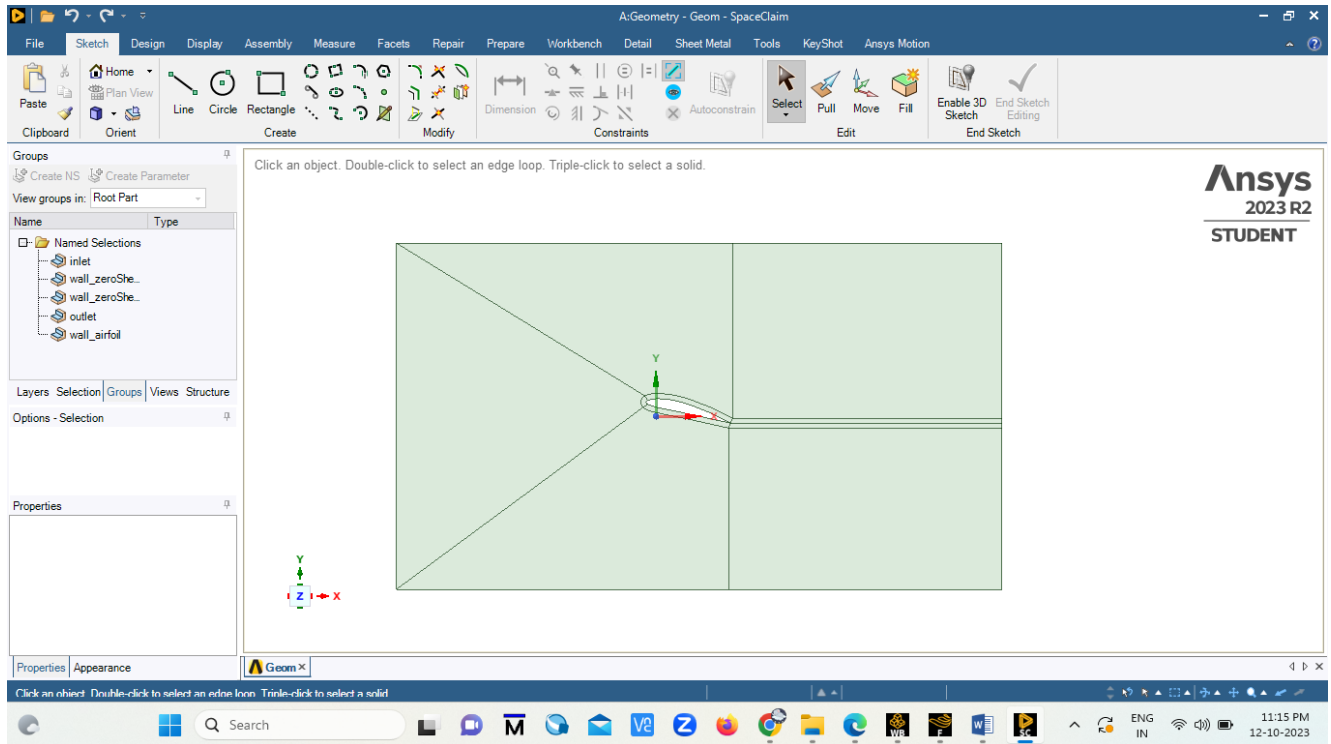
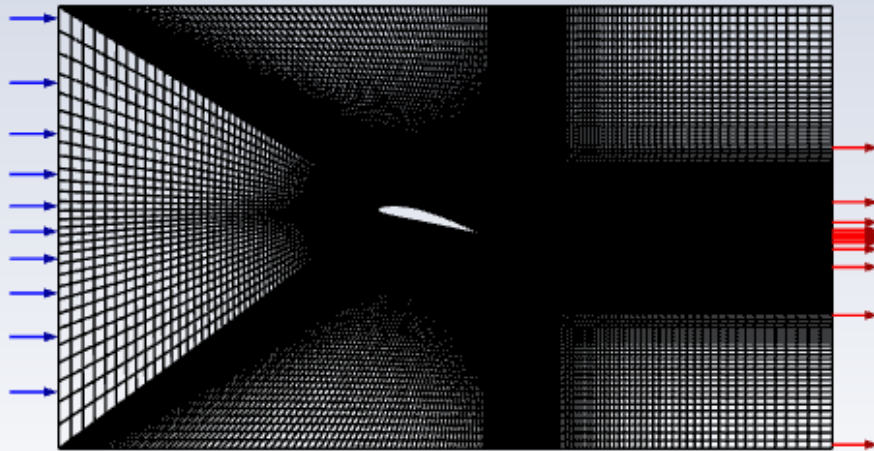


Geometry:

- NACA 4412 airfoil is generated using the above Python code. But the analysis done on the airfoil at angle of 13.87° . It is done in space claim of Ansys
- The interior region is divided to get fine mesh nearer to airfoil.

