Ansys
2022 R2

Ansys Fluent Simulation Report

Analyst	akten
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System Information

Application	Fluent
Settings	3d, double precision, pressure-based, laminar
Version	22.2.0-10212
Source Revision	61a5bc1c97
Build Time	May 27 2022 08:52:44 EDT
CPU	Intel(R) Core(TM) i7-10750H
OS	Windows

Geometry and Mesh

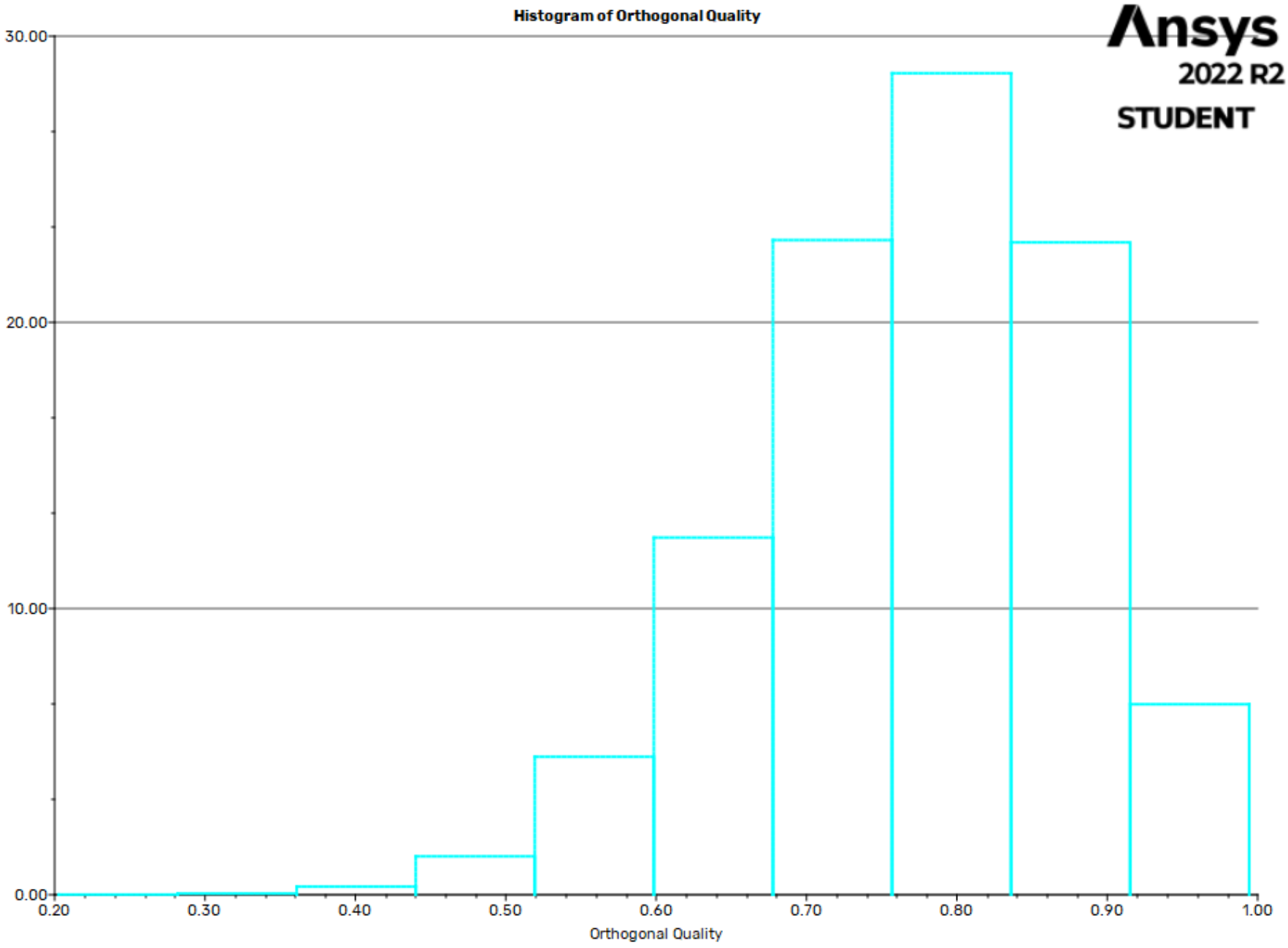
Mesh Size

Cells	Faces	Nodes
502932	1018326	90270

Mesh Quality

Name	Type	Min Orthogonal Quality	Max Aspect Ratio
solid	Tet Cell	0.20263337	20.385383

Orthogonal Quality



Simulation Setup

Physics

Models

Model	Settings

Model	Settings
Space	3D
Time	Steady
Viscous	Laminar

Material Properties

− Fluid	
− water-liquid	
Density	998.2 kg/m^3
Cp (Specific Heat)	4182 J/(kg K)
Thermal Conductivity	0.6 W/(m K)
Viscosity	0.001003 kg/(m s)
Molecular Weight	18.0152 kg/kmol
− 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)
Molecular Weight	28.966 kg/kmol
− 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	
− solid	
Material Name	water liquid
Specify source terms?	no
Specify fixed values?	no
Frame Motion?	no
Porous zone?	no
3D Fan Zone?	no

