



# Ansys Fluent Simulation Report

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## Geometry and Mesh

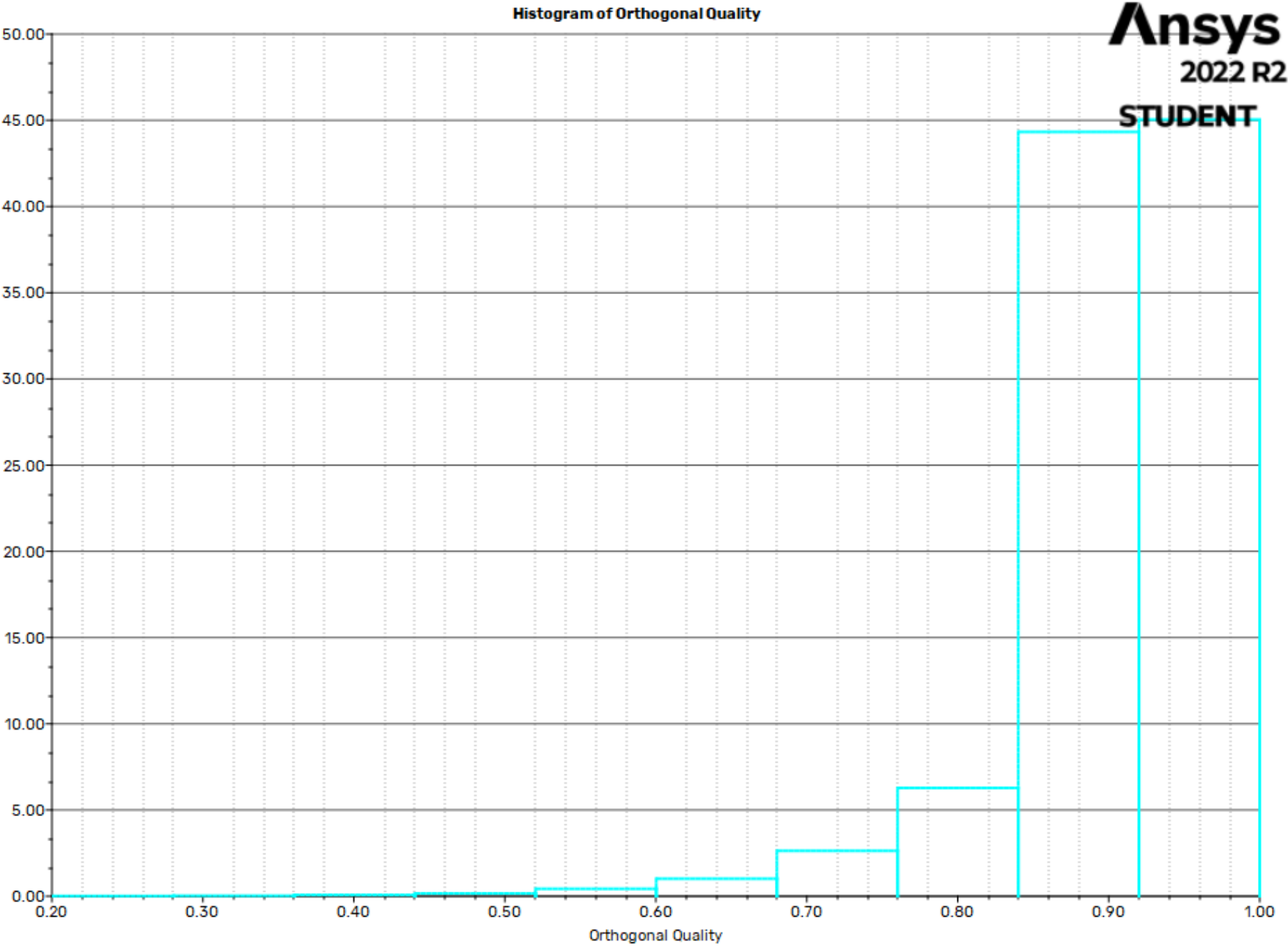
### Mesh Size

Cells	Faces	Nodes
34736	183162	131099

### Mesh Quality

Name	Type	Min Orthogonal Quality	Max Aspect Ratio
component1-fluid	Poly Cell	0.20060606	58.937107