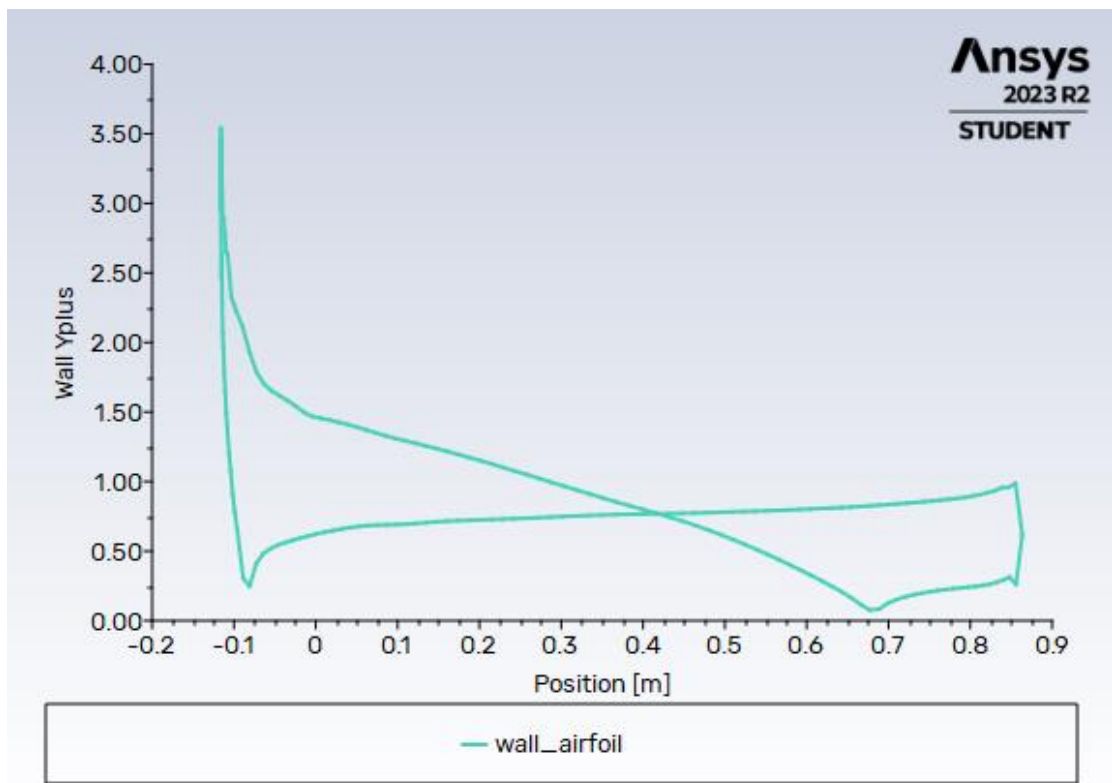


Geometry model of NACA - 4412 airfoil



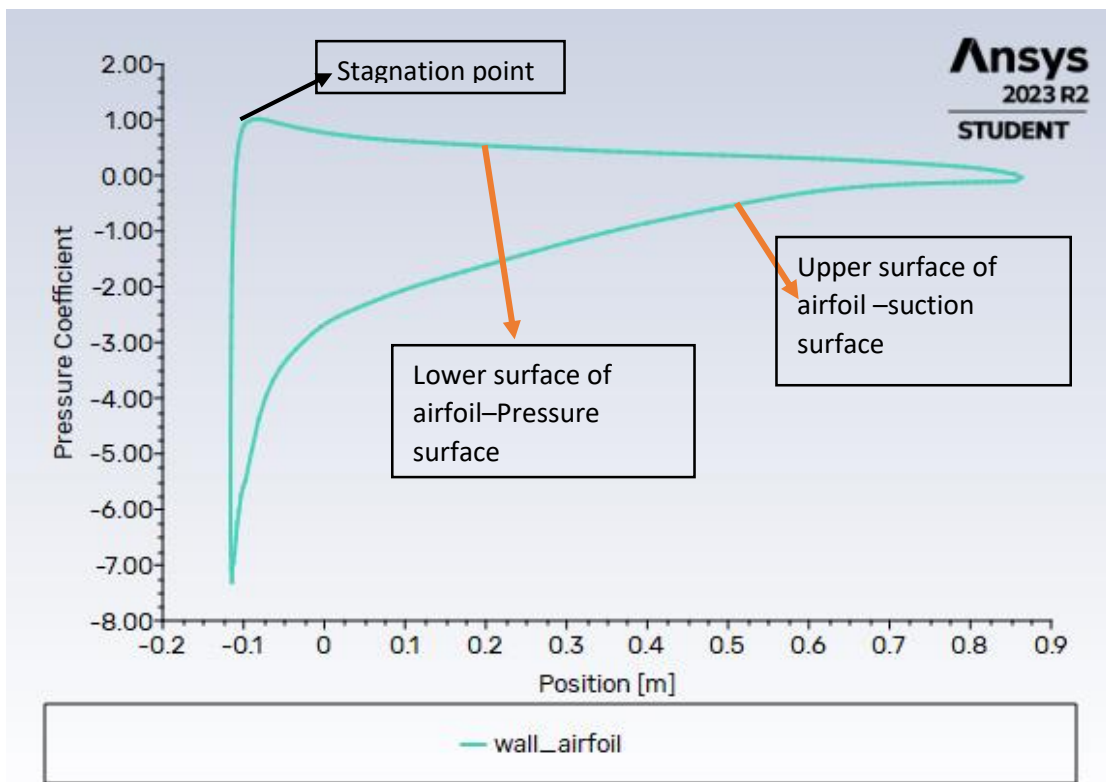