Boundary Conditions

− Inlet	
− inlet	
Velocity Specification Method	Magnitude, Normal to Boundary
Reference Frame	Absolute
Velocity Magnitude [m/s]	10
Supersonic/Initial Gauge Pressure [Pa]	0
− Outlet	
− outlet	

Backflow Reference Frame	Absolute
Gauge Pressure [Pa]	0
Pressure Profile Multiplier	1
Backflow Direction Specification Method	Normal to Boundary
Backflow Pressure Specification	Total Pressure
Build artificial walls to prevent reverse flow?	no
Radial Equilibrium Pressure Distribution	no
Average Pressure Specification?	no
Specify targeted mass flow rate	no
— Wall	
— wall-solid	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
— wall	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip

Reference Values

Area	1 m^2
Density	1.225 kg/m^3
Enthalpy	0 J/kg
Length	1 m
Pressure	0 Pa
Temperature	288.16 K
Velocity	1 m/s
Viscosity	1.7894e-05 kg/(m s)
Ratio of Specific Heats	1.4
Yplus for Heat Tran. Coef.	300
Reference Zone	solid

Solver Settings

— Equations	
Flow	True
— Numerics	
Absolute Velocity Formulation	True
— Pseudo Time Explicit Relaxation Factors	
Density	1
Body Forces	1
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
− Solution Limits	
Minimum Absolute Pressure [Pa]	1
Maximum Absolute Pressure [Pa]	5e+10
Minimum Temperature [K]	1
Maximum Temperature [K]	5000

Run Information

Number of Machines	1
Number of Cores	1
Case Read	5.925 seconds
Data Read	0.58 seconds
Virtual Current Memory	1.27604 GB
Virtual Peak Memory	1.29643 GB
Memory Per M Cell	1.33909

Solution Status

Iterations: 200

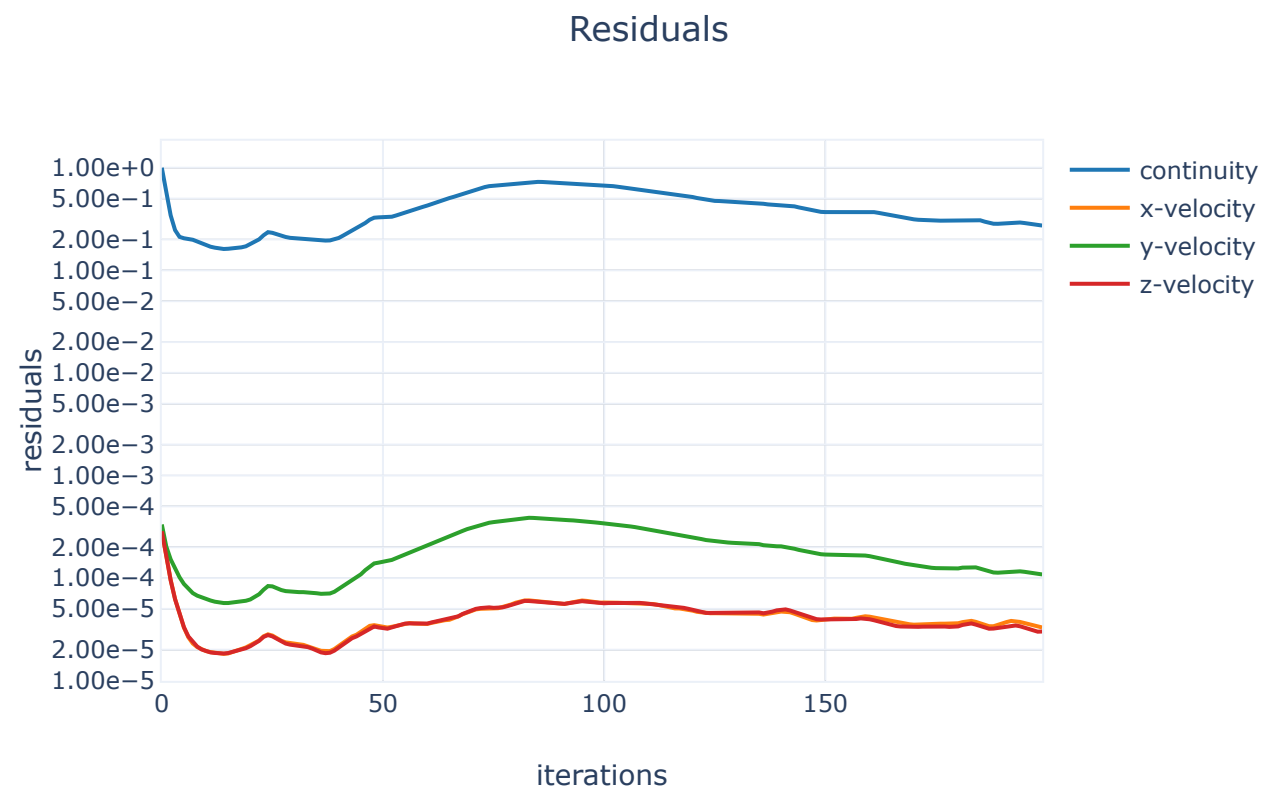
	Value	Absolute Criteria	Convergence Status
continuity	0.2732651	0.001	Not Converged
x-velocity	3.297179e-05	0.001	Converged
y-velocity	0.0001084198	0.001	Converged
z-velocity	3.01158e-05	0.001	Converged

