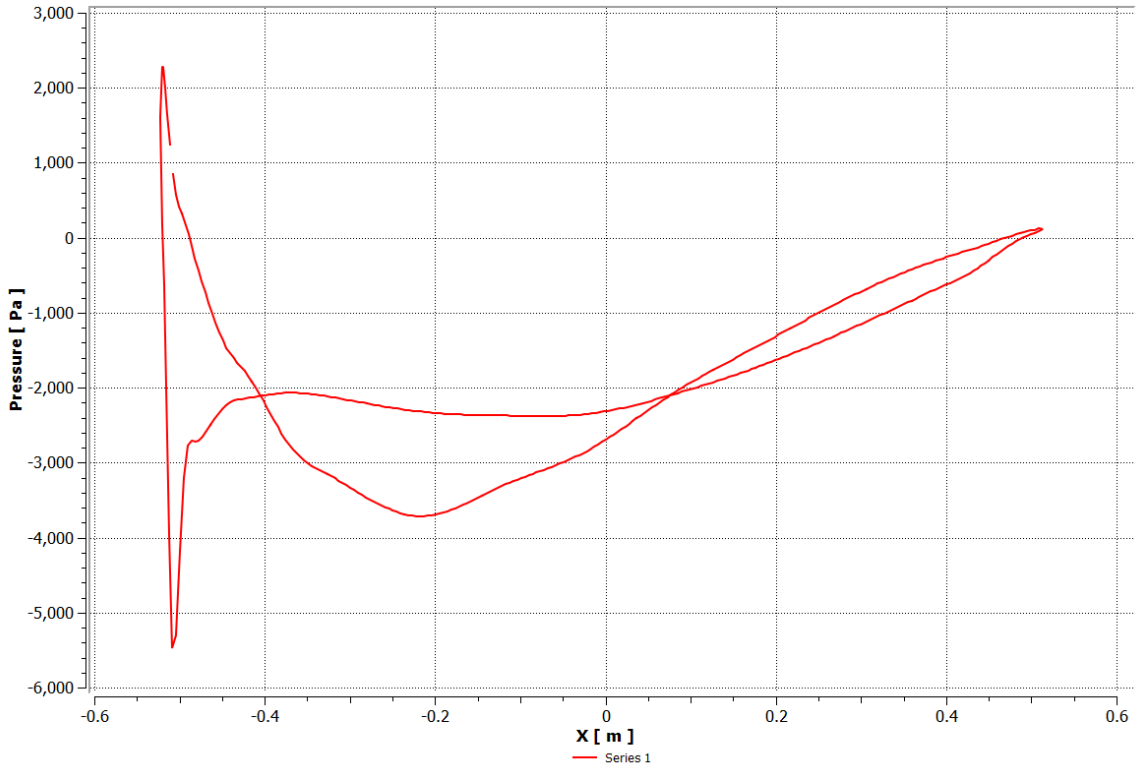


Figure 11: +7-degree Angle, Pressure vs Streamwise direction (x-direction)