Fine Meshing

Variation of Wall Y+ around the airfoil

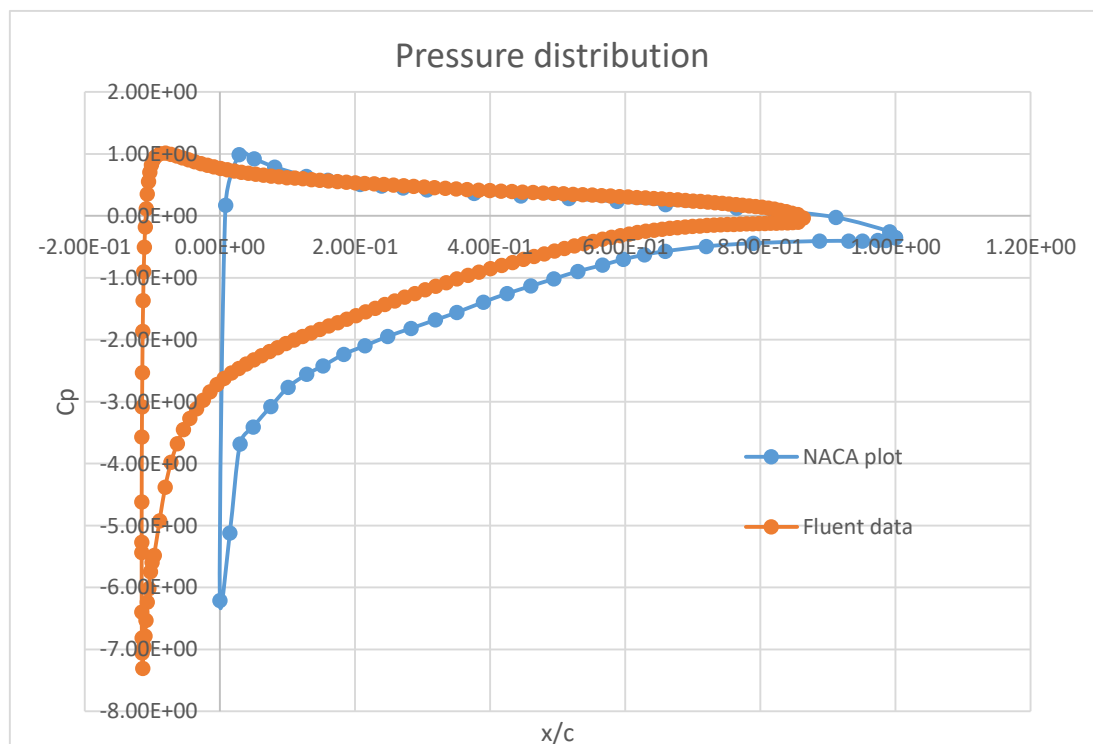


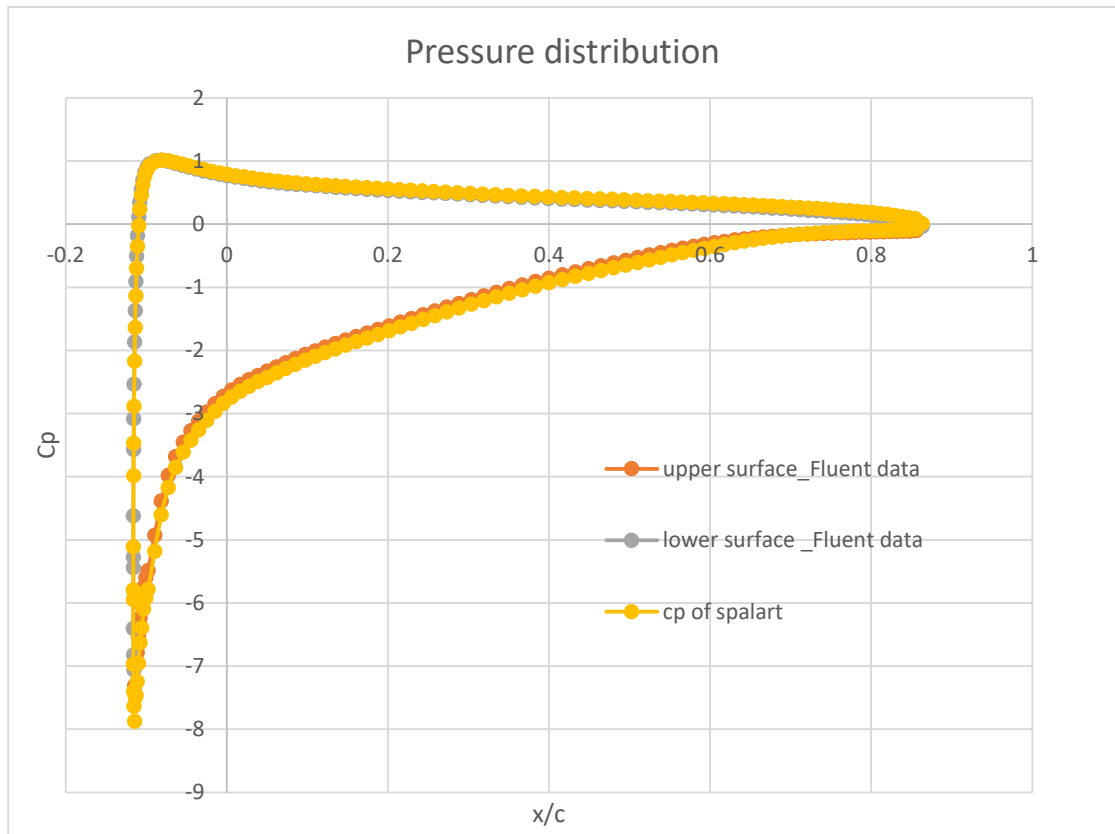
- Here the Y+ value is 0.8, which represents the fine meshing around it to get good understanding of Boundary layer distribution.