### Orthogonal Quality



# Simulation Setup

## Physics

## Models

Model	Settings
Space	3D
Time	Steady
Viscous	SST k-omega turbulence model

## Material Properties

— Fluid	
— air	
Density	1.18 kg/m^3
Cp (Specific Heat)	1006.43 J/(kg K)
Thermal Conductivity	0.0242 W/(m K)
Viscosity	1.85e-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	
— component1-fluid	
Material Name	air
Specify source terms?	no
Specify fixed values?	no
Frame Motion?	no
Laminar zone?	no
Porous zone?	no
3D Fan Zone?	no

## Boundary Conditions

— Inlet	
— inlet	
Velocity Specification Method	Components
Reference Frame	Absolute
Supersonic/Initial Gauge Pressure [Pa]	0
Coordinate System	Cartesian (X, Y, Z)
X-Velocity	x-coordinate-3 x-velocity
Y-Velocity	x-coordinate-3 y-velocity
Z-Velocity [m/s]	0
Turbulent Specification Method	K and Omega
Turbulent Kinetic Energy	x-coordinate-3 turb-kinetic-energy
Specific Dissipation Rate	x-coordinate-3 specific-diss-rate
— Outlet	
— outlet	
Backflow Reference Frame	Absolute
Gauge Pressure [Pa]	0
Pressure Profile Multiplier	1
Backflow Direction Specification Method	Normal to Boundary
Turbulent 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
Radial Equilibrium Pressure Distribution	no
Average Pressure Specification?	no
Specify targeted mass flow rate	no
— Symmetry	
symmetry-1	symmetry

symmetry-2	symmetry
— Wall	
— wall-top	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	0
Wall Roughness Height [m]	0
Wall Roughness Constant	500
— wall-downstream	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	0
Wall Roughness Height [m]	0
Wall Roughness Constant	500
— wall-step	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	0
Wall Roughness Height [m]	0
Wall Roughness Constant	500
— wall-step-small	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	0
Wall Roughness Height [m]	0
Wall Roughness Constant	500
— wall-upstream	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	0
Wall Roughness Height [m]	0
Wall Roughness Constant	500
— wall-upstream-small	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	0
Wall Roughness Height [m]	0
Wall Roughness Constant	500

## 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	component1-fluid

## Solver Settings

— Equations	
Flow	True
Turbulence	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
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
— Solution Limits	
Minimum Absolute Pressure [Pa]	1
Maximum Absolute Pressure [Pa]	5e+10
Minimum Temperature [K]	1
Maximum 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
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Number of Cores	2
Case Read	2.649 seconds
Iteration	53.231 seconds
AMG	36.914 seconds
Virtual Current Memory	1.03912 GB
Virtual Peak Memory	1.07289 GB
Memory Per M Cell	12.4753

