Ansys
2025 R2

Ansys Fluent Simulation Report

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System Information

Application	Fluent
Settings	2d, double precision, pressure-based, SST k-omega
Version	25.2.0-10204
Source Revision	5eecd5d865
Build Time	Jun 16 2025 10:44:41 EDT
CPU	13th Gen Intel(R) Core(TM) i5-13420H
OS	Windows

Geometry and Mesh

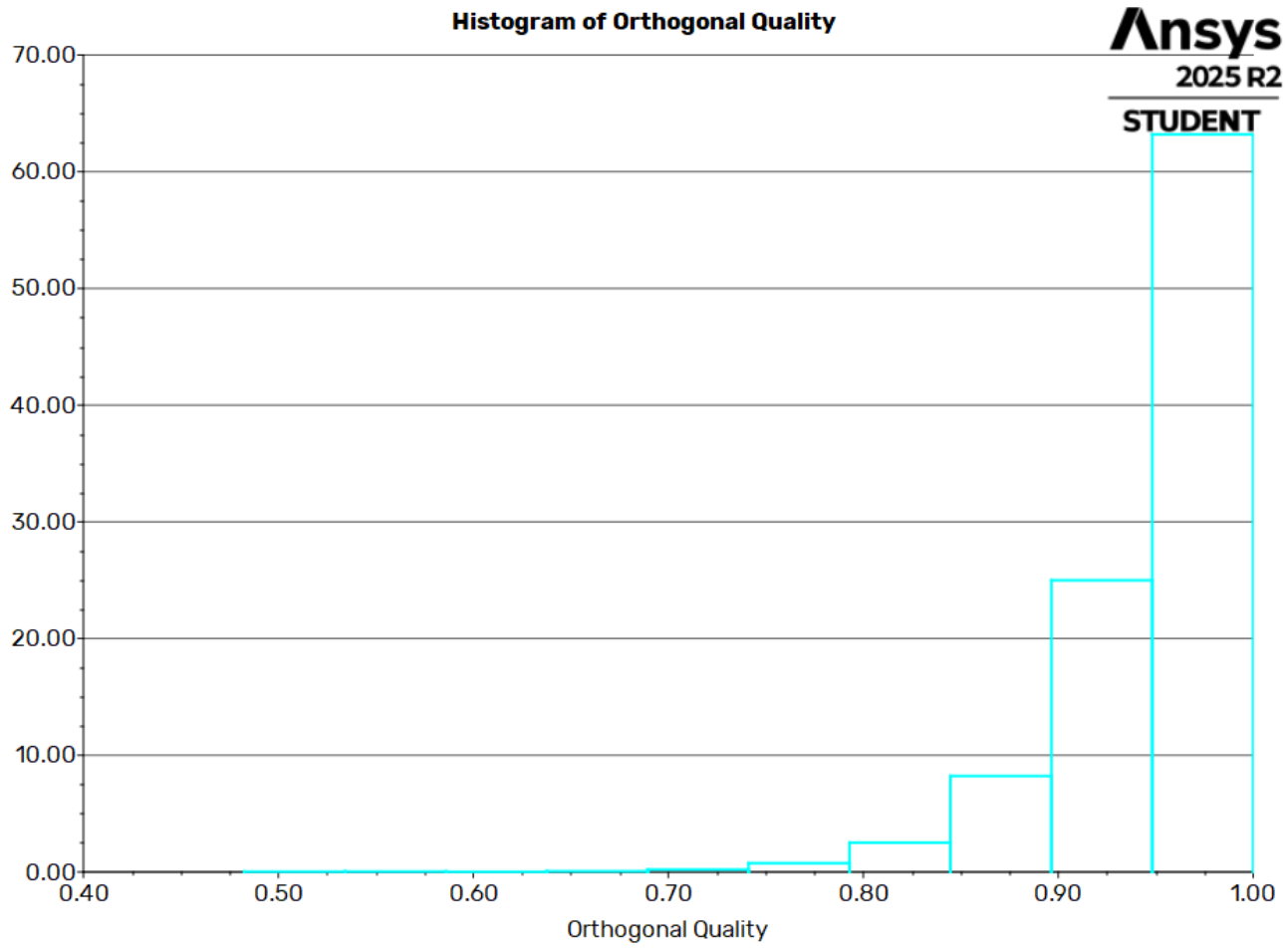
Mesh Size

Cells	Faces	Nodes
76680	115782	39102

Mesh Quality

Name	Type	Min Orthogonal Quality	Max Aspect Ratio
surface_body	Tri Cell	0.48249305	4.7754463

Orthogonal Quality



Simulation Setup

Physics

Models

Model	Settings
Space	2D
Time	Steady
Viscous	SST k-omega turbulence model
Heat Transfer	Enabled

Material Properties

– Fluid	
– air	
Density	1.225 kg/m^3
Cp (Specific Heat)	1006.43 J/(kg K)
Thermal Conductivity	0.0242 W/(m K)
Viscosity	1.7894e-05 kg/(m s)
– Solid	
– aluminum	
Density	2719 kg/m^3
Cp (Specific Heat)	871 J/(kg K)
Thermal Conductivity	202.4 W/(m K)

Cell Zone Conditions

– Fluid	
– surface_body	
Material Name	air
Specify source terms?	no

Specify fixed values?	no
Frame Motion?	no
Laminar zone?	no
Porous zone?	no

Boundary Conditions

– Inlet	
– inlet_	
Velocity Specification Method	Magnitude, Normal to Boundary
Reference Frame	Absolute
Velocity Magnitude [m/s]	3
Supersonic/Initial Gauge Pressure [Pa]	0
Temperature [K]	300
Turbulence Specification Method	Intensity and Viscosity Ratio
Turbulent Intensity [%]	5
Turbulent Viscosity Ratio	10
– Outlet	
– outlet	
Backflow Reference Frame	Absolute
Gauge Pressure [Pa]	0
Pressure Profile Multiplier	1
Backflow Total Temperature [K]	300
Backflow Direction Specification Method	Normal to Boundary
Turbulence Specification Method	Intensity and Viscosity Ratio
Backflow Turbulent Intensity [%]	5
Backflow Turbulent Viscosity Ratio	10
Backflow Pressure Specification	Total Pressure
Build artificial walls to prevent reverse flow?	no
Average Pressure Specification?	no
Specify targeted mass flow rate	no
– Wall	

– wall	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Heat Flux
Heat Flux [W/m^2]	0
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	Standard
Wall Roughness Height [m]	0
Wall Roughness Constant	0.5
Convective Augmentation Factor	1
– airfoil	
Wall Thickness [m]	0
Heat Generation Rate [W/m^3]	0
Material Name	aluminum
Thermal BC Type	Heat Flux
Heat Flux [W/m^2]	0
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	Standard
Wall Roughness Height [m]	0
Wall Roughness Constant	0.5
Convective Augmentation Factor	1

Reference Values

Area	1 m^2
Density	1.225 kg/m^3
Depth	1 m
Enthalpy	0 J/kg
Length	1 m

Pressure	0 Pa
Temperature	300 K
Velocity	3 m/s
Viscosity	1.7894e-05 kg/(m s)
Ratio of Specific Heats	1.4
Yplus for Heat Tran. Coef.	300
Reference Zone	surface_body

Solver Settings

– Equations	
Flow	True
Turbulence	True
Energy	True
– Numerics	
Absolute Velocity Formulation	True
– Pseudo Time Explicit Relaxation Factors	
Density	1
Body Forces	1
Turbulent Kinetic Energy	0.75
Specific Dissipation Rate	0.75
Turbulent Viscosity	1
Energy	0.75
Explicit Momentum	0.5
Explicit Pressure	0.5
– Pressure-Velocity Coupling	
Type	Coupled
Pseudo Time Method (Global Time Step)	True
– Discretization Scheme	
Pressure	Second Order
Momentum	Second Order Upwind
Turbulent Kinetic Energy	Second Order Upwind