Report Definitions

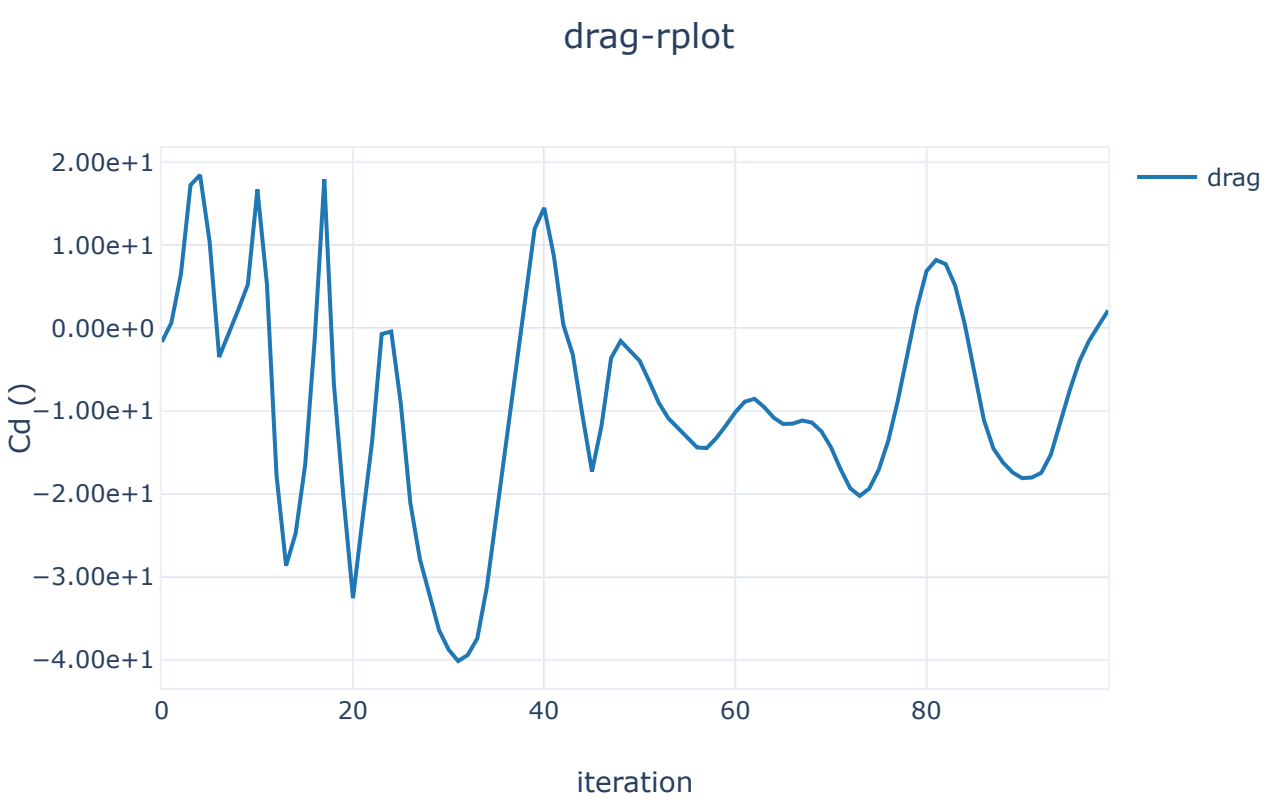
dragx	2.088508	
force	1.833777	N
drag	2.145536	