## Solution Status

Iterations: 213

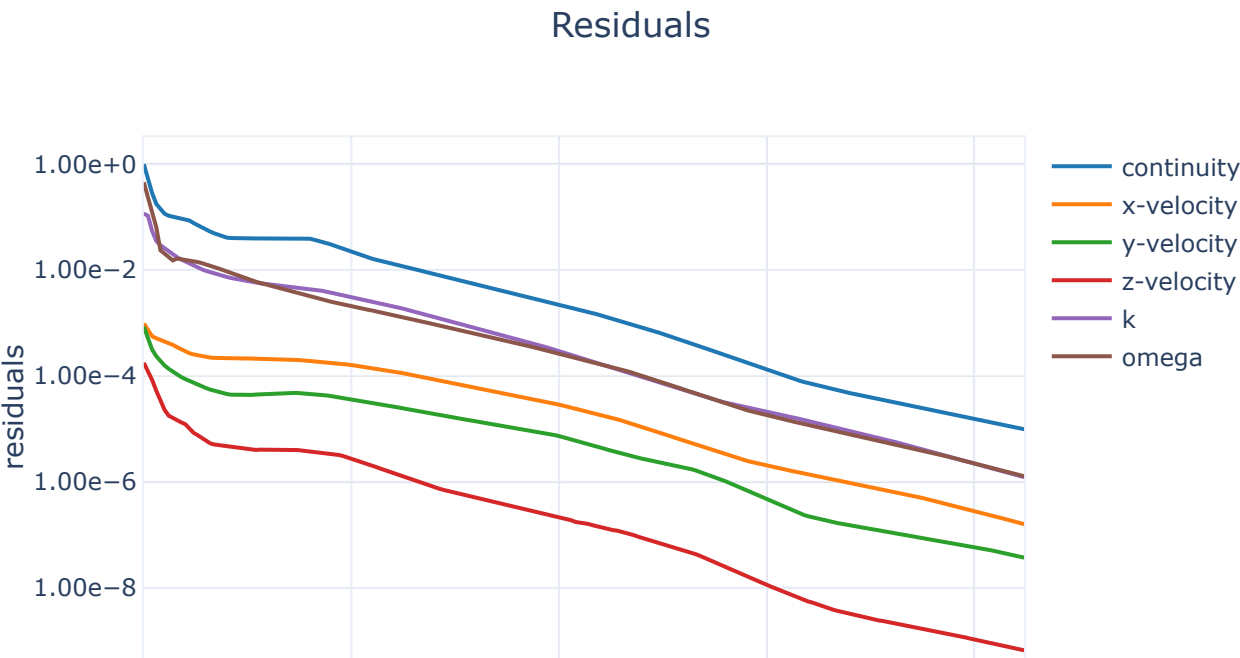
	Value	Absolute Criteria	Convergence Status
continuity	9.829567e-06	1e-05	Converged
x-velocity	1.577921e-07	0.001	Converged
y-velocity	3.684683e-08	0.001	Converged
z-velocity	6.532571e-10	0.001	Converged
k	1.221443e-06	0.001	Converged
omega	1.272151e-06	0.001	Converged