Specific Dissipation Rate	Second Order Upwind
Energy	Second Order Upwind
– Solution Limits	
Minimum Absolute Pressure [Pa]	1
Maximum Absolute Pressure [Pa]	5e+10
Minimum Static Temperature [K]	1
Maximum Static Temperature [K]	5000
Minimum Turb. Kinetic Energy [m^2/s^2]	1e-14
Minimum Spec. Dissipation Rate [s^-1]	1e-20
Maximum Turb. Viscosity Ratio	100000

Run Information

Number of Machines	1
Number of Cores	4
Case Read	11.095 seconds
Data Read	0.245 seconds
Virtual Current Memory	1.40979 GB
Virtual Peak Memory	1.42609 GB
Memory Per M Cell	10.0304

Solution Status

Iterations: 126

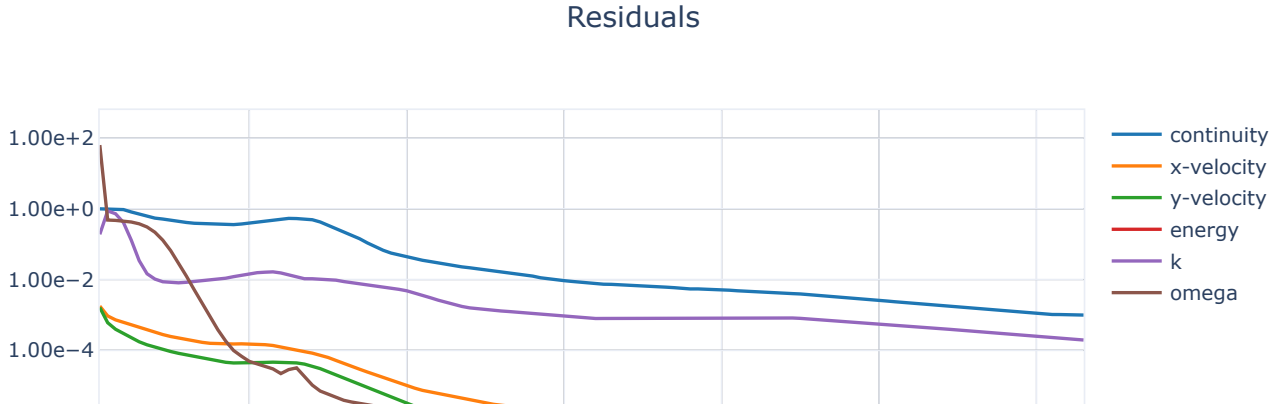
	Value	Absolute Criteria	Convergence Status
continuity	0.0009920049	0.001	Converged
x-velocity	1.569579e-07	0.001	Converged
y-velocity	4.991093e-08	0.001	Converged
energy	1.594131e-16	1e-06	Converged
k	0.0001953315	0.001	Converged
omega	1.319872e-07	0.001	Converged

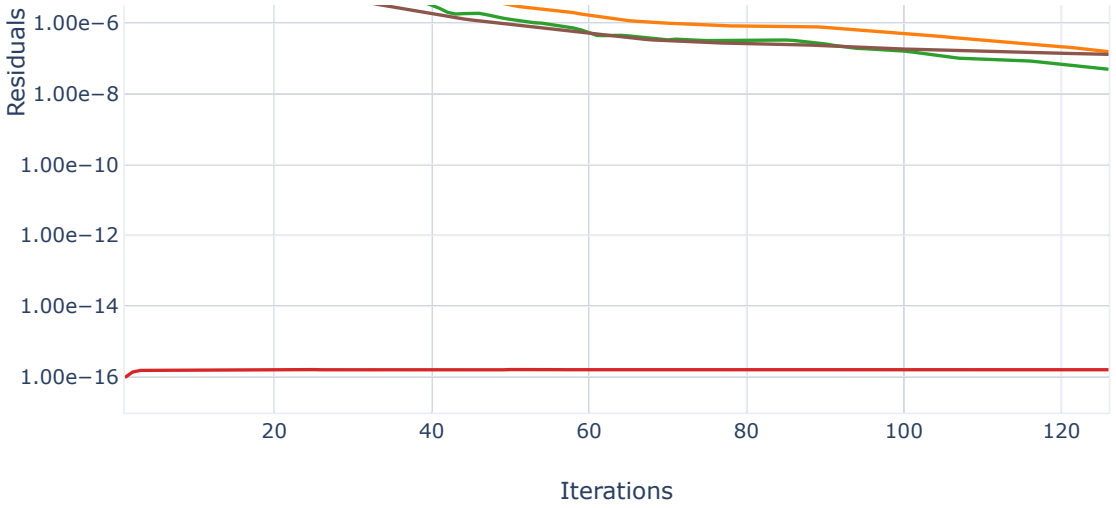
Report Definitions

lift-force	-0.06440116	N
drag-force	0.6872278	N
left-cofficient	-0.01168275	
drag-cofficient	0.1246672	