Plots

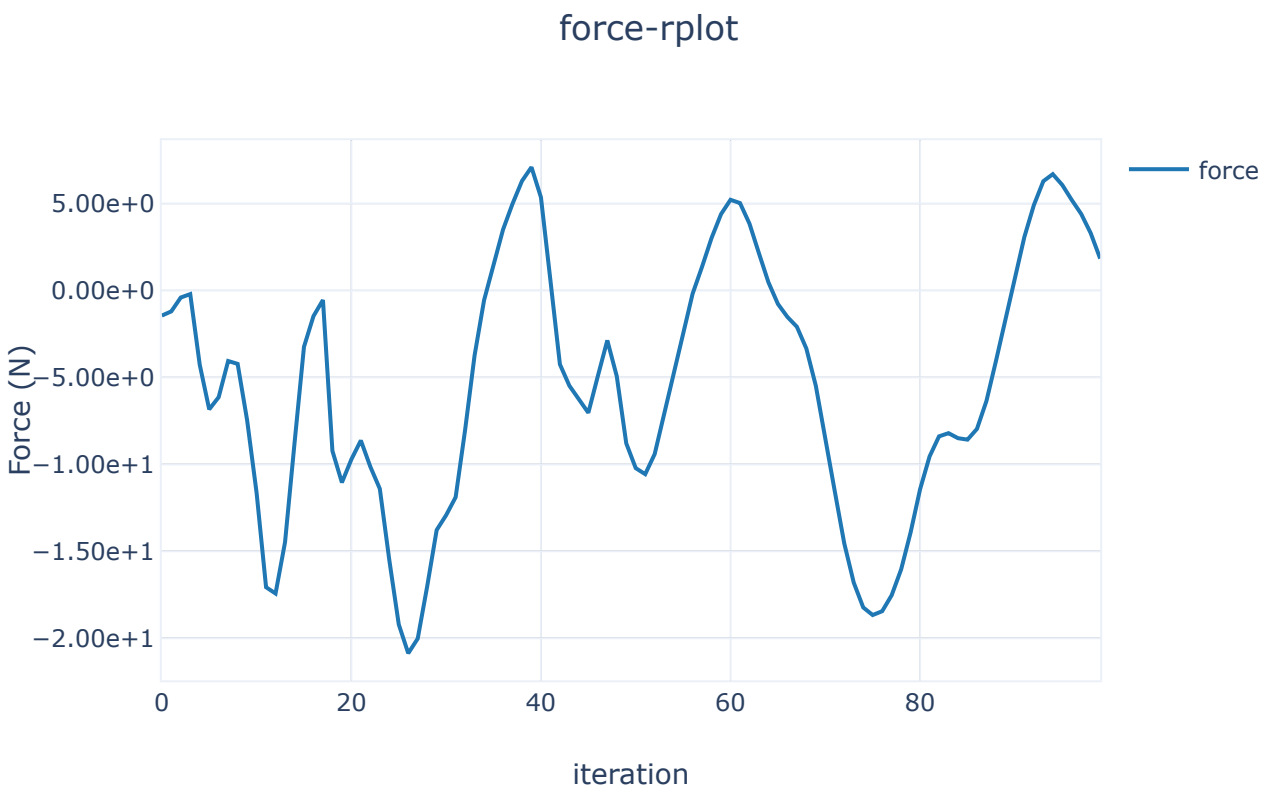
Residuals



drag-rplot

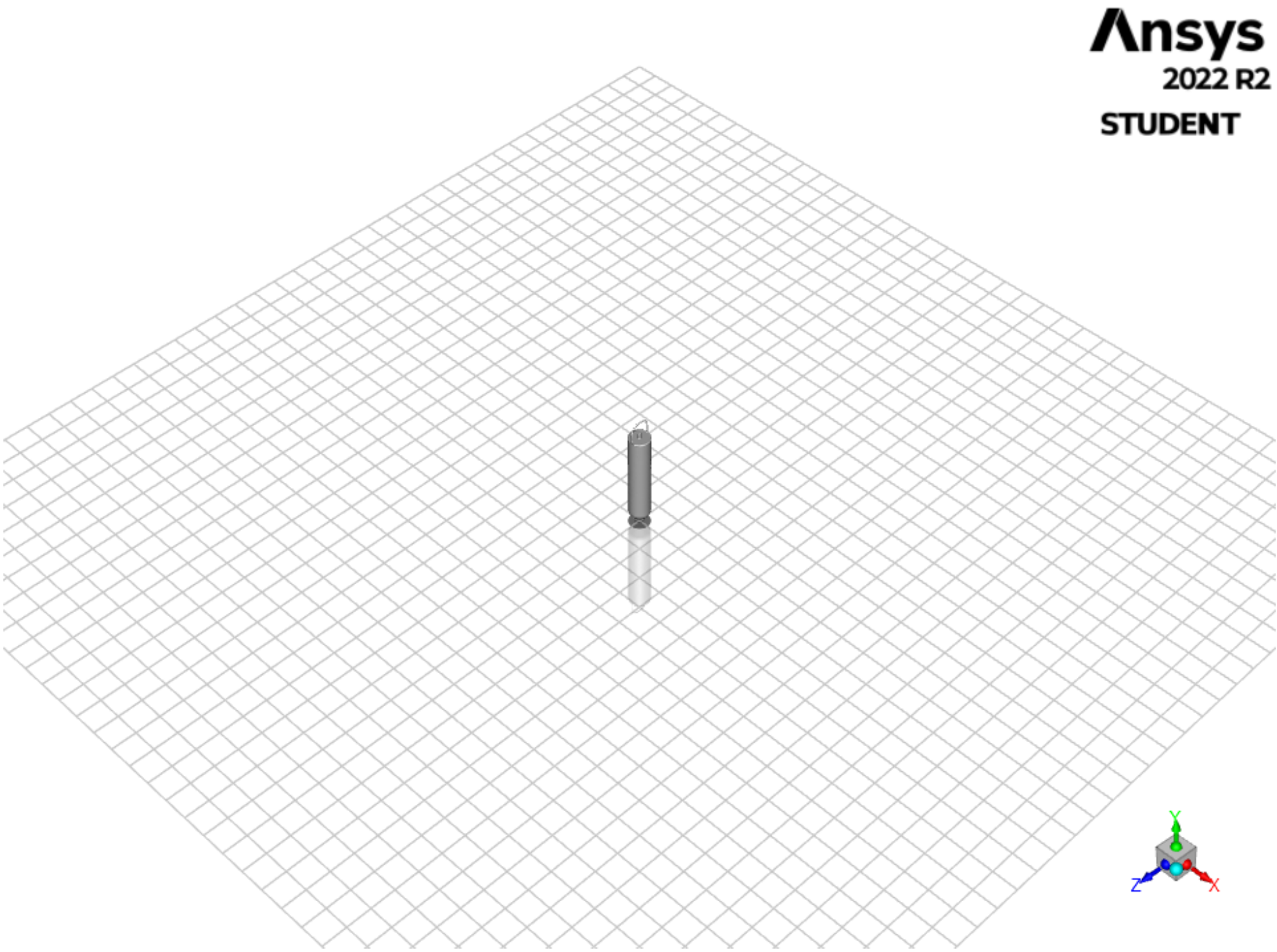


force-rplot