## Report Definitions

report-wallshearstress	1.79462	Pa
report-viscosityratio	104.2103	

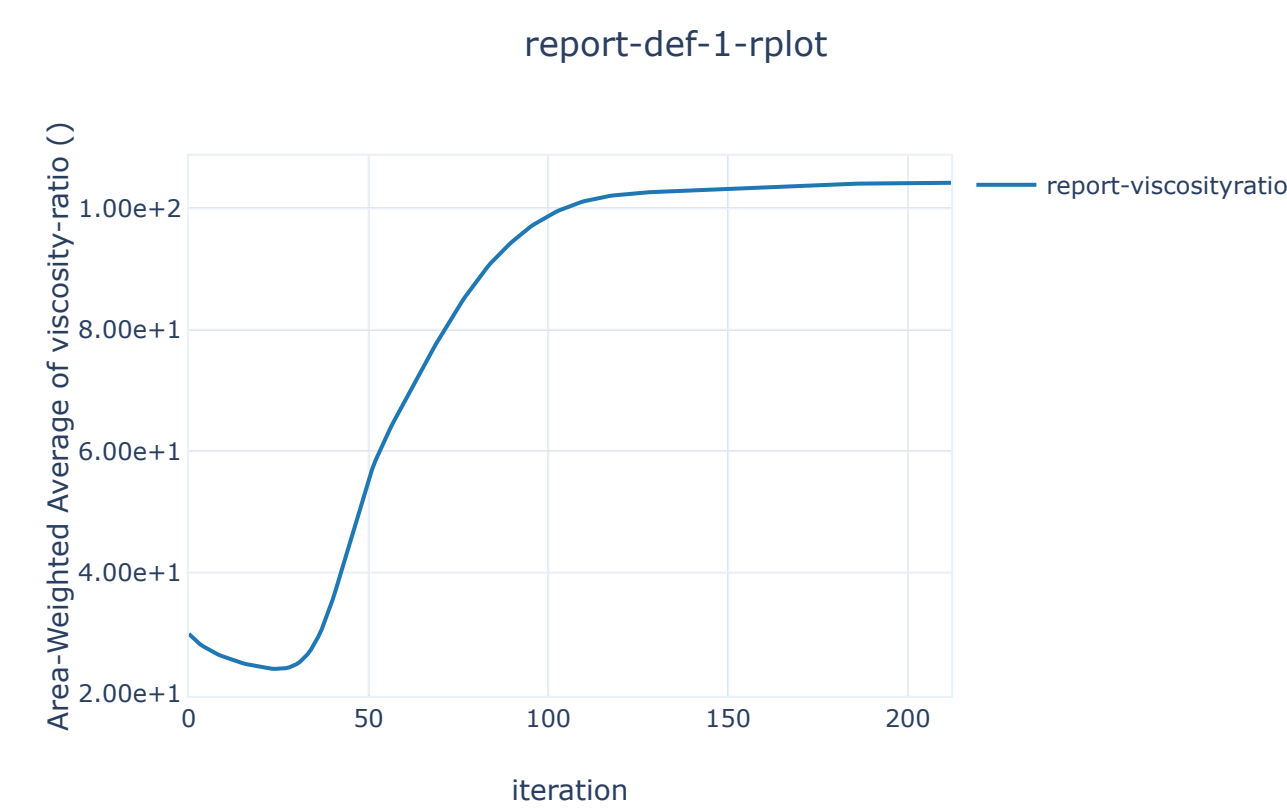
## Plots

### Residuals

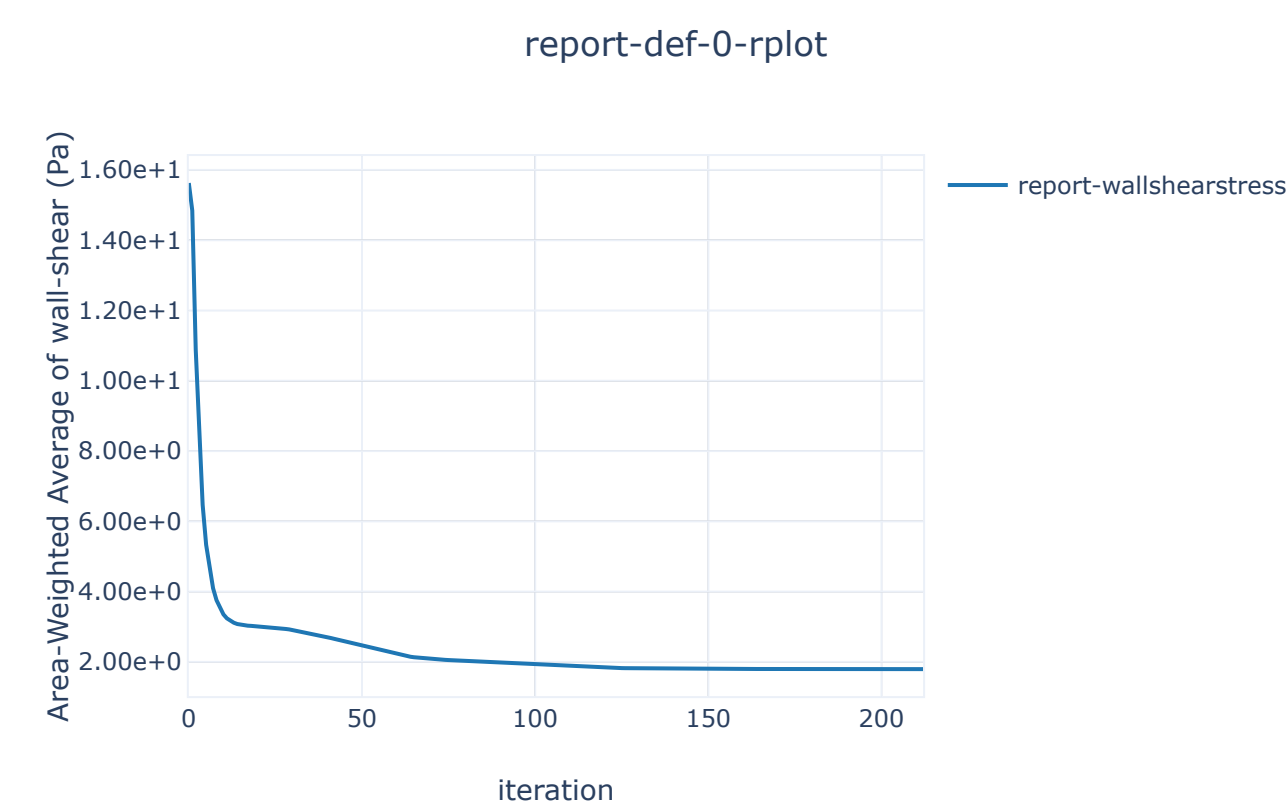




