Ansys 2022 R2

Ansys Fluent Simulation Report

Table of Contents

Geometry and Mesh

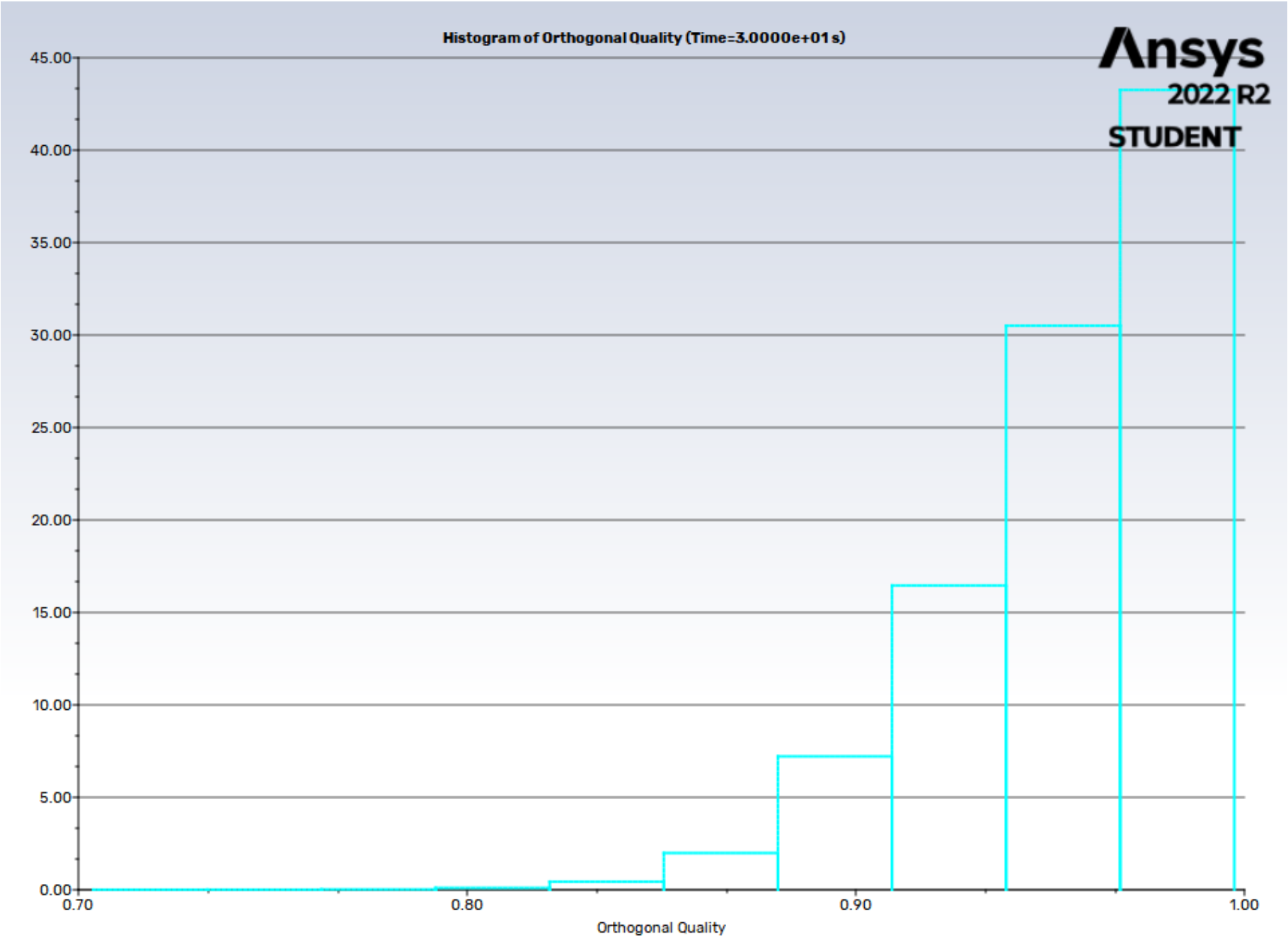
Mesh Size

Cells	Faces	Nodes
34610	223361	180621

Mesh Quality

Name	Type	Min Orthogonal Quality	Max Aspect Ratio
cell_fluid	Poly Cell	0.70383276	8.2448342