Pressure distribution around airfoil @ 13.87deg angle of attack (AOA)



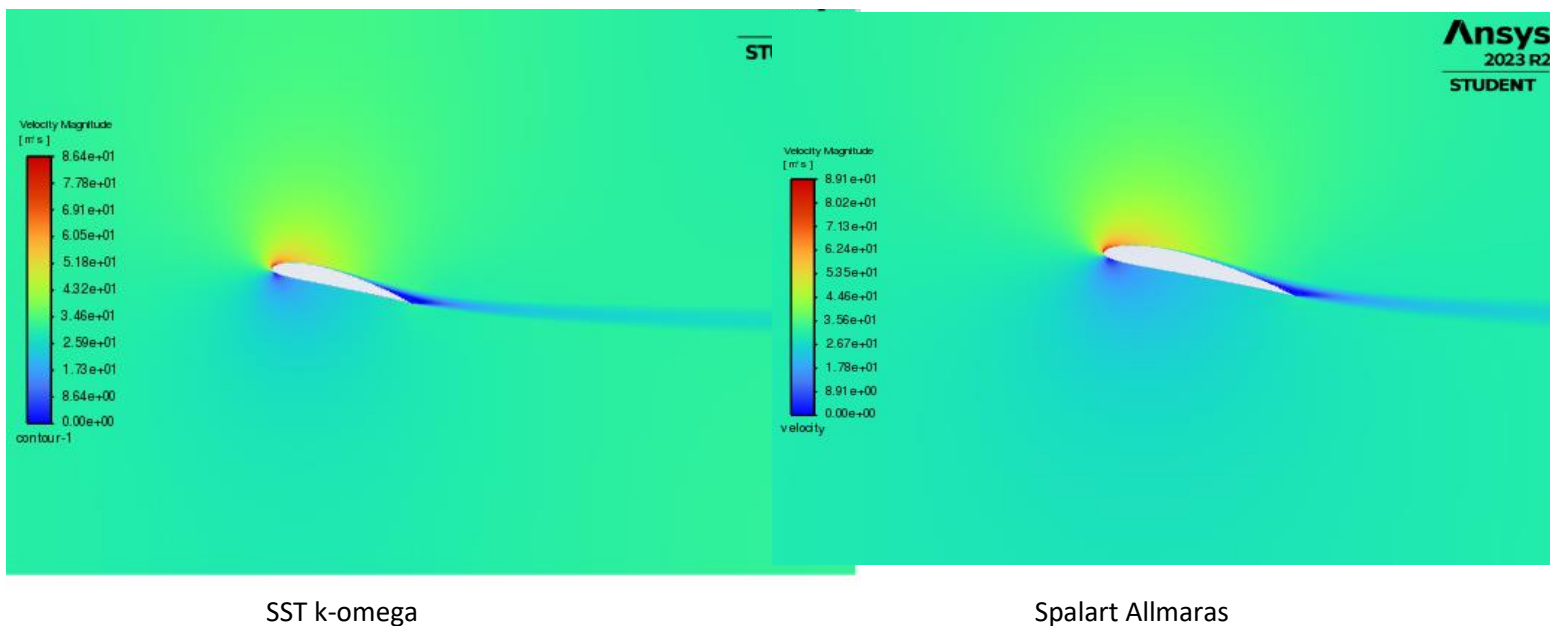
- Due to flow over airfoil, suction is created on upper surface. And pressure is created on lower surface.
- Due to the imbalance in pressure, Lift (area under this C_p curve) is created in upward direction.
- The below figure shows the comparison of pressure distribution between NACA data and our fluent data. It shows that both are approximately equal