## report-def-1-rplot



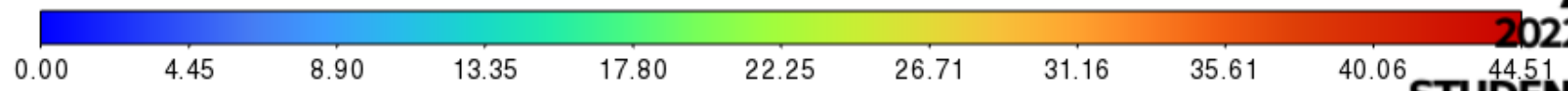
## report-def-0-rplot



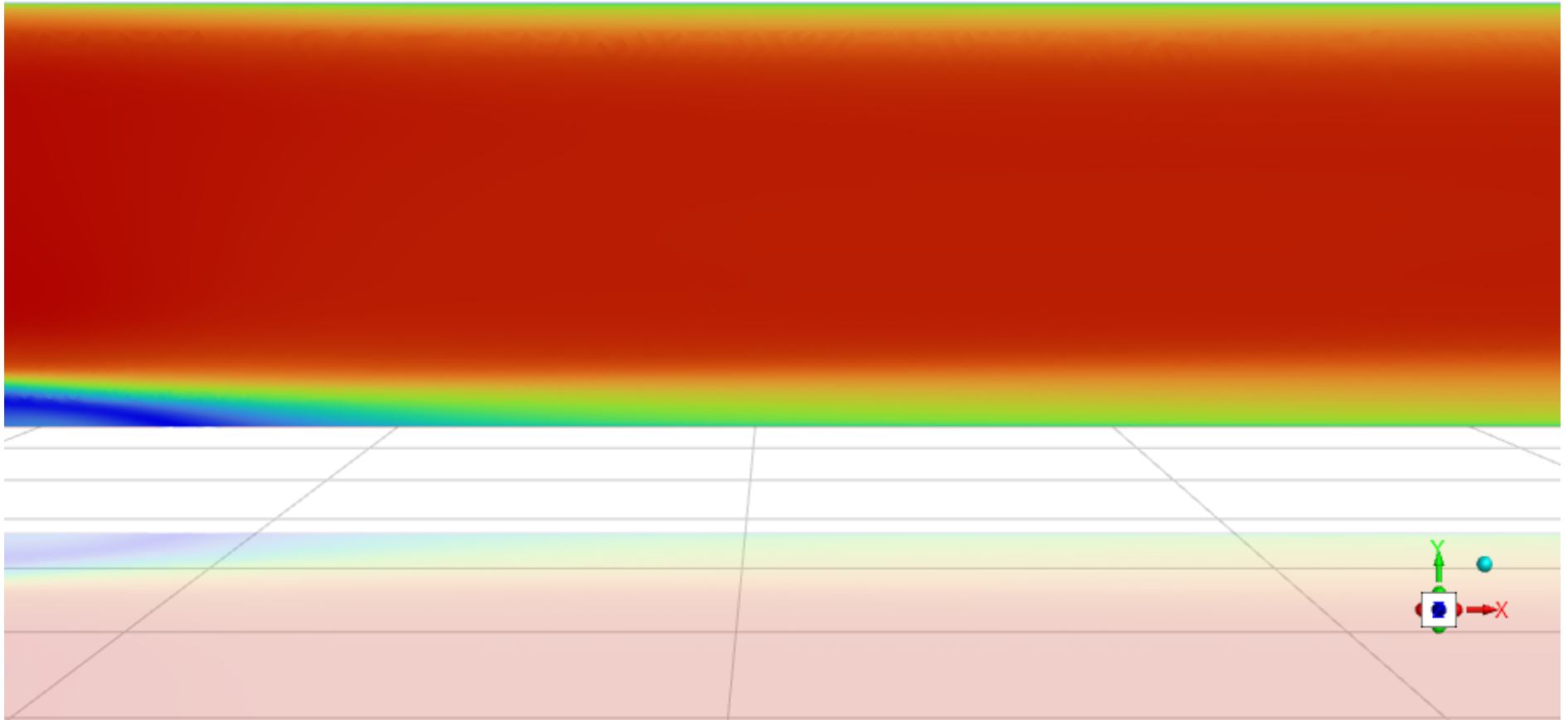
## Contours

### contour-2

contour-2  
Velocity Magnitude [ m/s ]