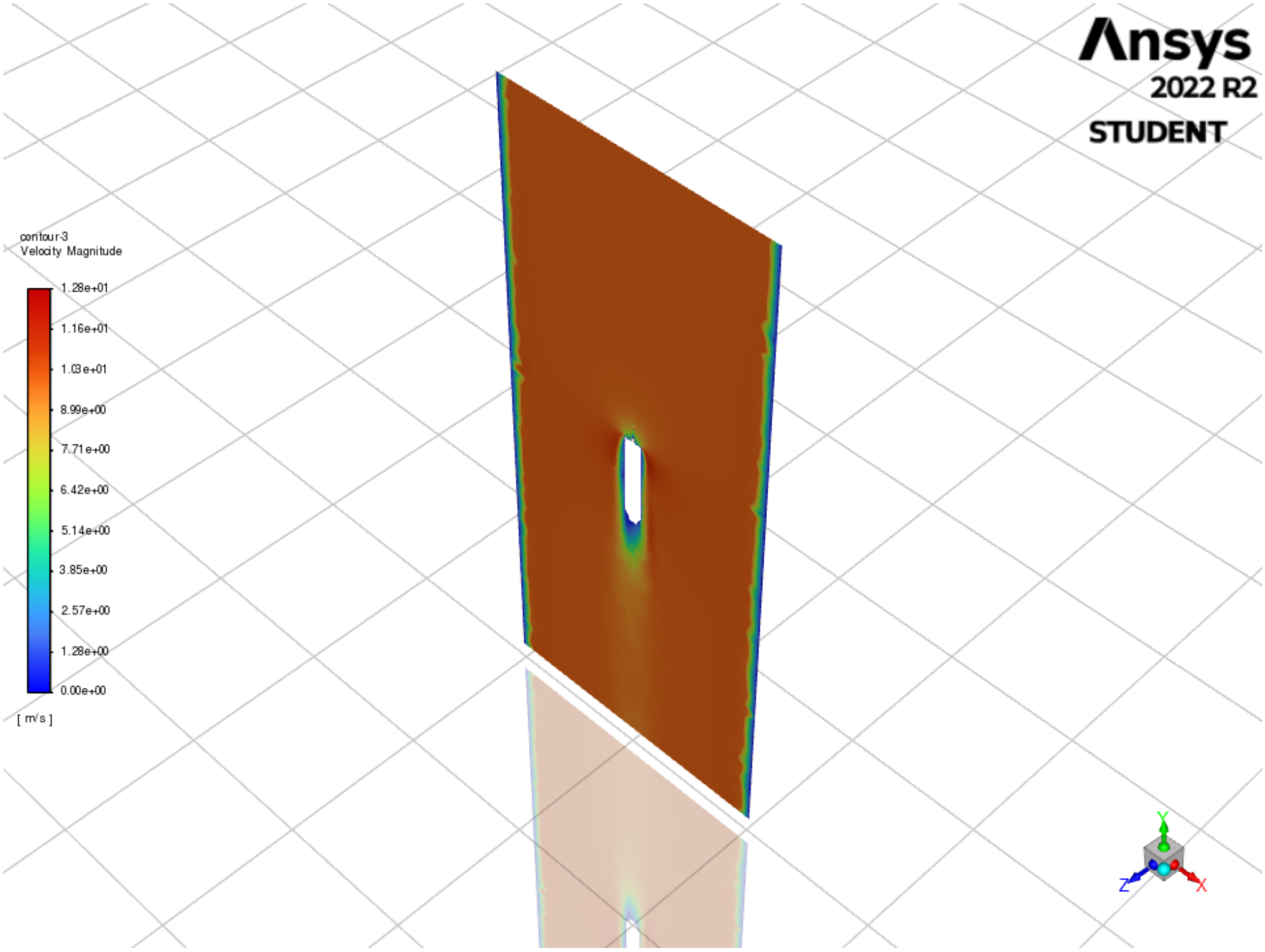
Mesh

mesh-1



Contours

contour-3


Ansys
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