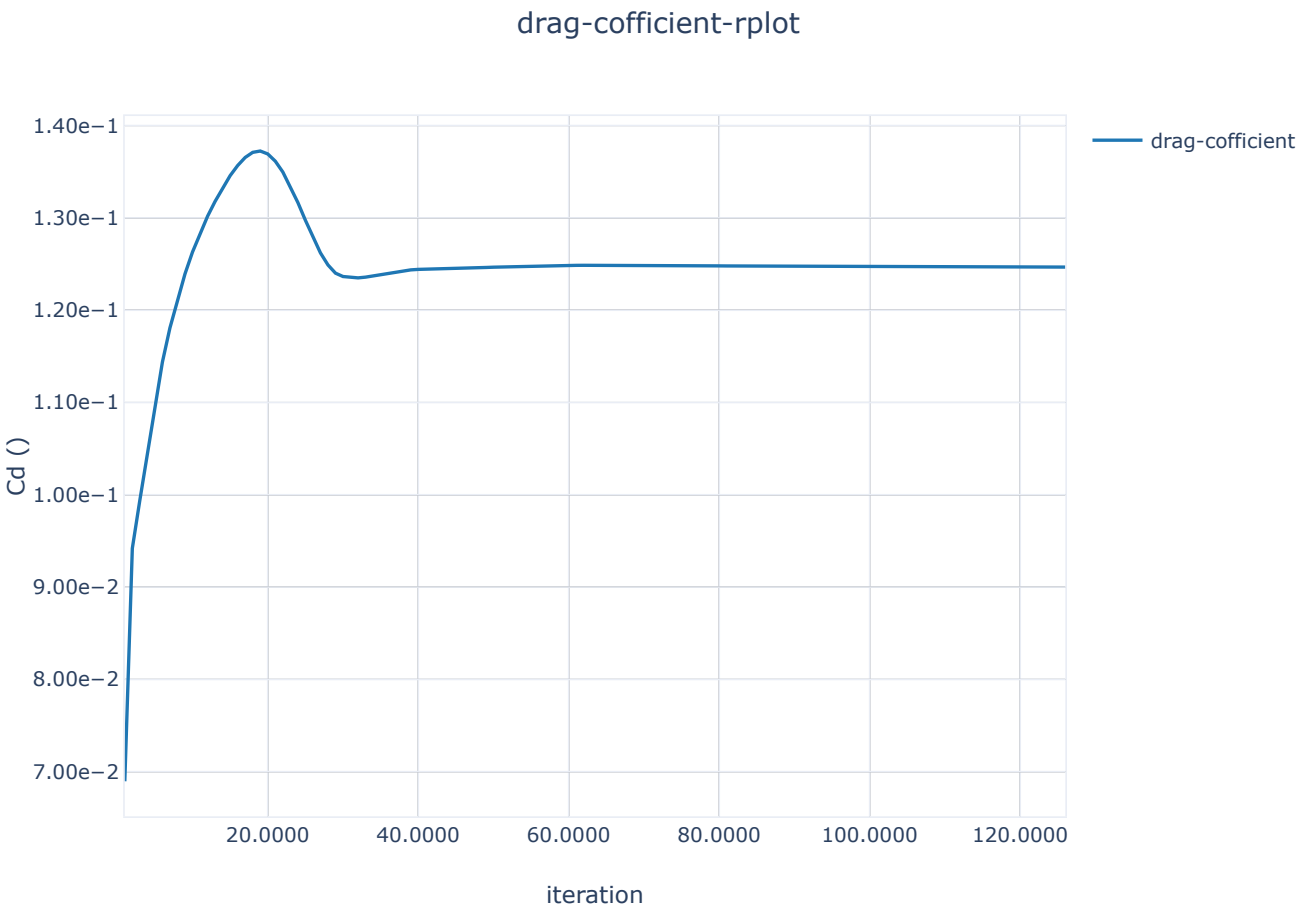
Plots

Residuals

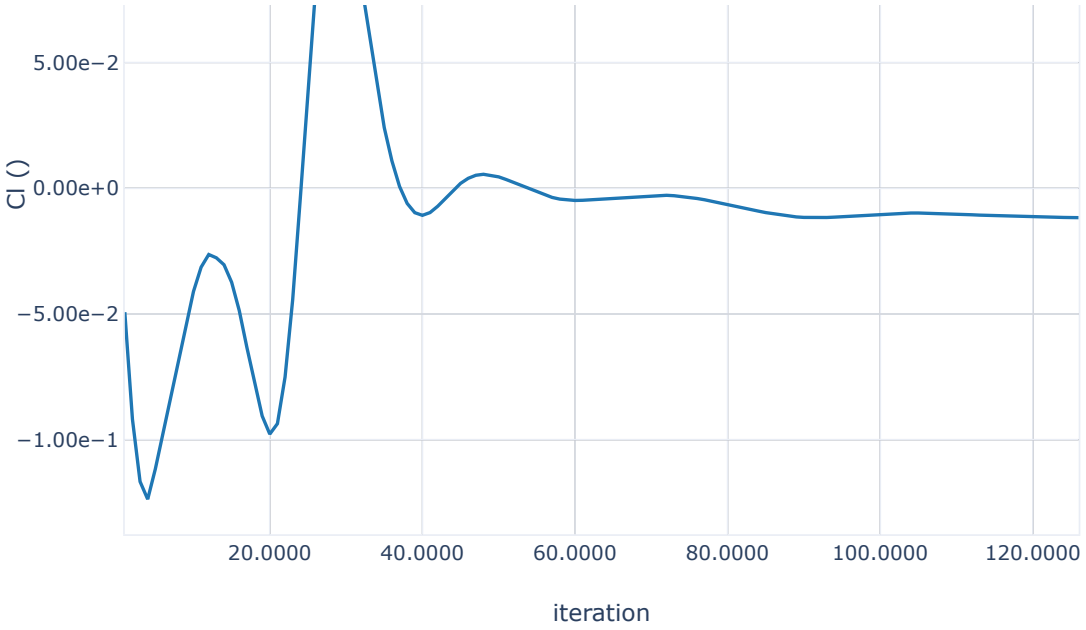




drag-cofficient-rplot



left-cofficient-rplot



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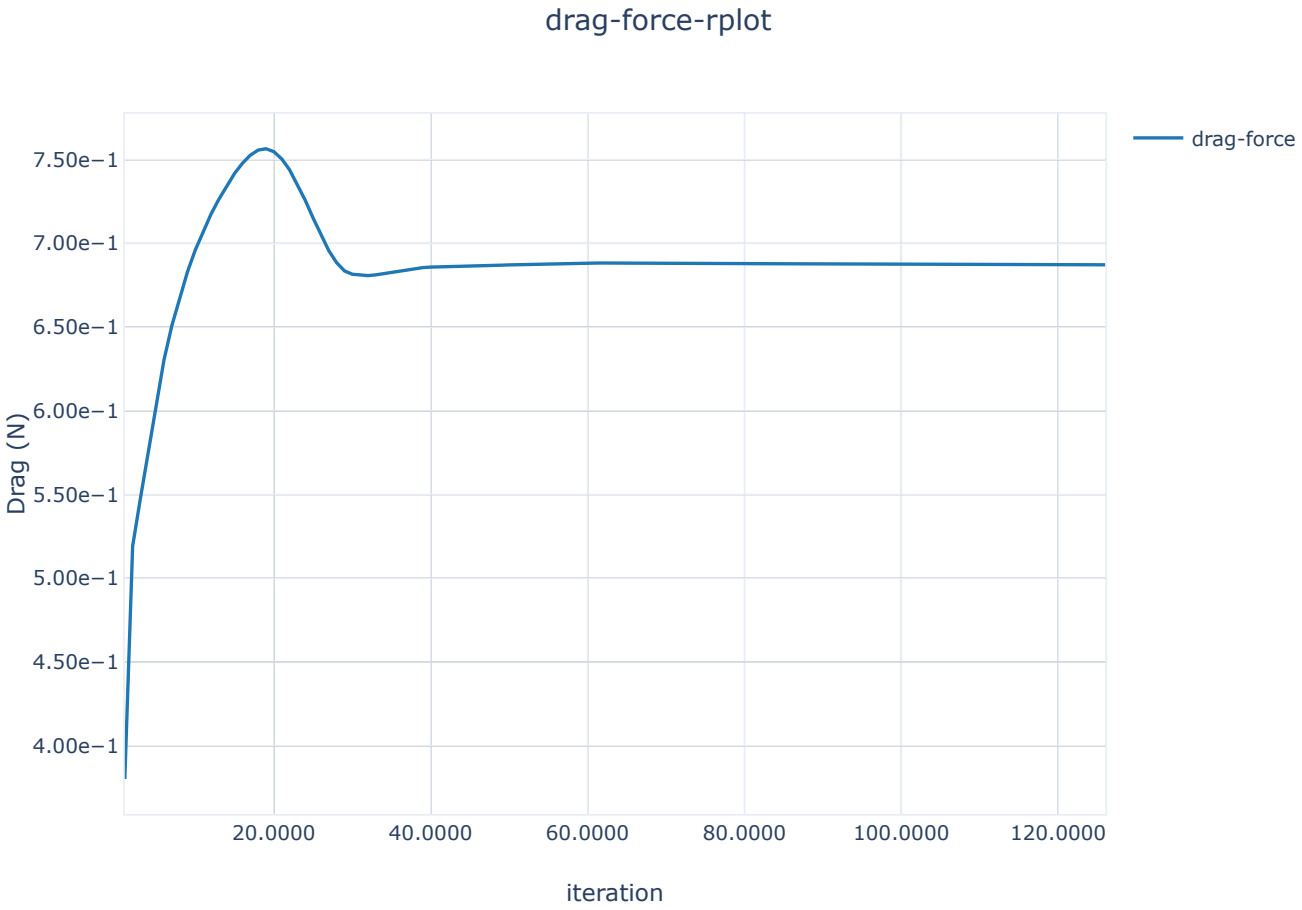
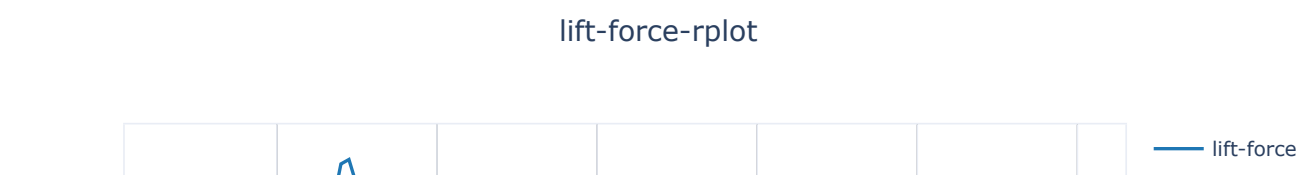
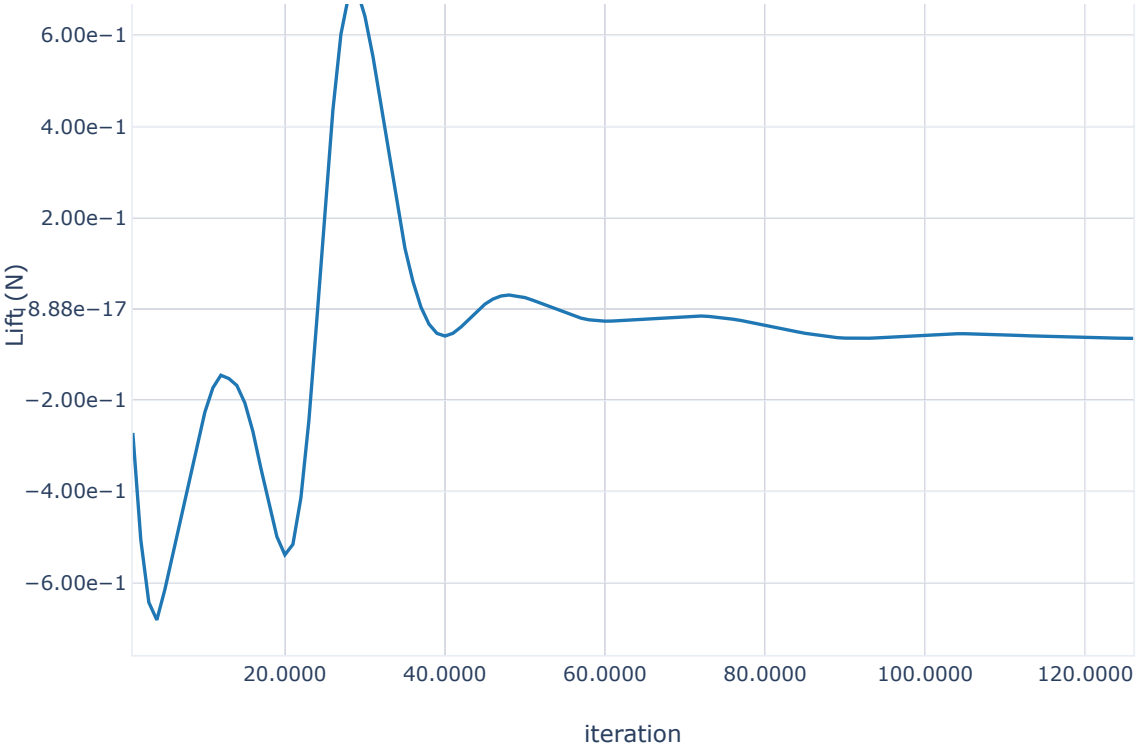