Orthogonal Quality



Simulation Setup

Physics

Models

Model	Settings
Space	3D
Time	Unsteady, Bounded 2nd-Order Implicit
Viscous	Laminar

Material Properties

− Fluid	
− air	
Density	1 kg/m^3
Cp (Specific Heat)	1006.43 J/(kg K)
Thermal Conductivity	0.0242 W/(m K)
Viscosity	0.01 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	
− cell_fluid	
Material Name	air
Specify source terms?	no
Specify fixed values?	no
Frame Motion?	no
Mesh Motion?	no
Porous zone?	no
3D Fan Zone?	no

Boundary Conditions

− Inlet	
− in	
Velocity Specification Method	Magnitude, Normal to Boundary
Reference Frame	Absolute
Velocity Magnitude [m/s]	1
Supersonic/Initial Gauge Pressure [Pa]	0
− Outlet	
− out	
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
− Symmetry	
sym-1	symmetry
sym-2	symmetry
sym-a	symmetry
sym-b	symmetry
− Wall	
− cylinder	
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	cell_fluid

Solver Settings

− Equations	
Flow	True
− Numerics	
Absolute Velocity Formulation	True
− Unsteady Calculation Parameters	
Number of Time Steps	120
Time Step Size [s]	0.05
− Non-Iterative Solver Relaxation Factors	
Pressure	1
Momentum	1
− Pressure-Velocity Coupling	
Type	Fractional Step
− 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	2
Case Read	3.784 seconds
Iteration	189.568 seconds
AMG	80.692 seconds

Virtual Current Memory	0.322598 GB
Virtual Peak Memory	2.31858 GB
Memory Per M Cell	6.23655

Solution Status

Flow Time: 30
Time Step: 480

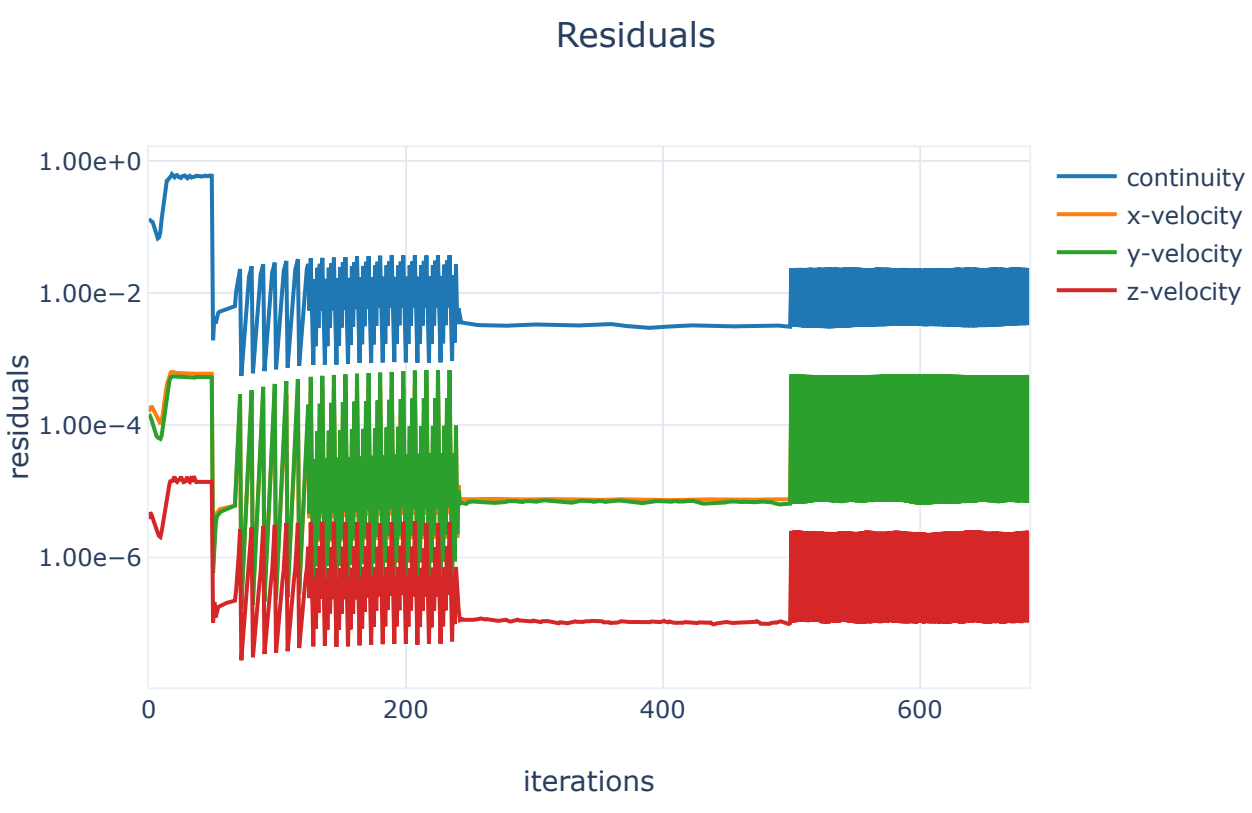
	Value	Absolute Criteria	Convergence Status
continuity	0.02409421	0.001	Not Converged
x-velocity	0.0003473218	0.001	Converged
y-velocity	0.0005800134	0.001	Converged
z-velocity	2.538584e-06	0.001	Converged