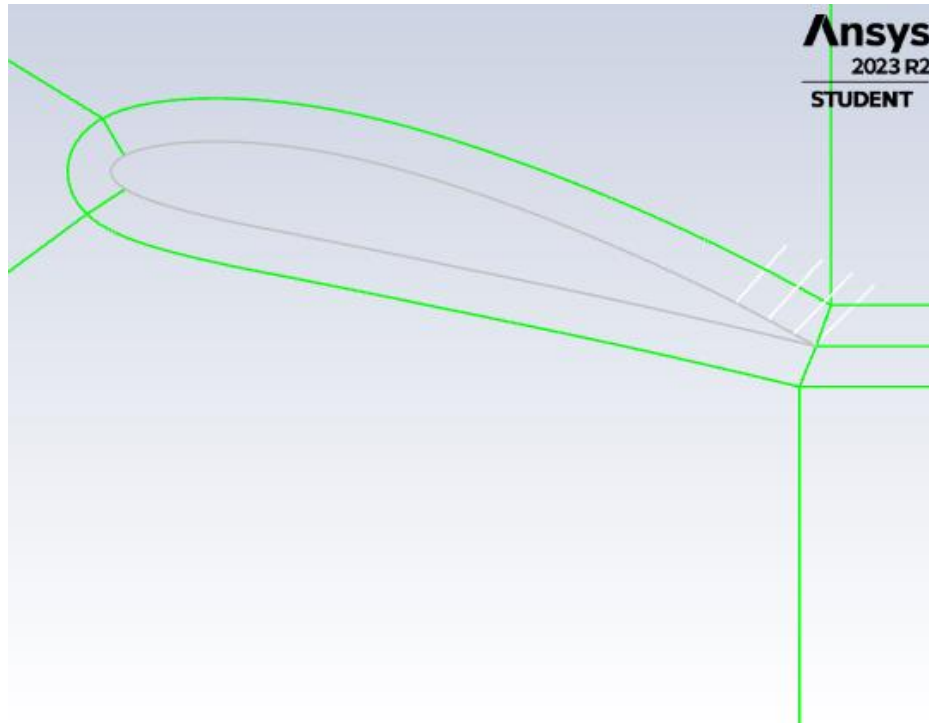


- The C_p curve is found by using SST k- ω and Spalart Allmaras models. In both the cases the C_p distribution around airfoil is same.

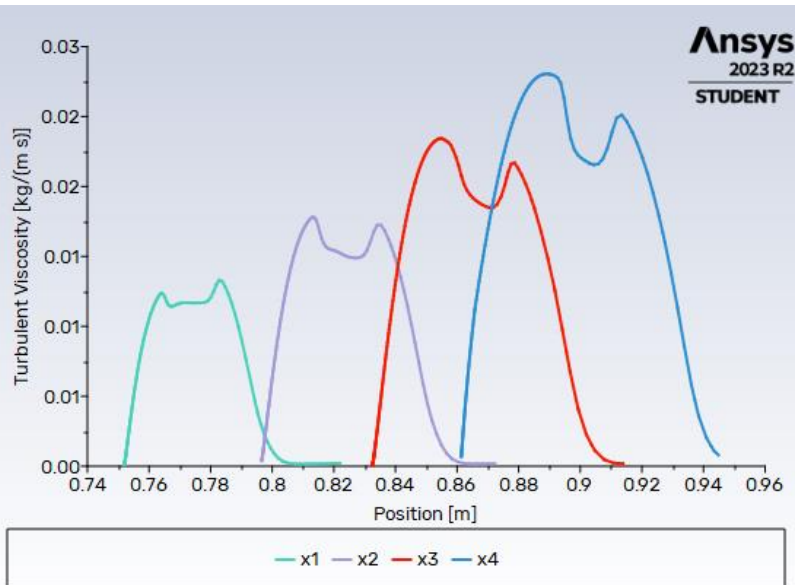
Velocity Contour



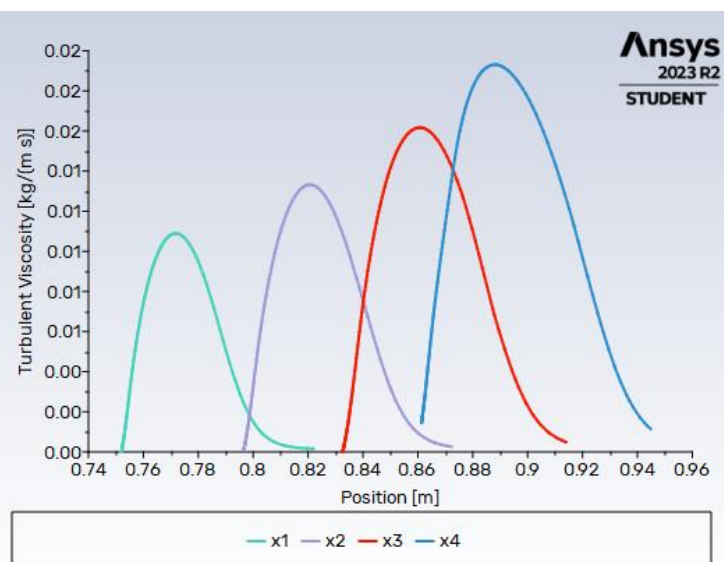
- The profile of velocity looks similar in both cases. But the maximum velocity in case of SST model is 86m/s, whereas in other it is 89m/s.