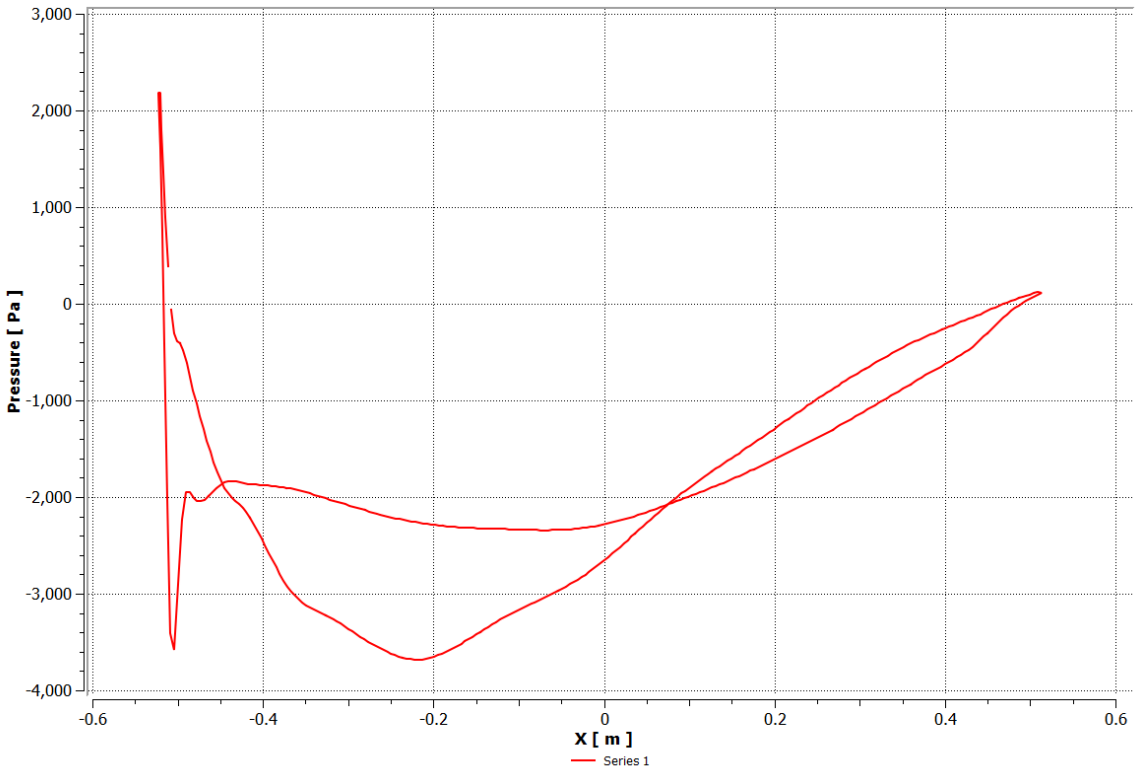
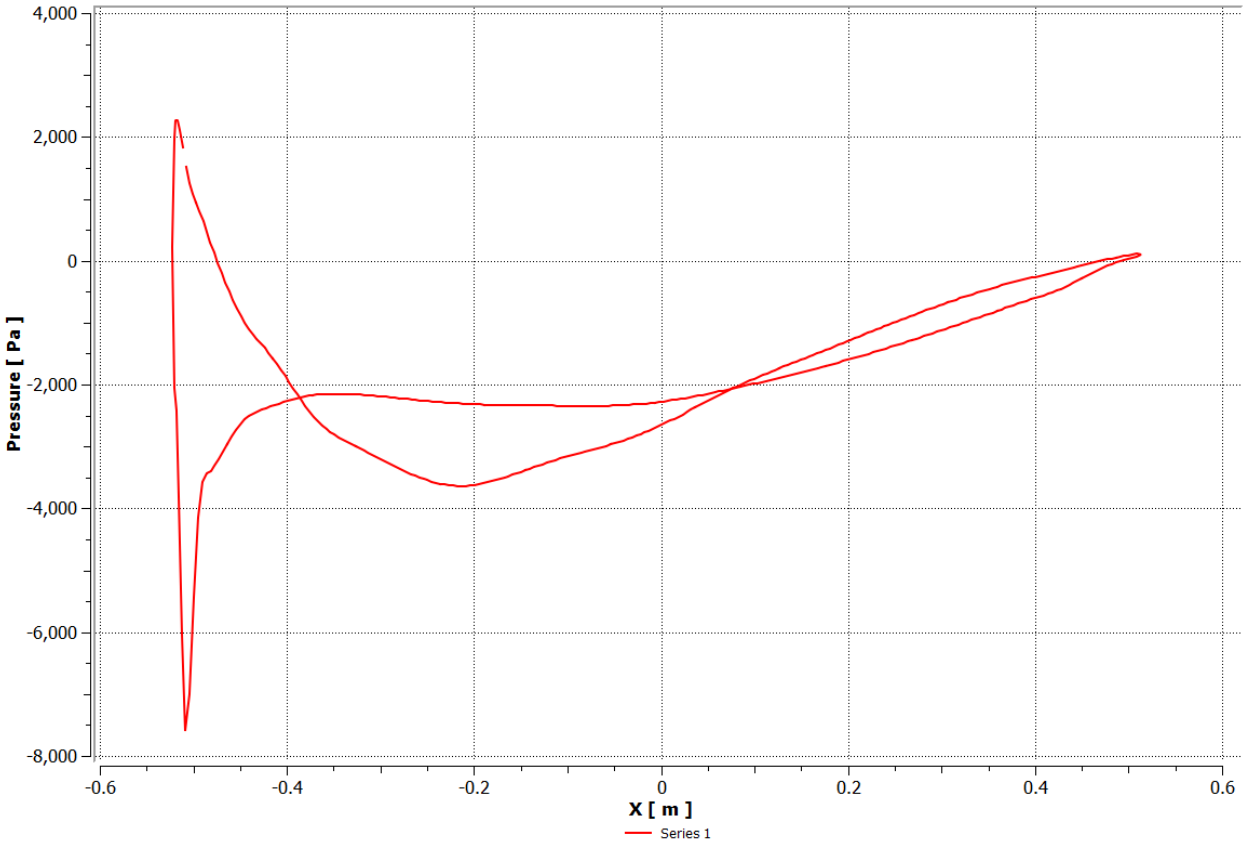