Report Definitions

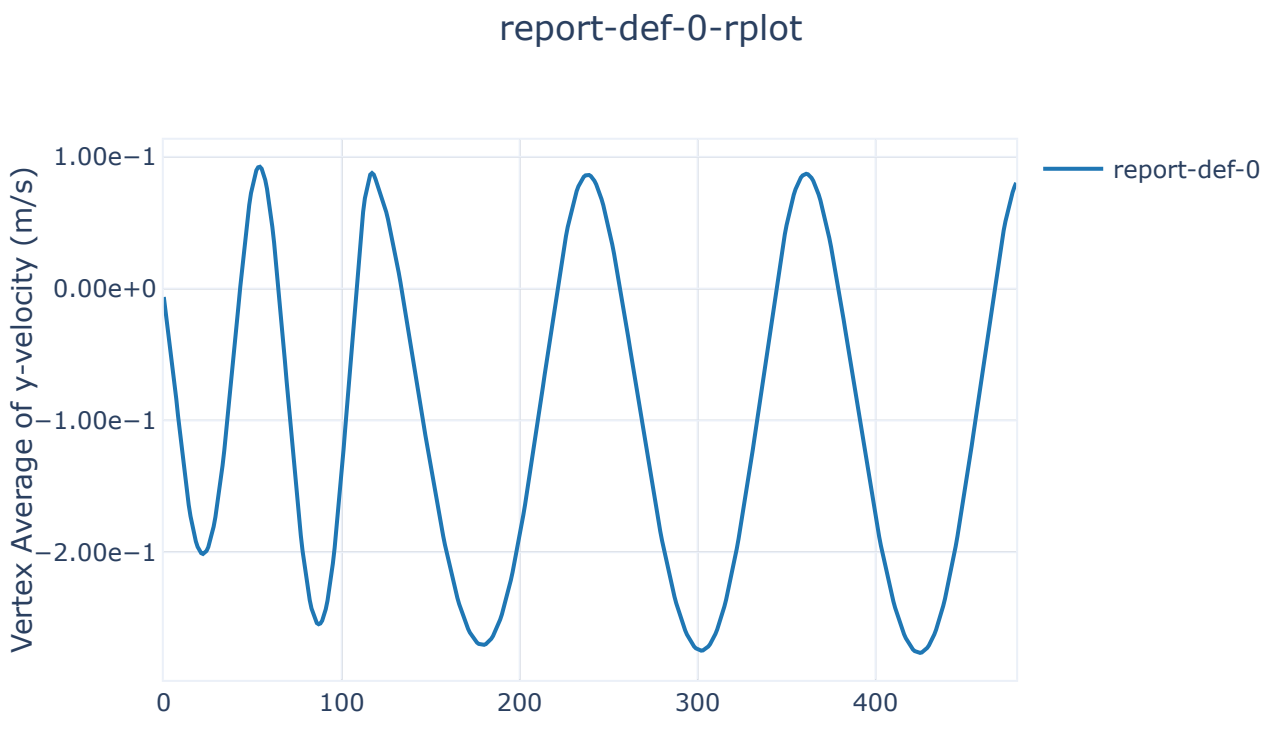
report-def-1	0.08034769	m/s
report-def-0	0.08034769	m/s
delta-time	0.05	s
iters-per-timestep	1	
flow-time	30	s

