



# 40deg

<b>Analyst</b>	temis
<b>Date</b>	5/20/2021 02:10 PM

## Table of Contents

## System Information

<b>Application</b>	Fluent
<b>Settings</b>	3d, density-based implicit, SST k-omega
<b>Version</b>	21.1.0-10179
<b>Source Revision</b>	49a2c352da
<b>Build Time</b>	Nov 20 2020 15:49:11 EST
<b>CPU</b>	Intel(R) Core(TM) i7-8550U
<b>OS</b>	Windows

## Geometry and Mesh

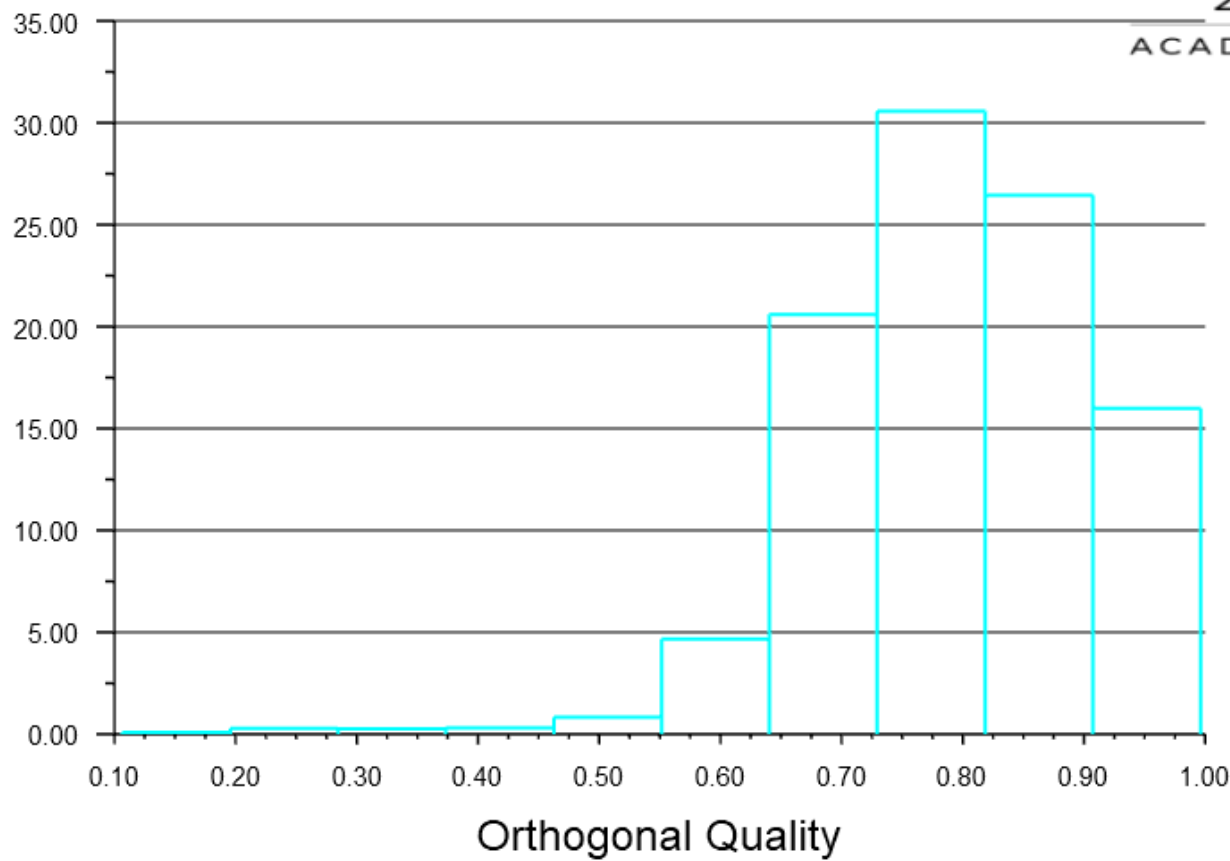
### Mesh Size

<b>Cells</b>	<b>Faces</b>	<b>Nodes</b>
425720	930460	123143

### Mesh Quality

<b>Name</b>	<b>Type</b>	<b>Min Orthogonal Quality</b>	<b>Max Aspect Ratio</b>
solid	Mixed Cell	0.10664976	239.76938

### Orthogonal Quality



## Simulation Setup

### Physics

### Models

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

### Material Properties

— Fluid	
— air	
Density	ideal gas
Cp (Specific Heat)	kinetic theory
Thermal Conductivity	kinetic theory
Viscosity	kinetic theory
Molecular Weight	28.966 kg/kmol