Figure 12: -7-degree Angle, Pressure vs Streamwise direction (x-direction)

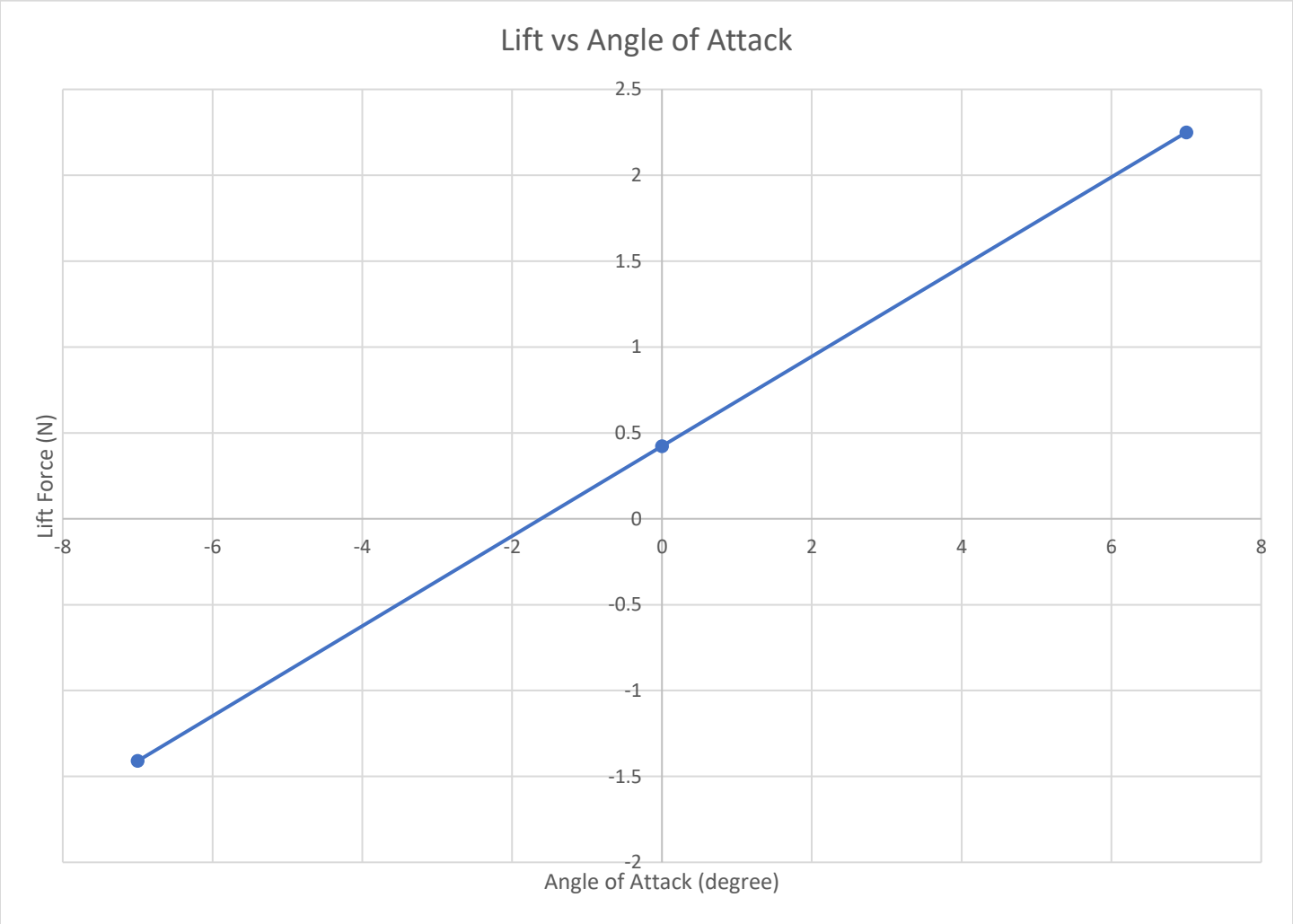


From the graphs above we can see that in the beginning the air above the airfoil is at maximum pressure and the air below the airfoil is at the lowest pressure, when the air hits the airfoil the pressure above the airfoil begins to decrease whereas its velocity begins to increase, and the pressure below the airfoil begins to increase whereas its velocity begins to decrease.