Plots

Residuals

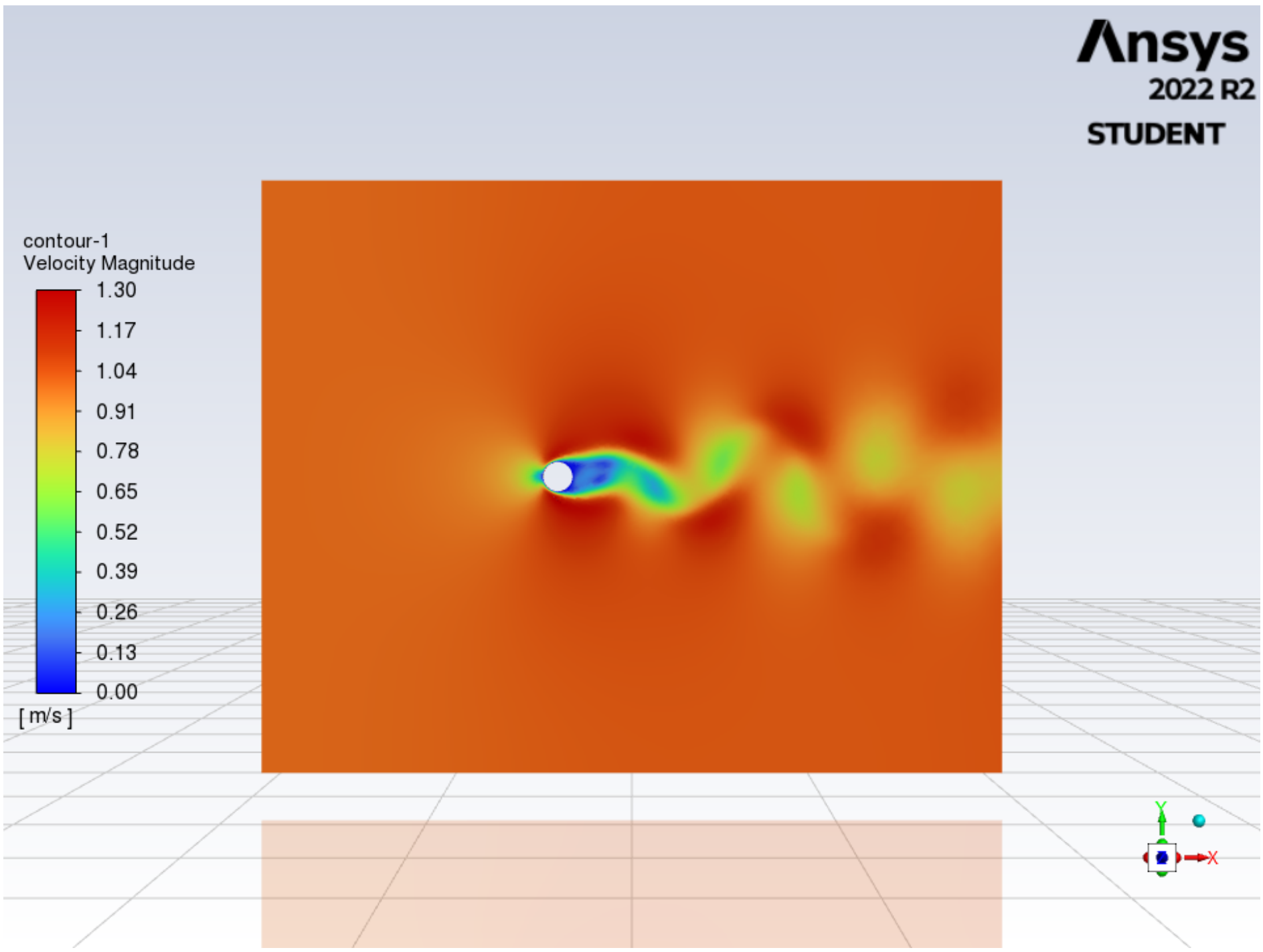


report-def-0-rplot



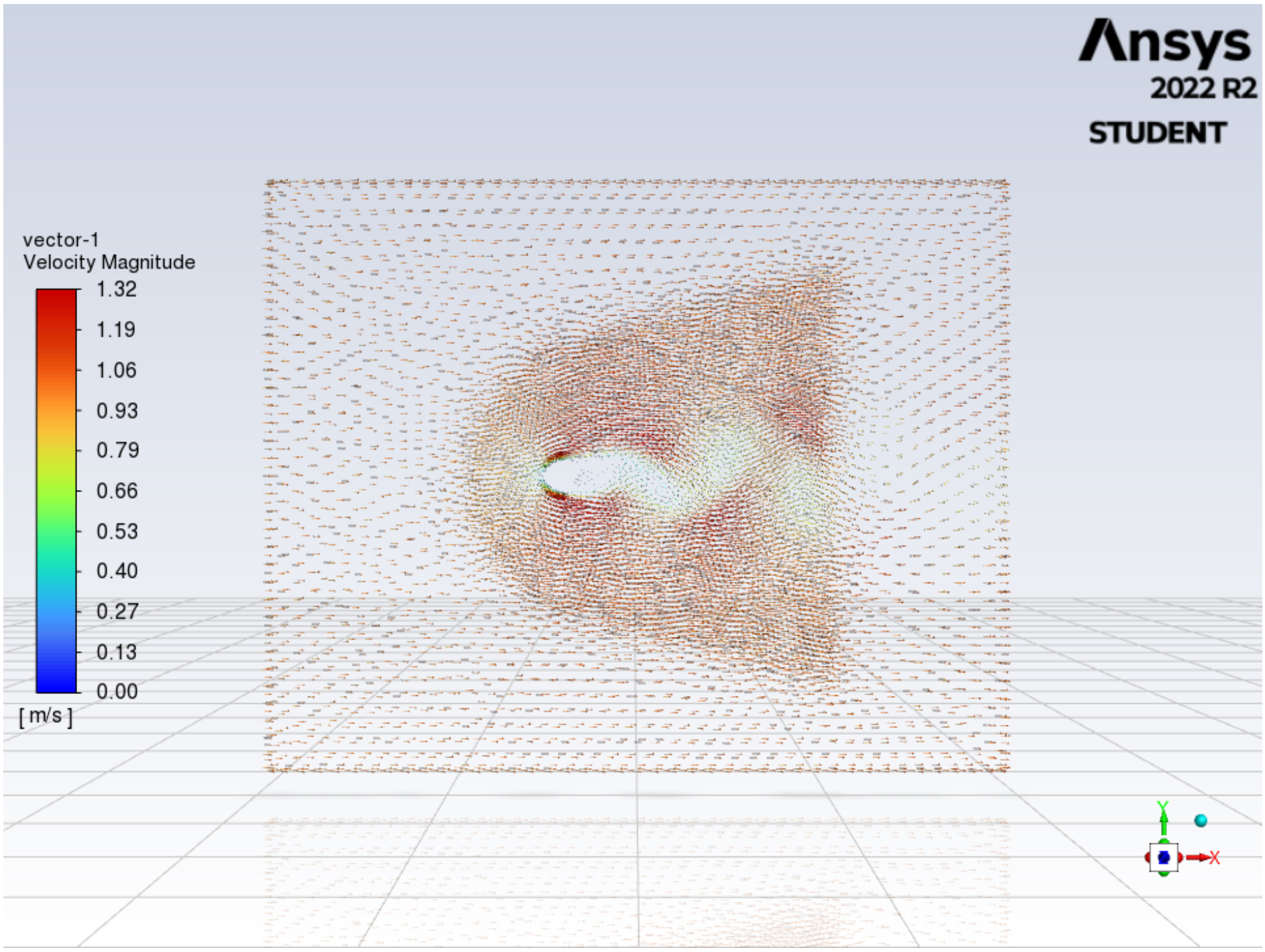