L-J Characteristic Length	3.711 Angstrom
L-J Energy Parameter	-194.55 K
Thermal Expansion Coefficient	0
Degrees of Freedom	5
Speed of Sound	none
— 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	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	
Gauge Pressure [Pa]	1951
Mach Number	8
Temperature [K]	58

Coordinate System	Cartesian (X, Y, Z)
Component of Flow Direction (x,y,z)	(1, 0, 0)
Turbulent Specification Method	Intensity and Length Scale
Turbulent Intensity [%]	0.01
Turbulent Length Scale [m]	0.001
— Outlet	
— outlet	
Backflow Reference Frame	Absolute
Gauge Pressure [Pa]	1951
Pressure Profile Multiplier	1
Backflow Total Temperature [K]	58
Backflow Direction Specification Method	Normal to Boundary
Turbulent Specification Method	Intensity and Length Scale
Backflow Turbulent Intensity [%]	0.01
Backflow Turbulent Length Scale [m]	0.001
Acoustic Wave Model	Off
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	symmetry
— Wall	
— capsula	
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	0
Wall Roughness Height [m]	0
Wall Roughness Constant	0.5
Convective Augmentation Factor	1

## Reference Values

Area	7.6 m^2
Density	0.1171881 kg/m^3
Enthalpy	804122.5 J/kg
Length	3.74 m
Pressure	1950.999 Pa
Temperature	58.00007 K
Velocity	1221.355 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
Turbulence	True
— Numerics	
Absolute Velocity Formulation	True
— Under-Relaxation Factors	
Turbulent Kinetic Energy	0.8
Specific Dissipation Rate	0.8
Turbulent Viscosity	1
Solid	1
— Discretization Scheme	

Flow	Second Order Upwind
Turbulent Kinetic Energy	Second Order Upwind
Specific Dissipation Rate	Second Order Upwind
— Time Marching	
Solver	Implicit
Courant Number	5
— 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