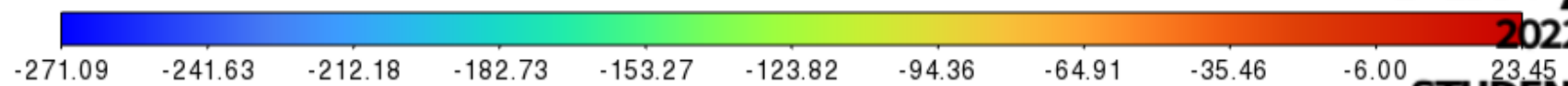


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contour-1

contour-1  
Static Pressure [ Pa ]



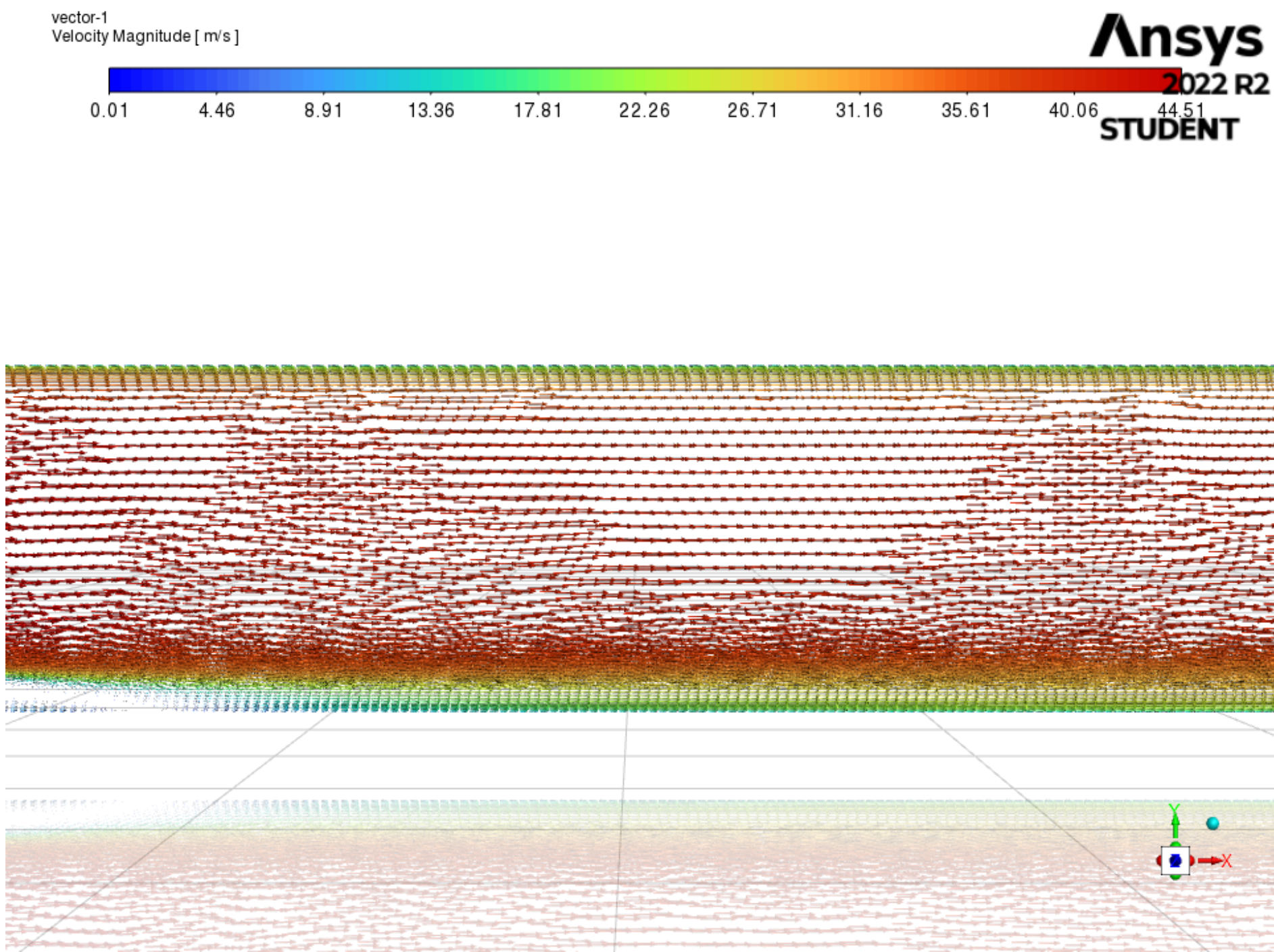