Contours

contour-1



Vectors

vector-1



User Data

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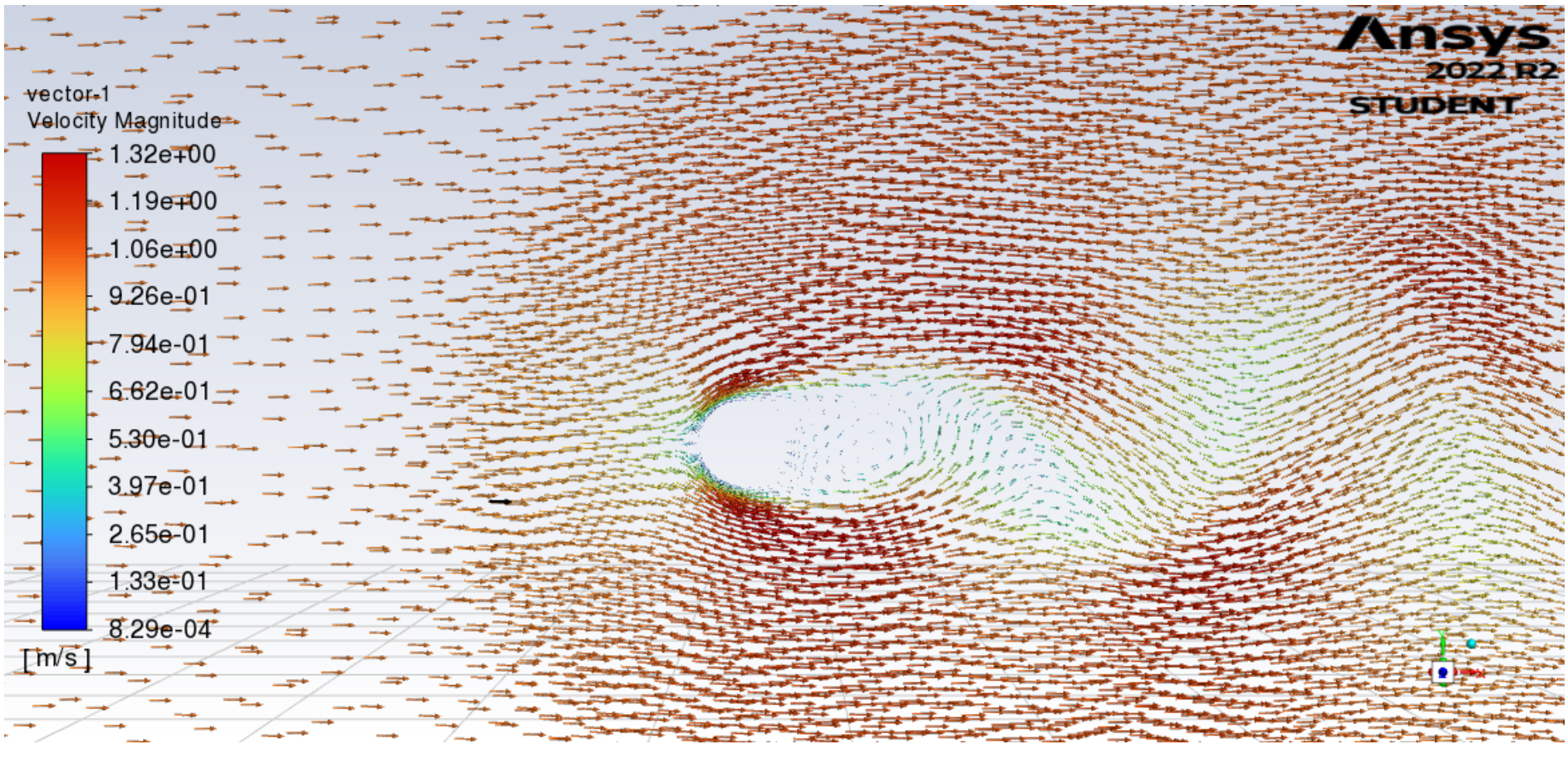

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