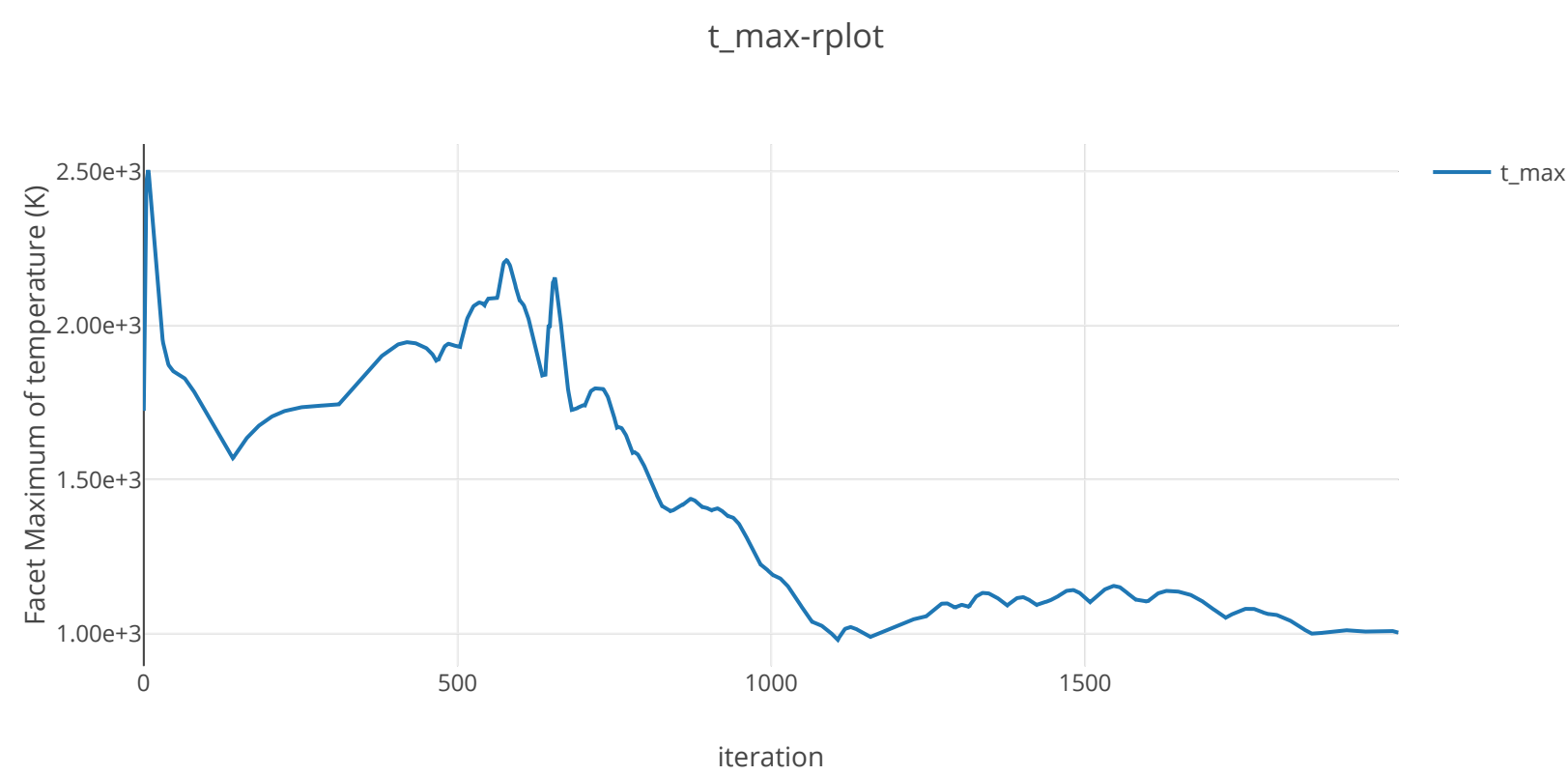
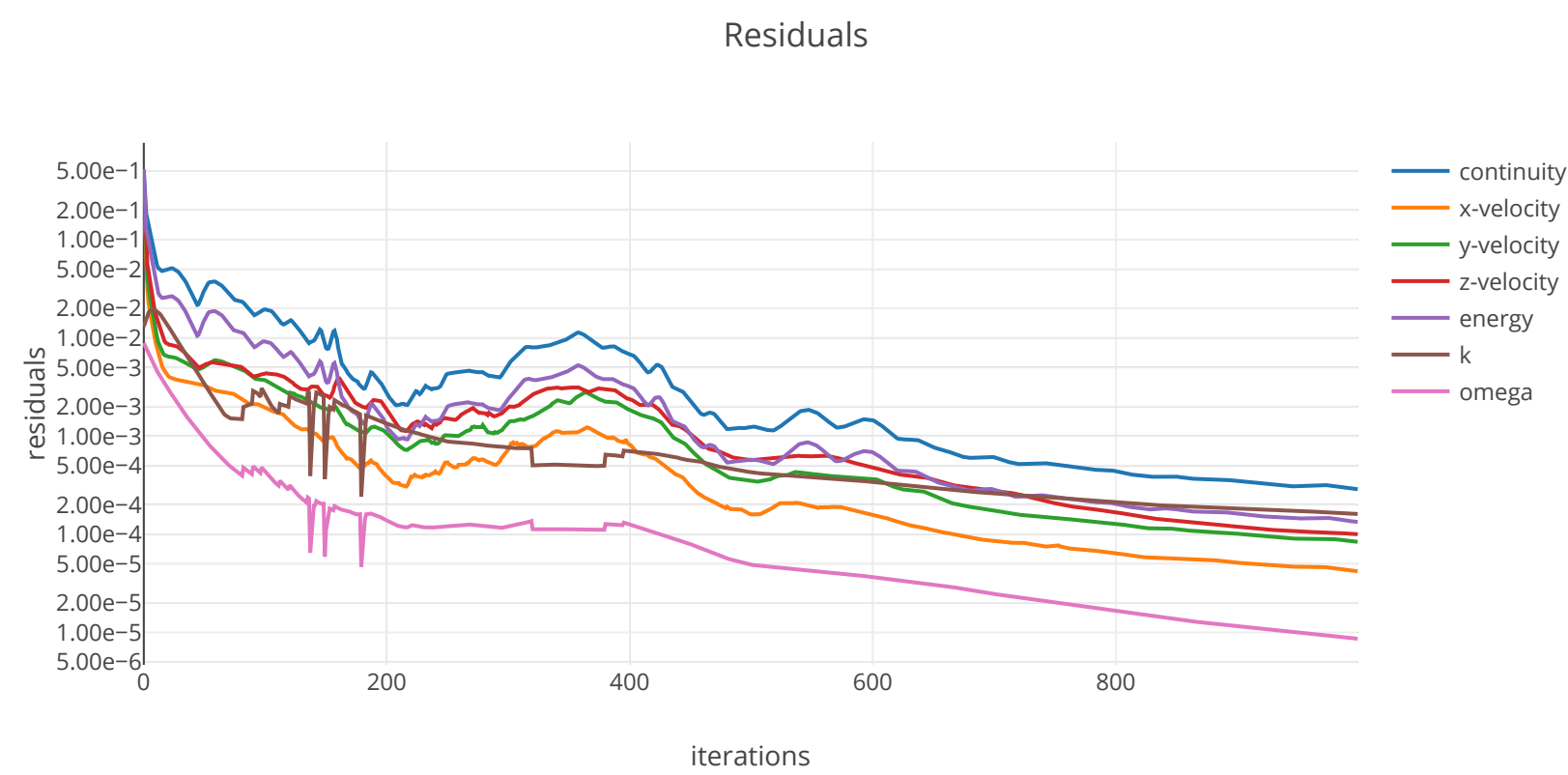
Number of Machines	1
Number of Cores	3
Case Read	10.68 seconds
Iteration	3348.9 seconds
AMG	1533.37 seconds
Virtual Current Memory	1.27533 GB
Virtual Peak Memory	1.42572 GB
Memory Per M Cell	2.70971