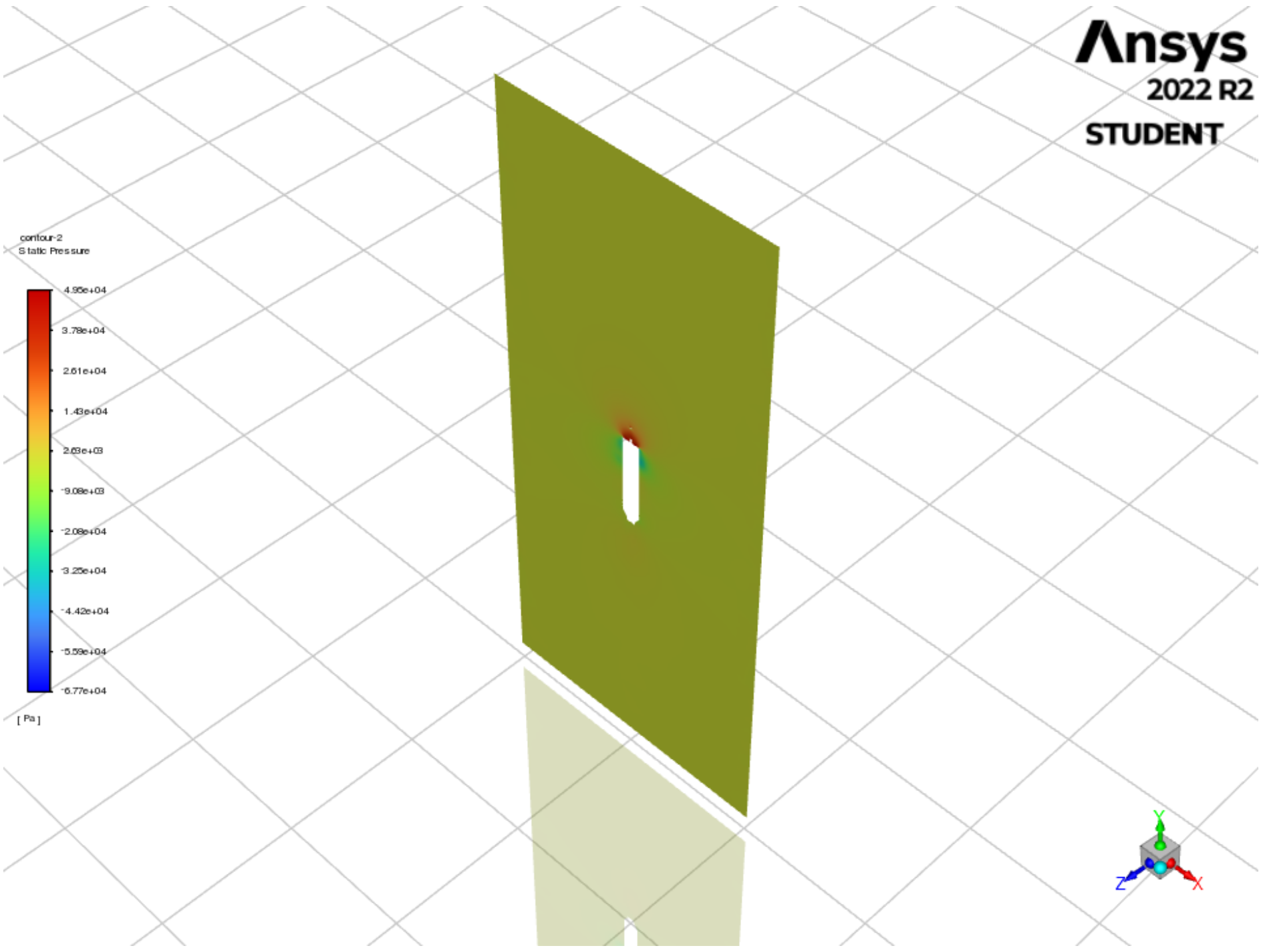
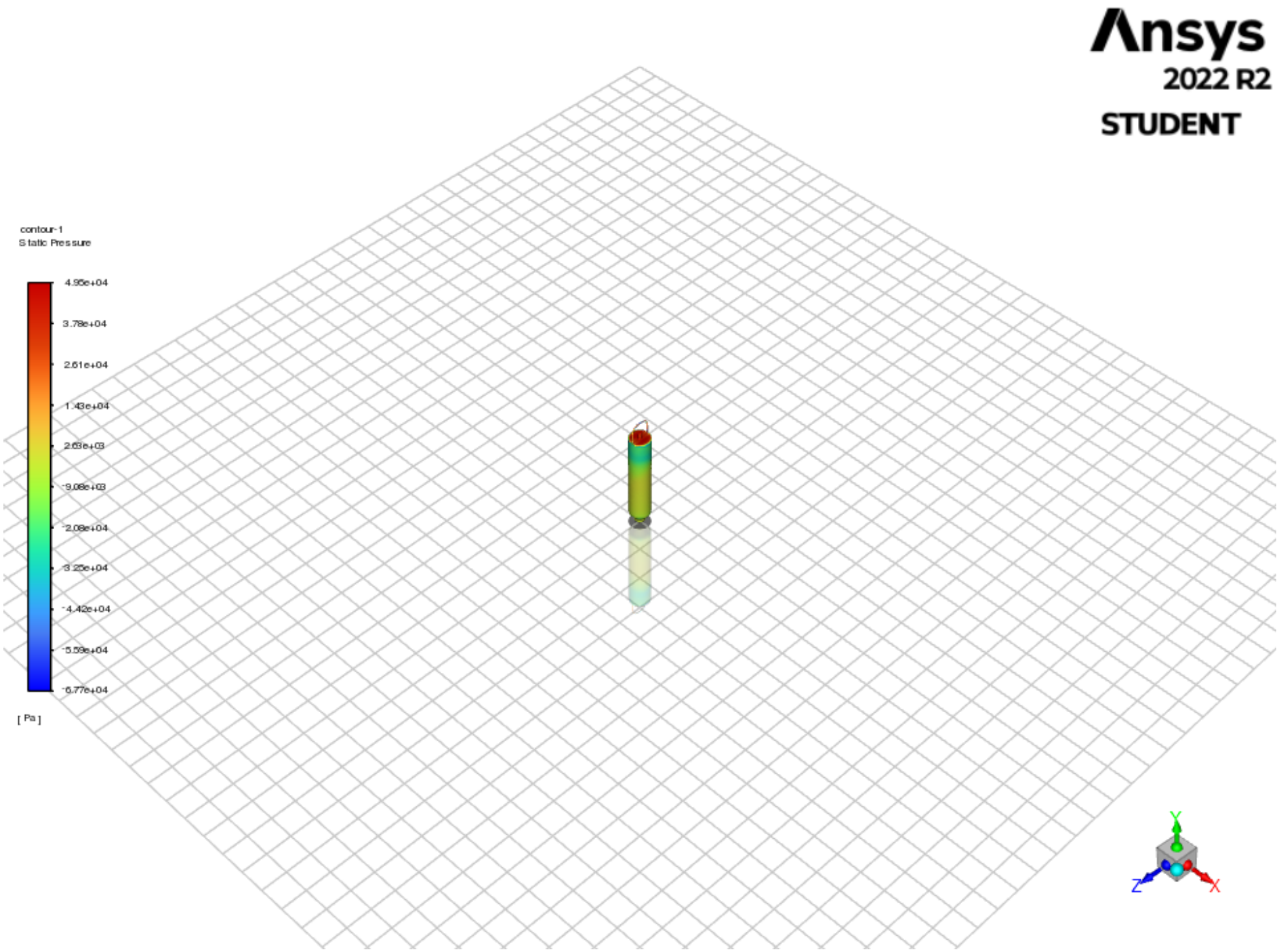
STUDENT
contour-3
Velocity Magnitude
1.28e+01
1.16e+01
1.03e+01
8.99e+00
7.71e+00
6.42e+00
5.14e+00
3.85e+00
2.57e+00
1.28e+00
0.00e+00
[m/s]
Y
Z
X