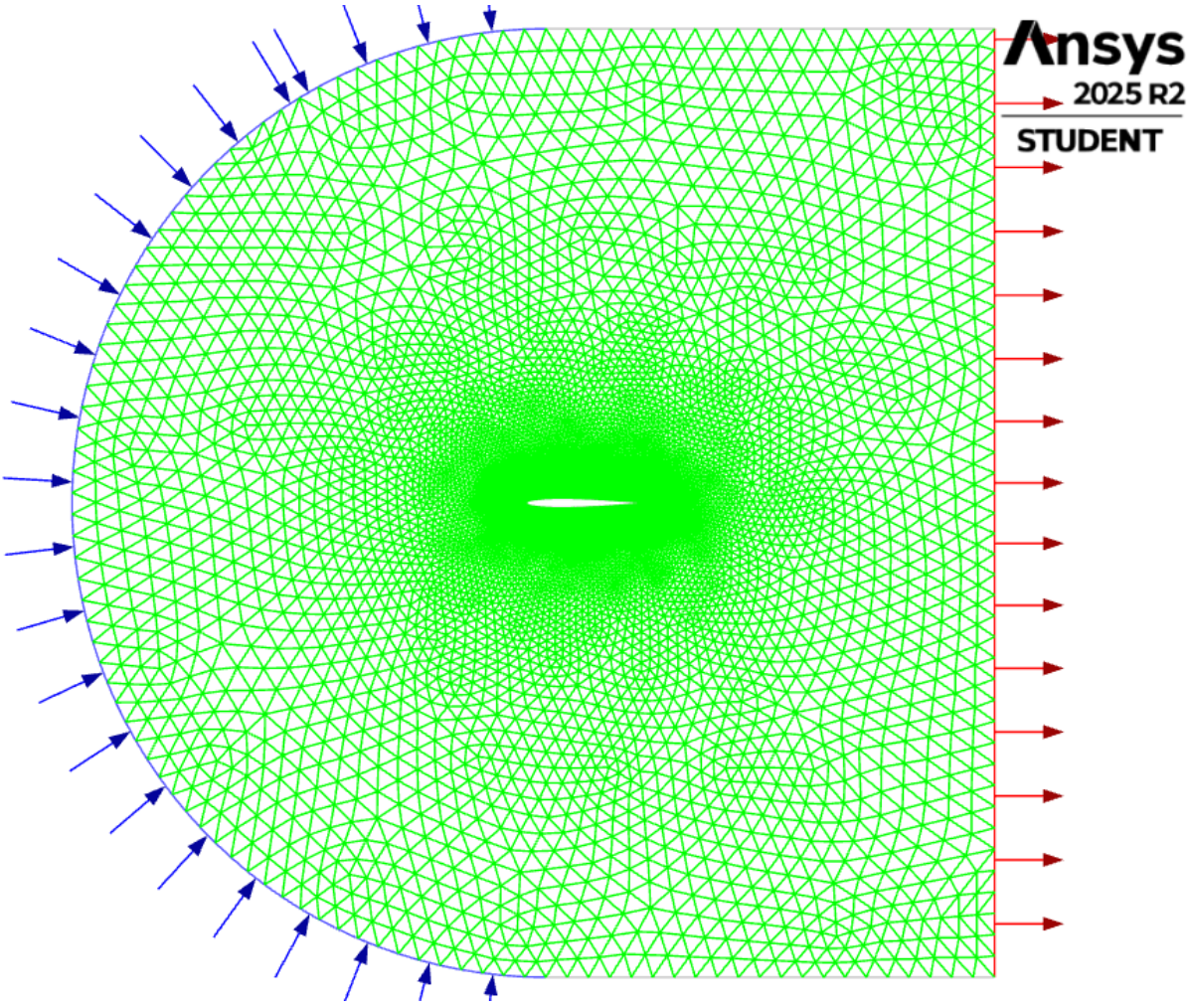
lift-force-rplot




6.00e−1
4.00e−1
2.00e−1
8.88e−17
−2.00e−1
−4.00e−1
−6.00e−1
Lift (N)
20.0000
40.0000
60.0000
80.0000
100.0000
120.0000
iteration