**Ansys**  
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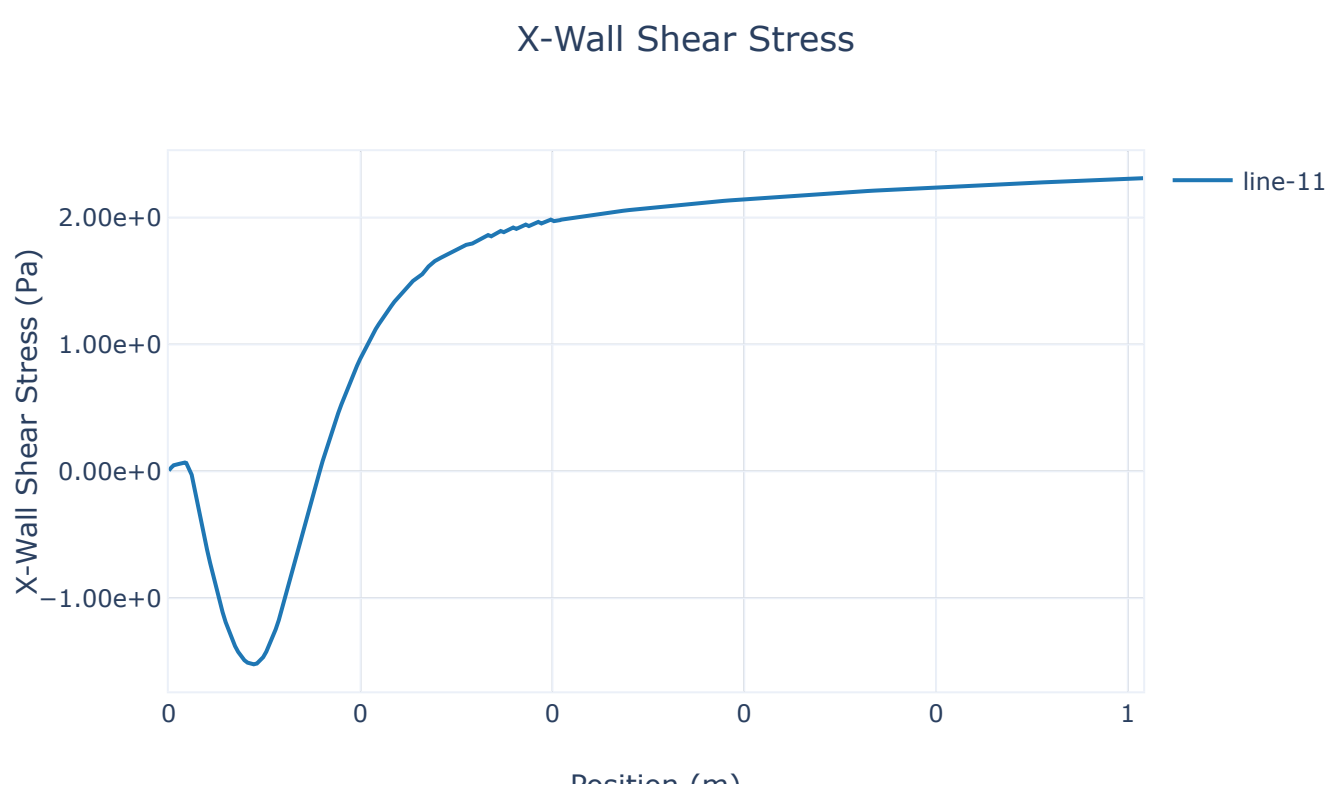
# Vectors

vector-1



# XY Plots

xy-plot-2



Position (m)

xy-plot-1

Wall Yplus