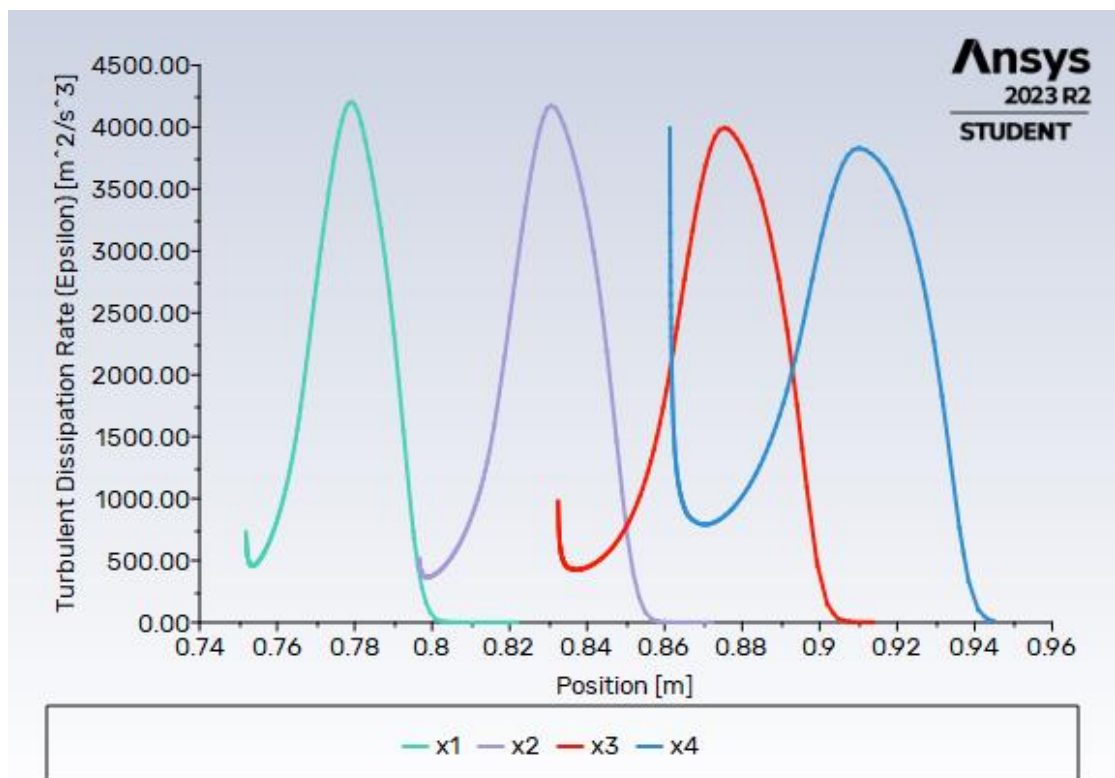
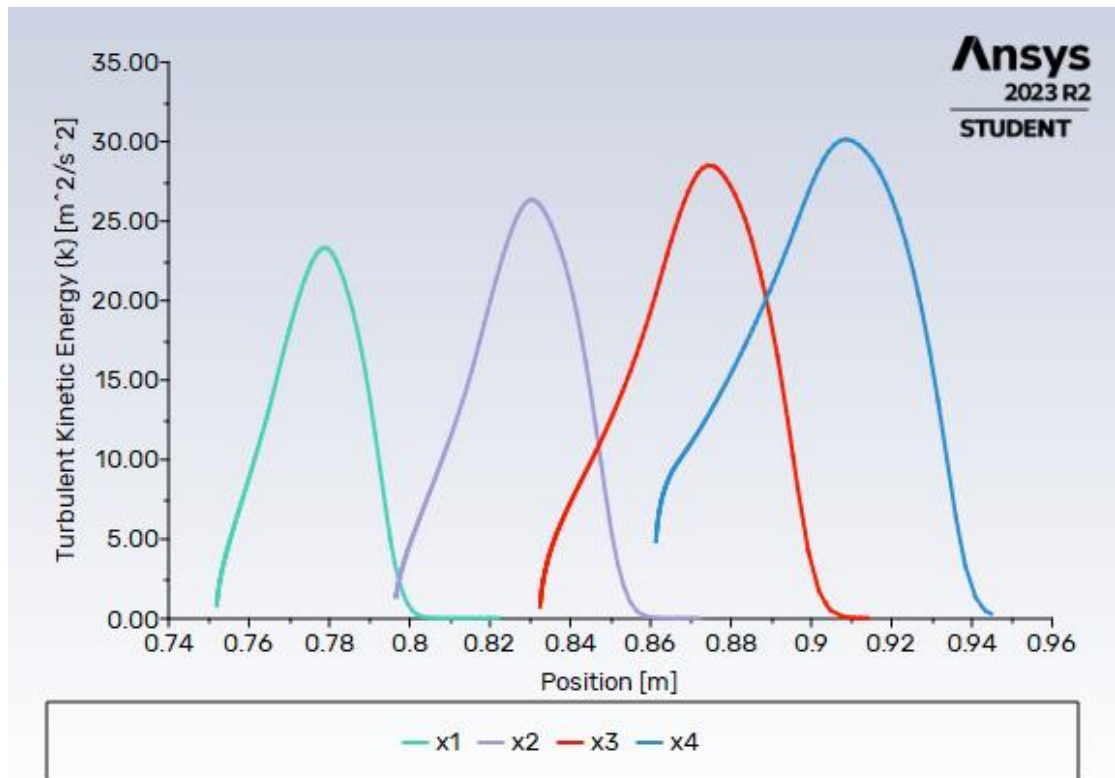
Turbulent viscosity