Mesh

mesh-1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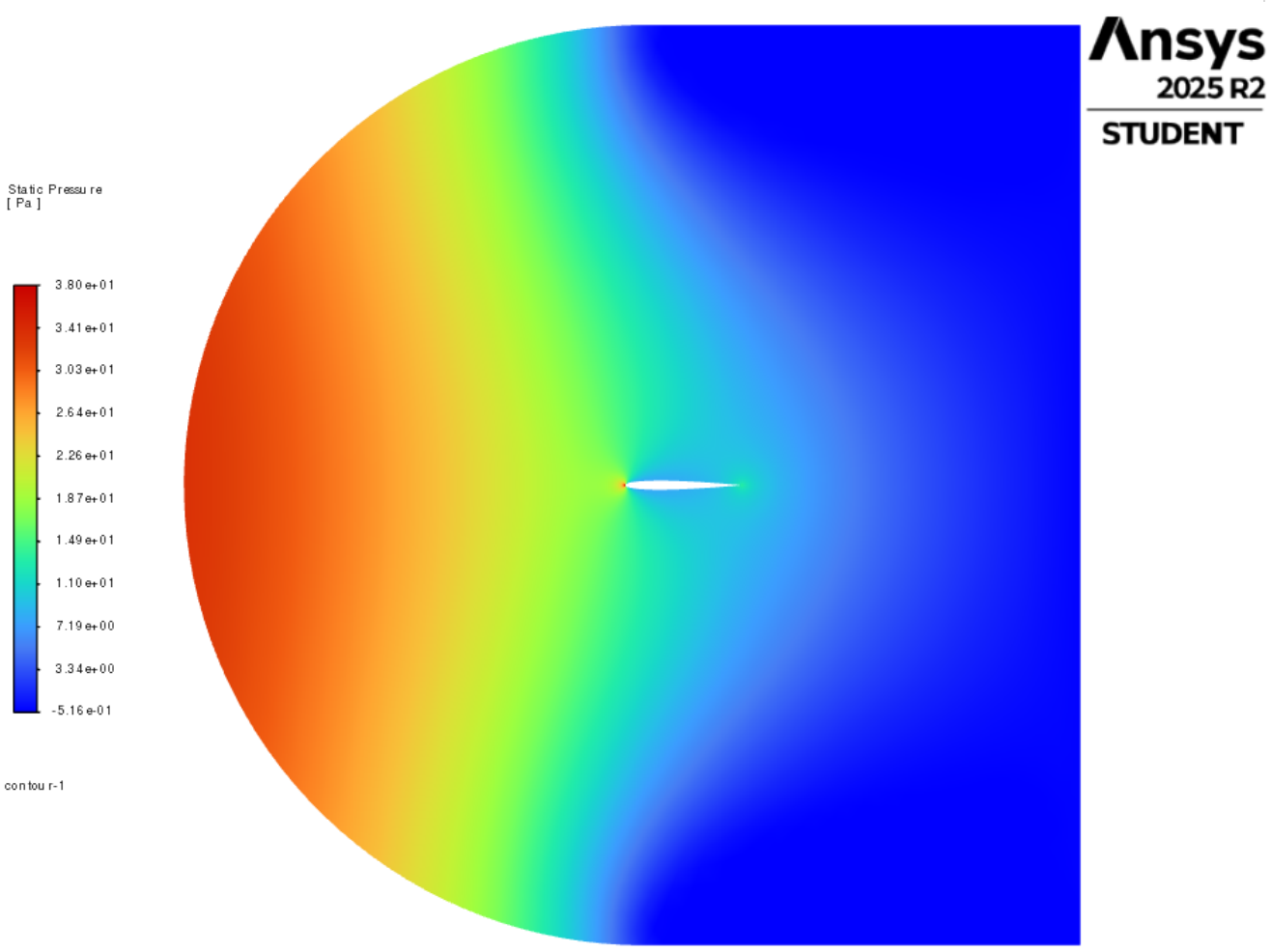
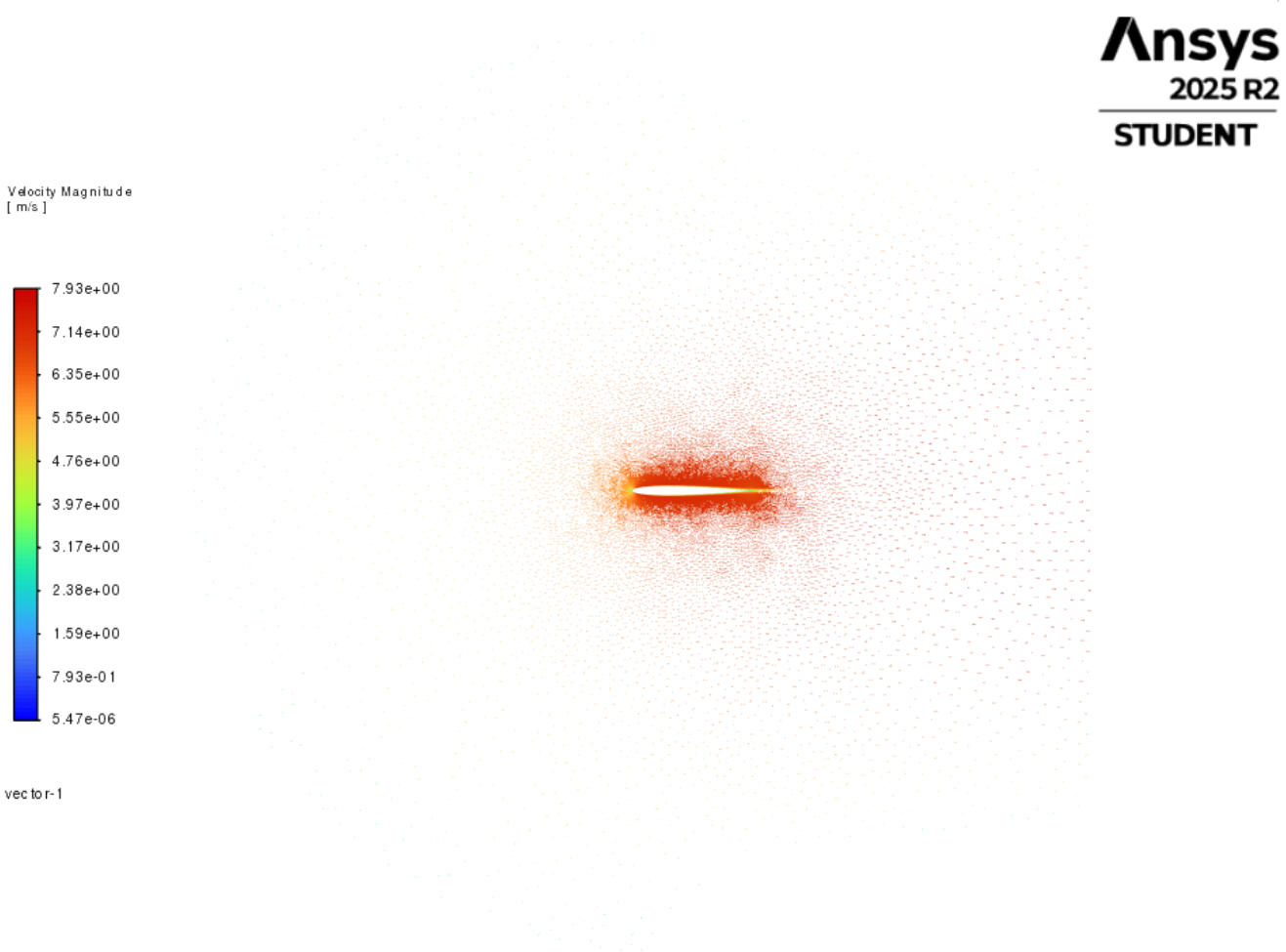
Contours