contour-2

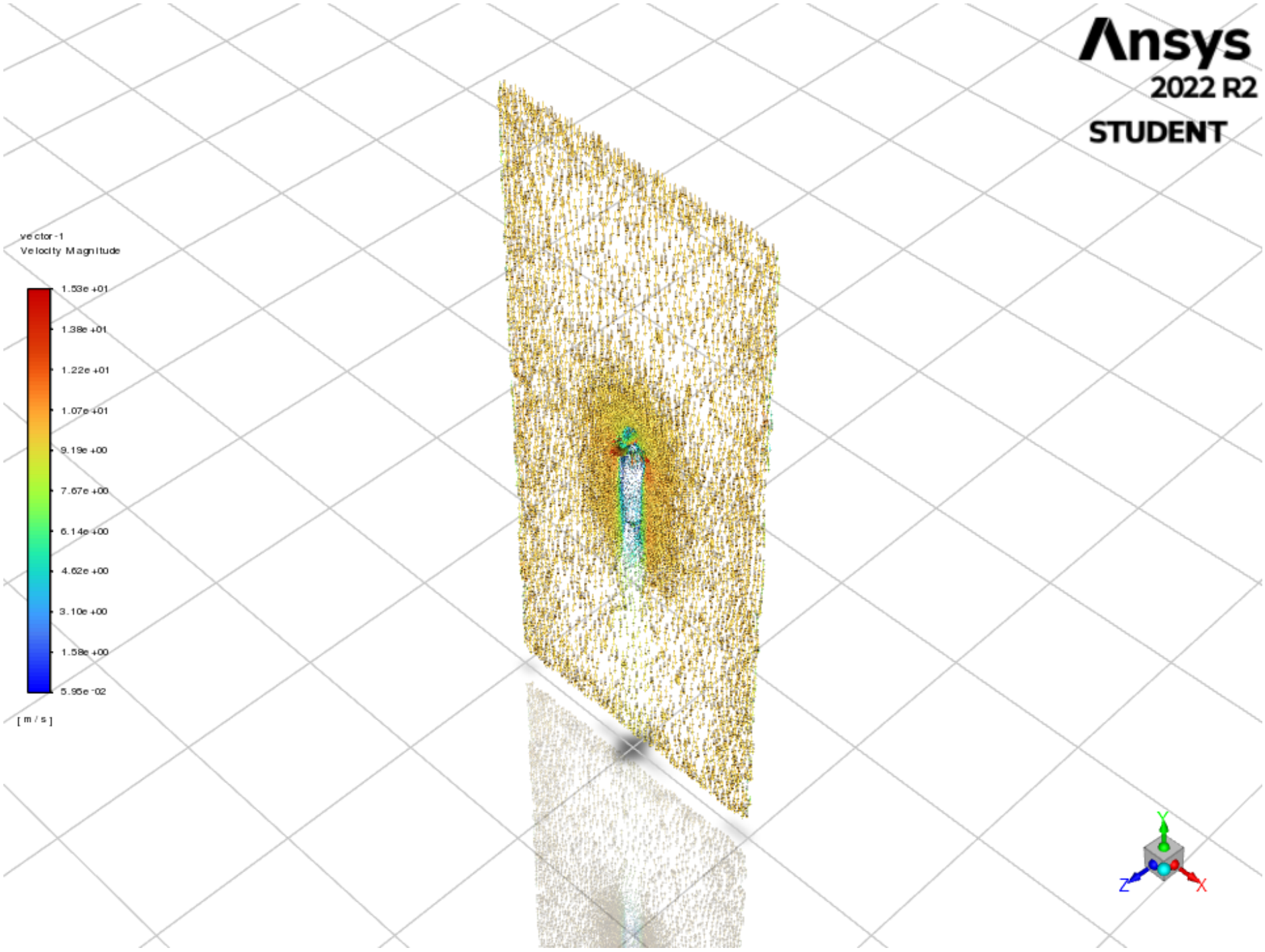

Ansys
2022 R2
STUDENT
contour-2
Static Pressure
4.95e+04
3.78e+04
2.61e+04
1.43e+04
2.63e+03
-9.08e+03
-2.08e+04
-3.25e+04
-4.42e+04
-5.59e+04
-6.77e+04
[Pa]
Y
Z
X

contour-1



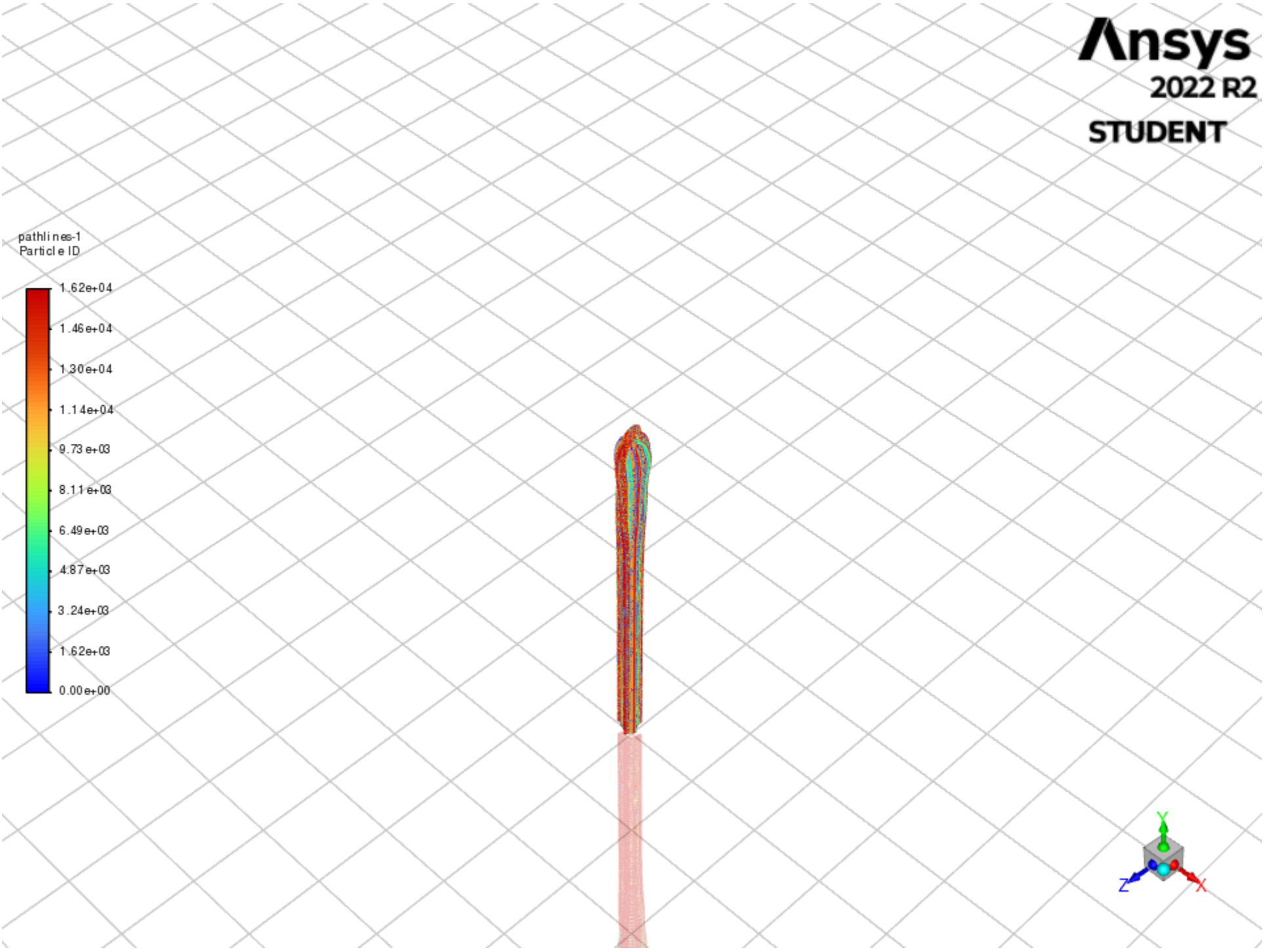
Vectors

vector-1



Pathlines

pathlines-1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pathlines-1
Particle ID
1.62e+04
1.46e+04
1.30e+04
1.14e+04
9.73e+03
8.11e+03
6.49e+03
4.87e+03
3.24e+03
1.62e+03
0.00e+00
Y
Z
X