If we compare the graphs for 0 degree and 7 degree, we find that the 0-degree angle airfoil has the lowest starting pressure at the bottom of the airfoil, whereas both follow the same trend for the pressure vs streamwise direction thereafter.

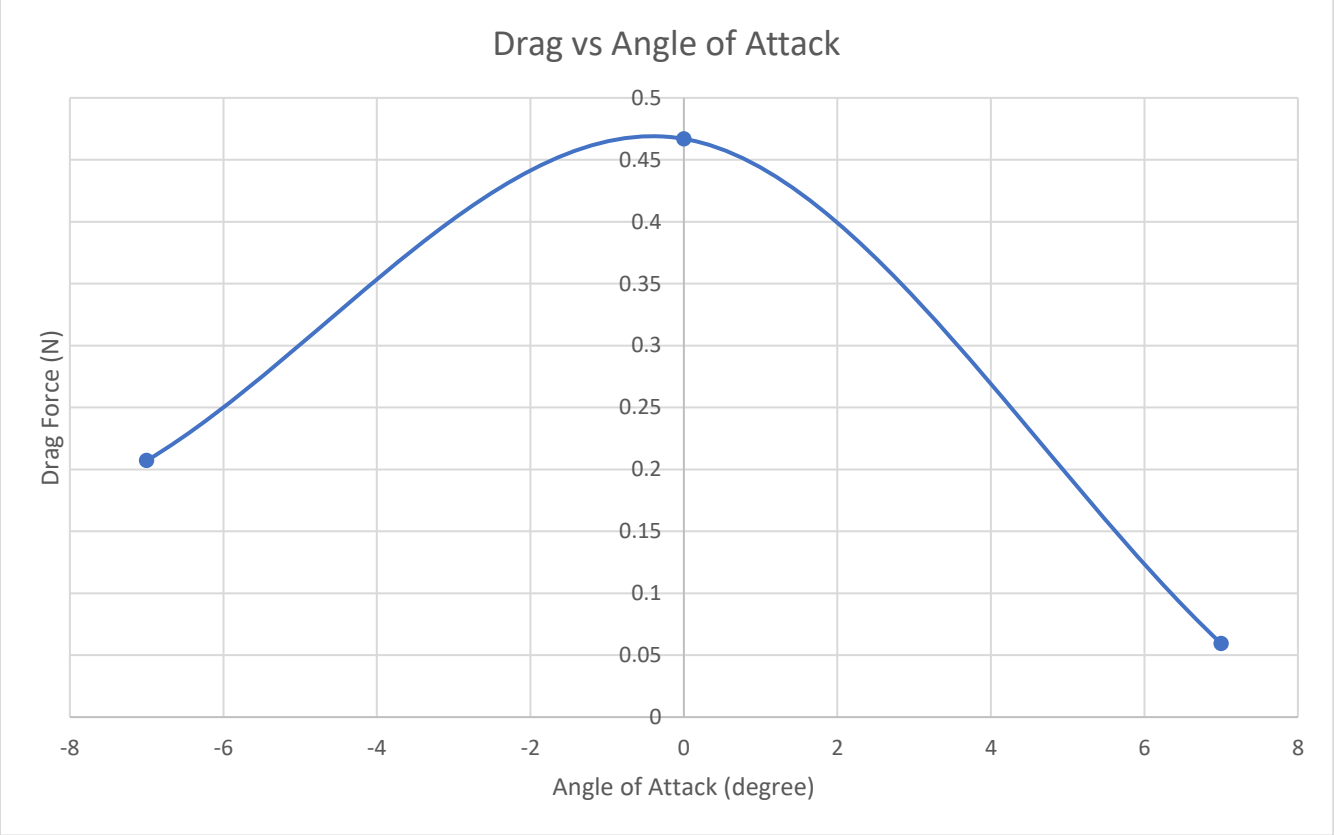
3.

Figure 13: Lift Force (Newton) vs Angle of Attack (degrees)



4.

Figure 14: Drag Force (Newton) vs Angle of Attack (degrees)



5) Volume of Airfoil = 54.2353 in^3 = 0.000889 m^3

Density of Airfoil (Aluminum) = 2702 kg/m^3

Weight = ρ*V*g = 23.54 Newtons

$Force_{LIFT}$ (0 Degree) = 0.422863 N , $Force_{LIFT}$ (+7 Degree) = 2.25 N , $Force_{LIFT}$ (-7 Degree) = -1.41 N

The airfoil will not lift of the ground for any of the three cases, because the weight of the airfoil is greater than the lift force in each of the cases, and the angle of attack are so extreme that they are close to the stall.