contour-1



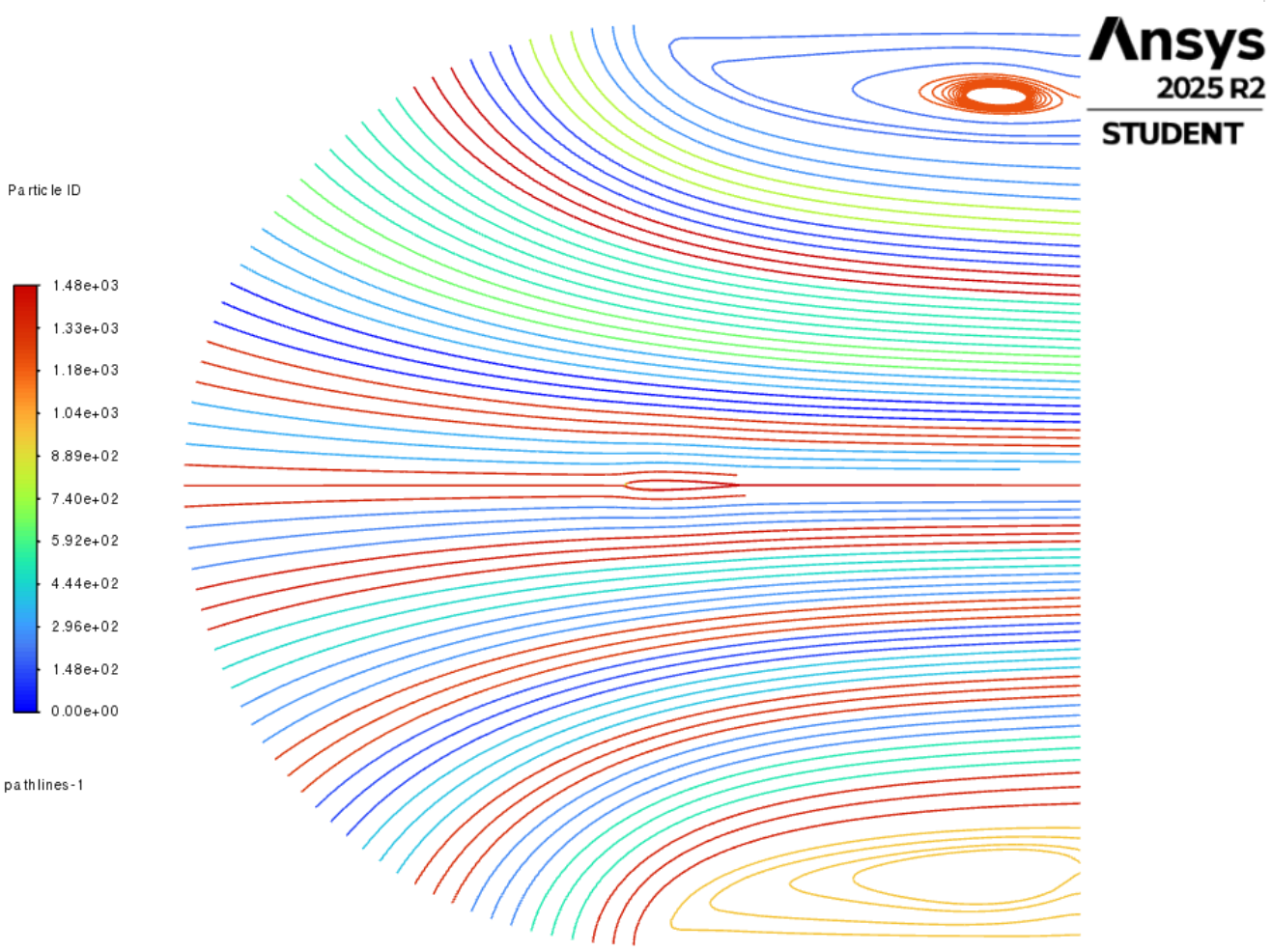
Vectors

vector-1

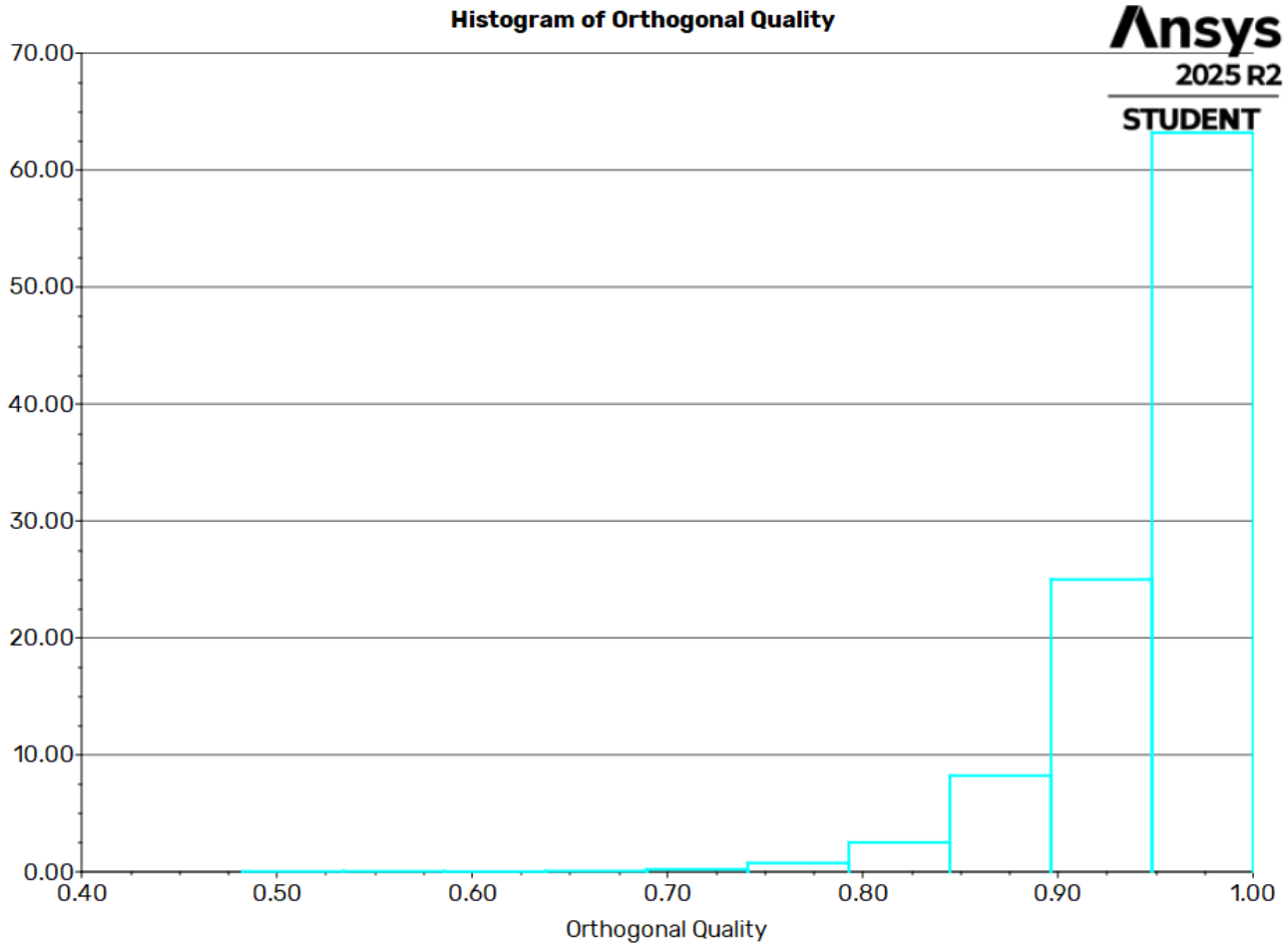


Pathlines

pathlines-1



Scenes


Histogram of Orthogonal Quality
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