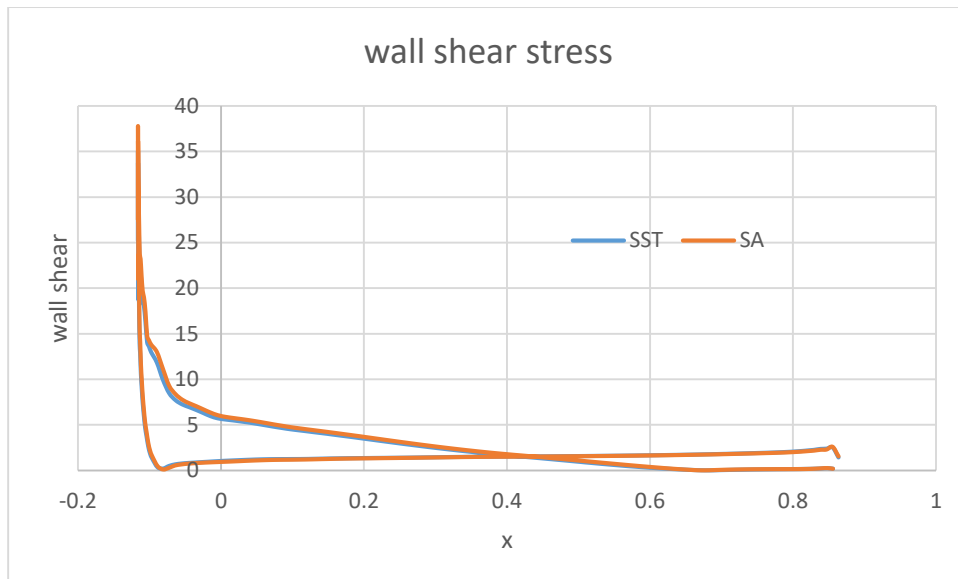


SST k-omega



Spalart Allmaras





- It is observed that there is no variation of wall shear stress by using two turbulence viscous models.

density (rho)	1.225		
M	0.09		
Tref	539	R	
	299.444	K	
a	346.8668321		
velocity	31.21801489	m/s	
chord	1		
Viscosity (nu)	0.00001849		
Re	2068256.8		
Cf	0.003229987		
tau	1.928046369		
fric velocity	1.254557852		
y+	y		
1	1.20312E-05		
30	0.000360937		
100	0.001203123		
From Fluent			
	SST K-omega	SA model	error
pressure force	17.494596	16.543003	0.05439354
Cl	0.029308073	0.027710376	0.054513873
viscous force	3.9758651	4.108551	-0.033372838
Cd	0.006660625	0.006882033	-0.033241331

- It is observed that SST model is efficient in generating High lift and less drag coefficients than SA model