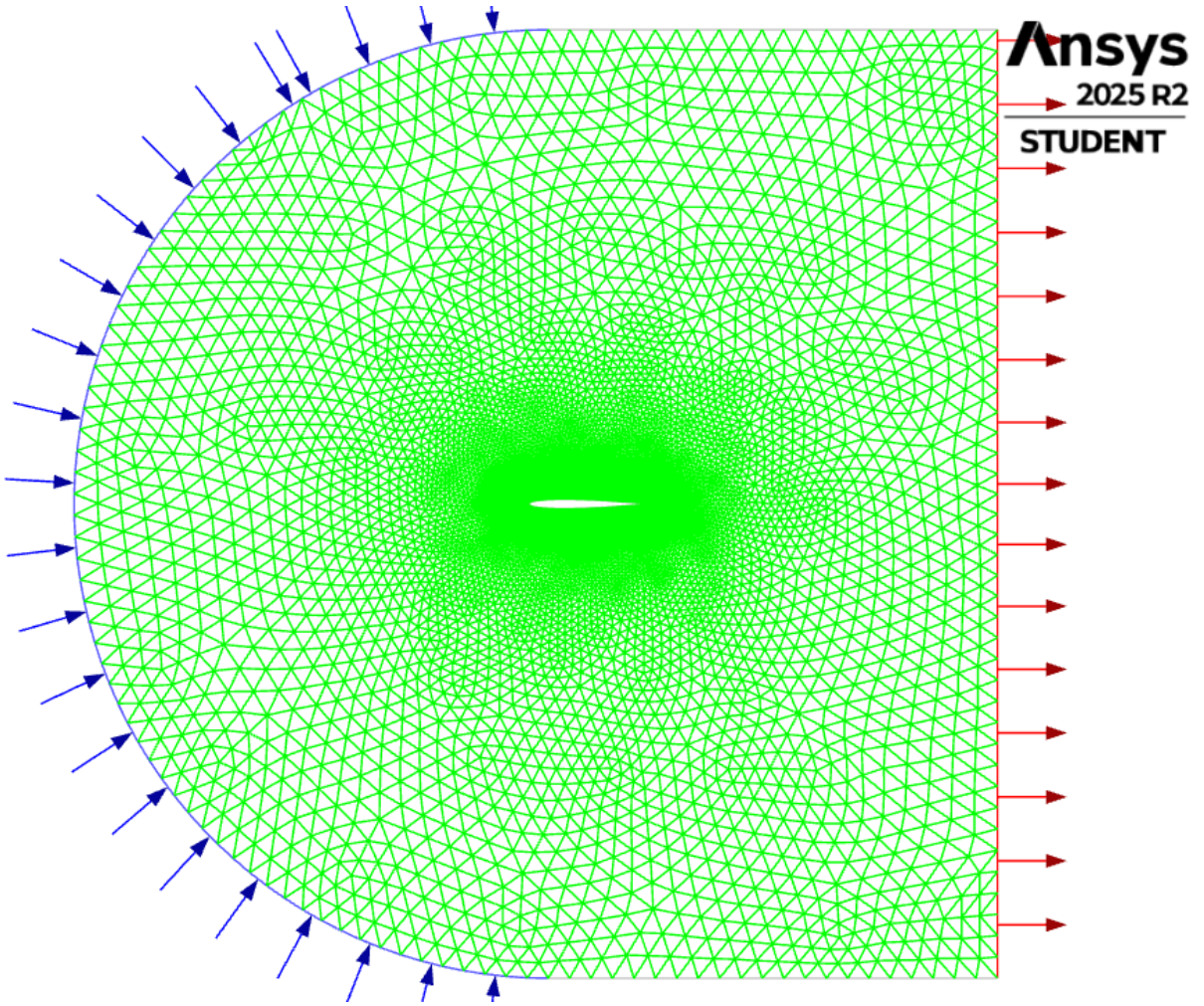
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0.40
0.50
0.60
0.70
0.80
0.90
1.00
Orthogonal Quality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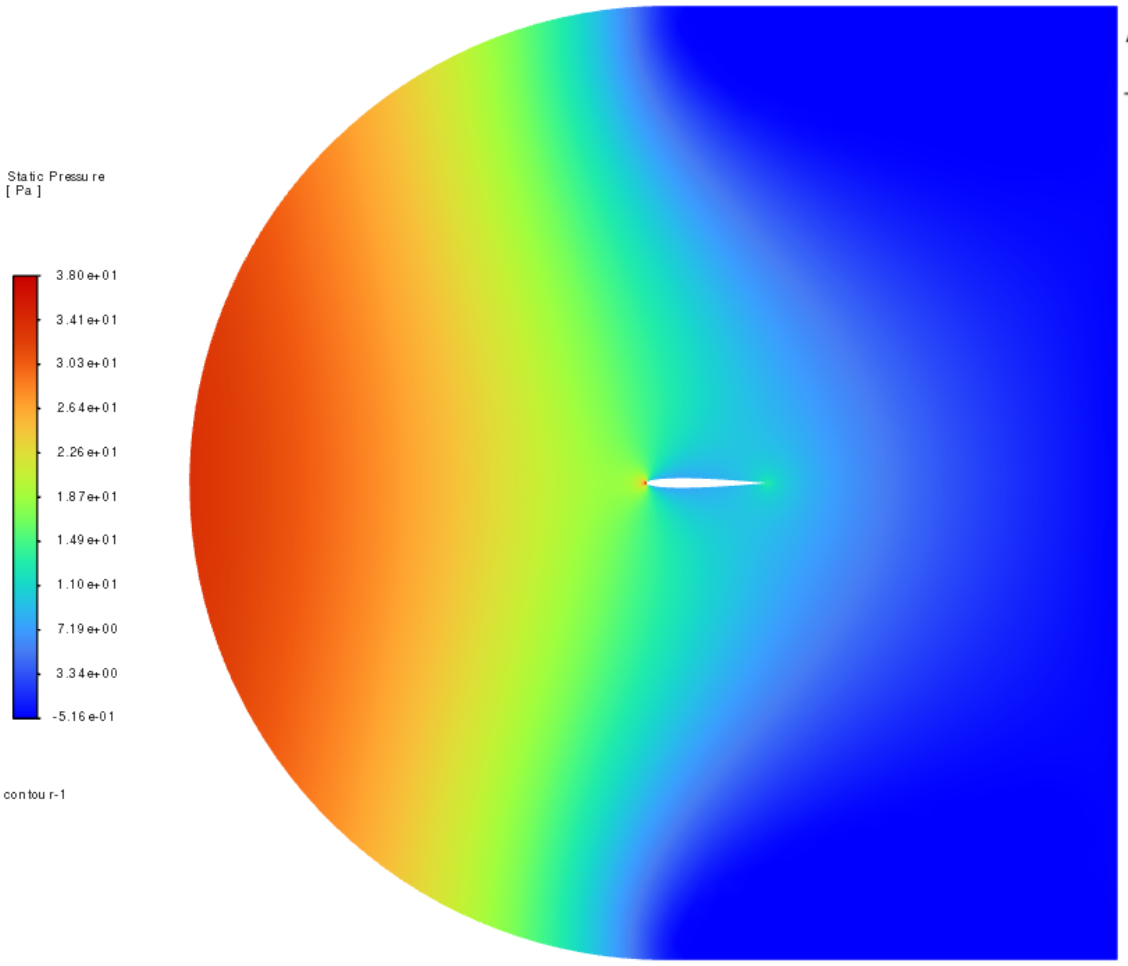

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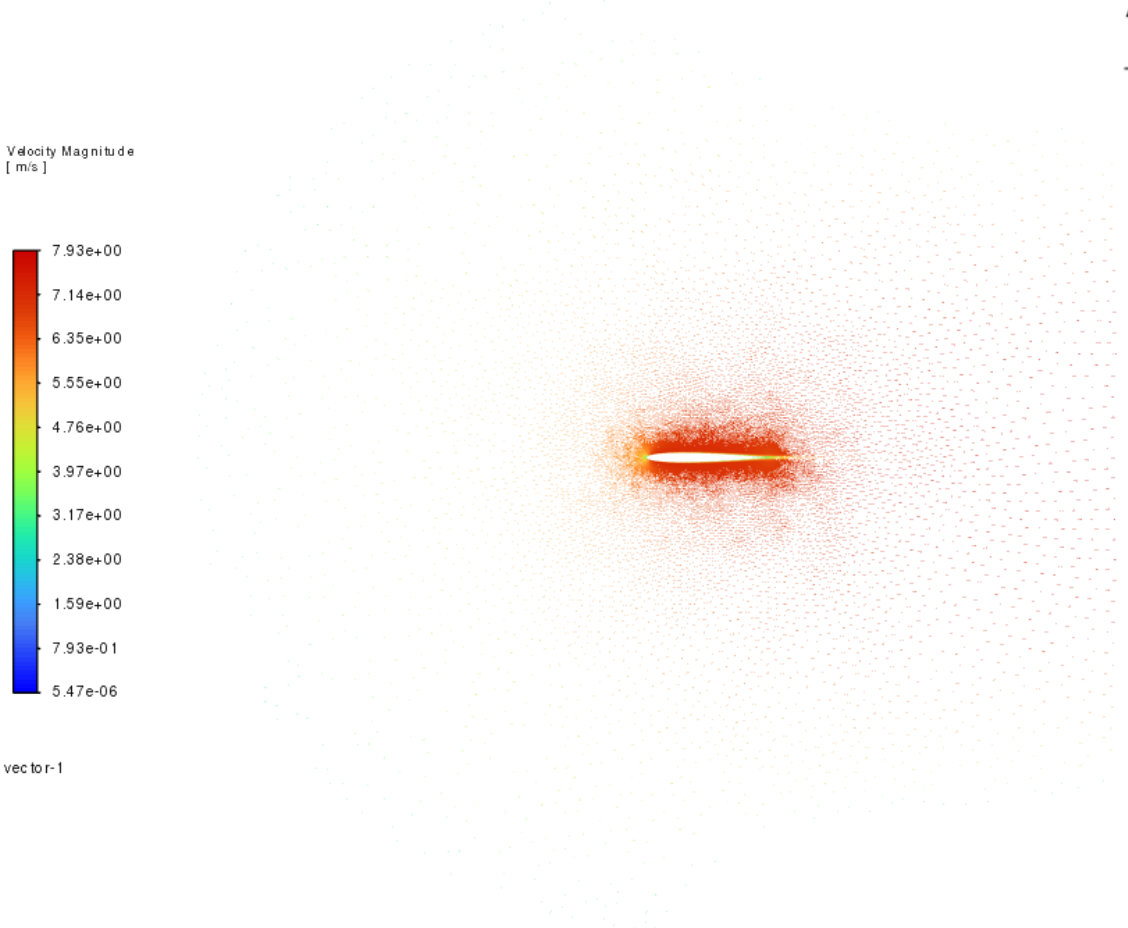

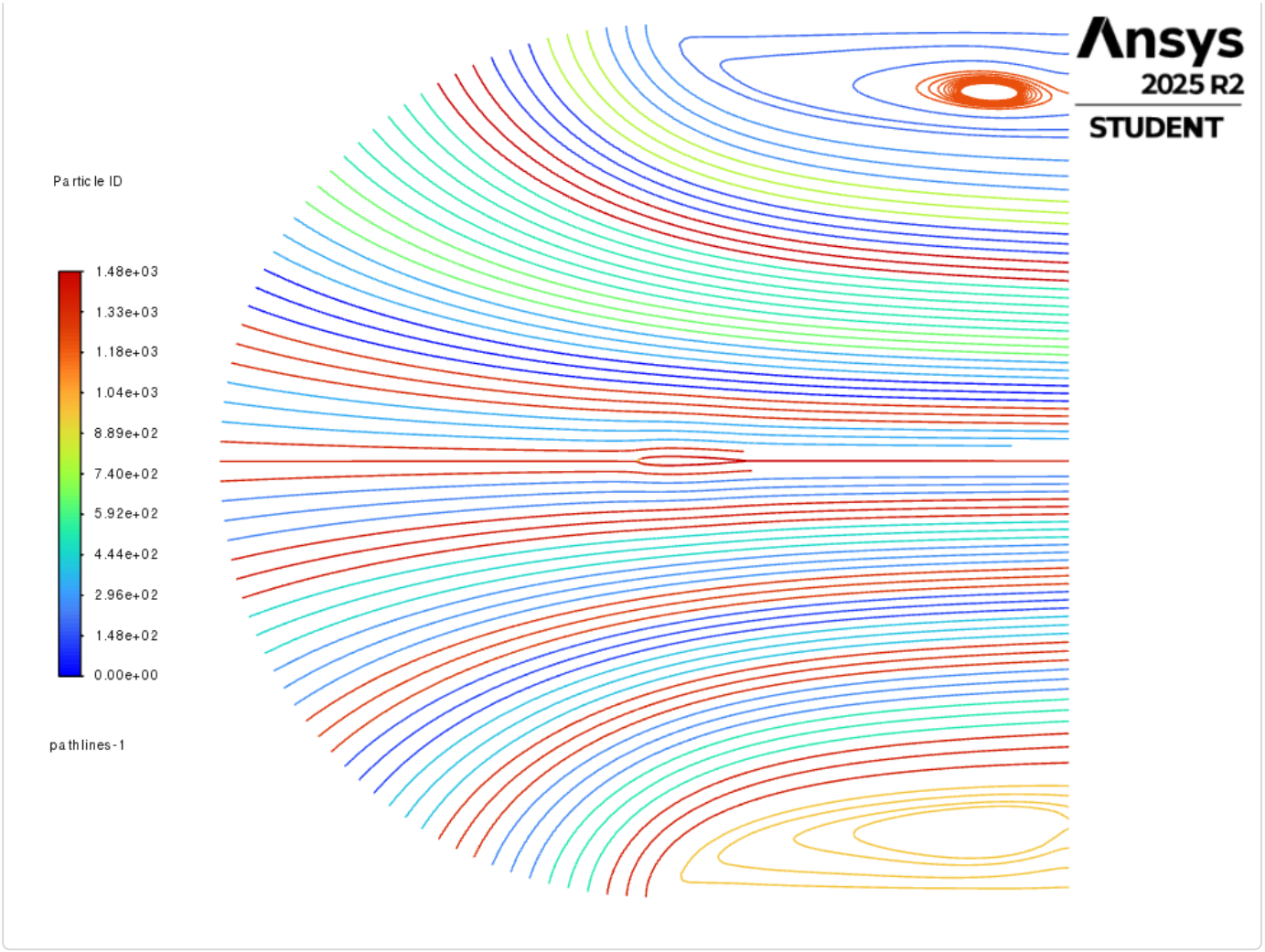
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Particle ID
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1.33e+03
1.18e+03
1.04e+03
8.89e+02
7.40e+02
5.92e+02
4.44e+02
2.96e+02
1.48e+02
0.00e+00
pathlines-1