## Report Definitions

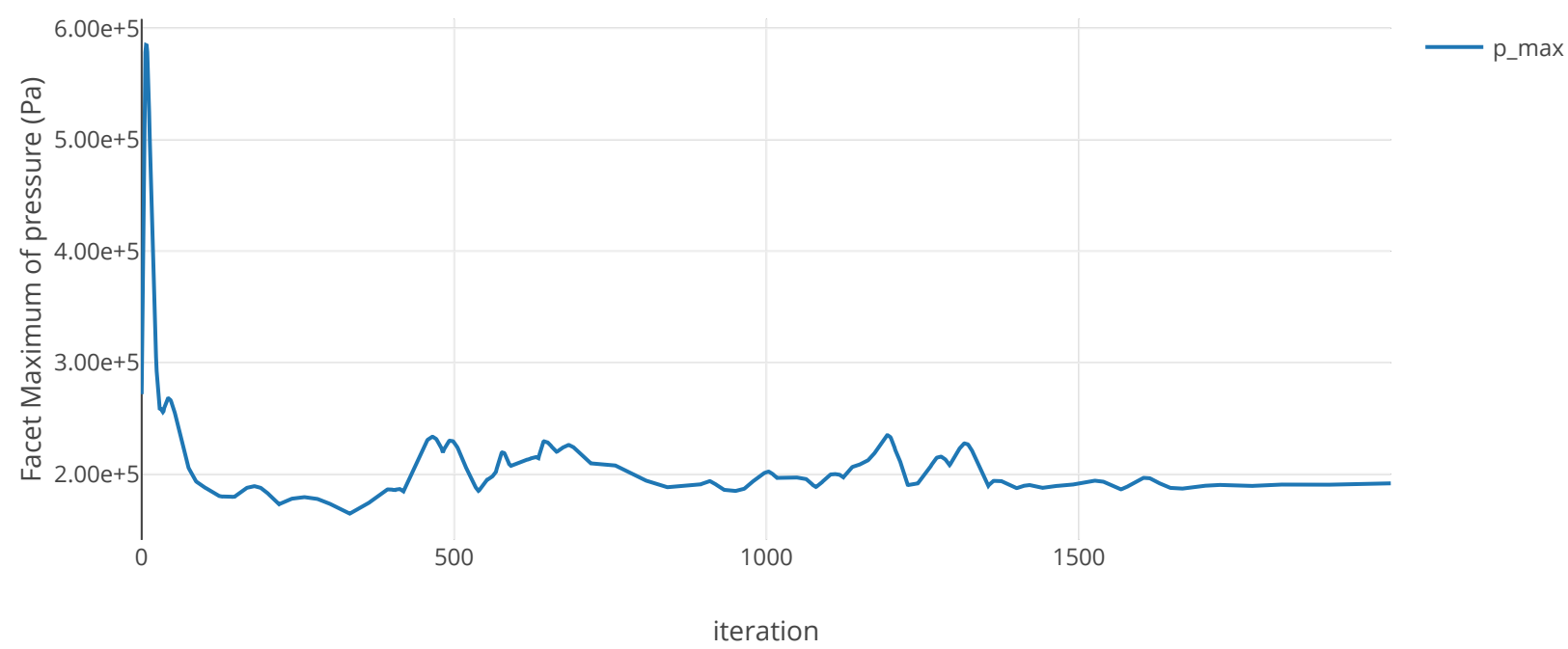
t_max	1003.144 K
p_max	191738.5 Pa
cm	-0.05760843

cl	0.578959
cd	0.8961824

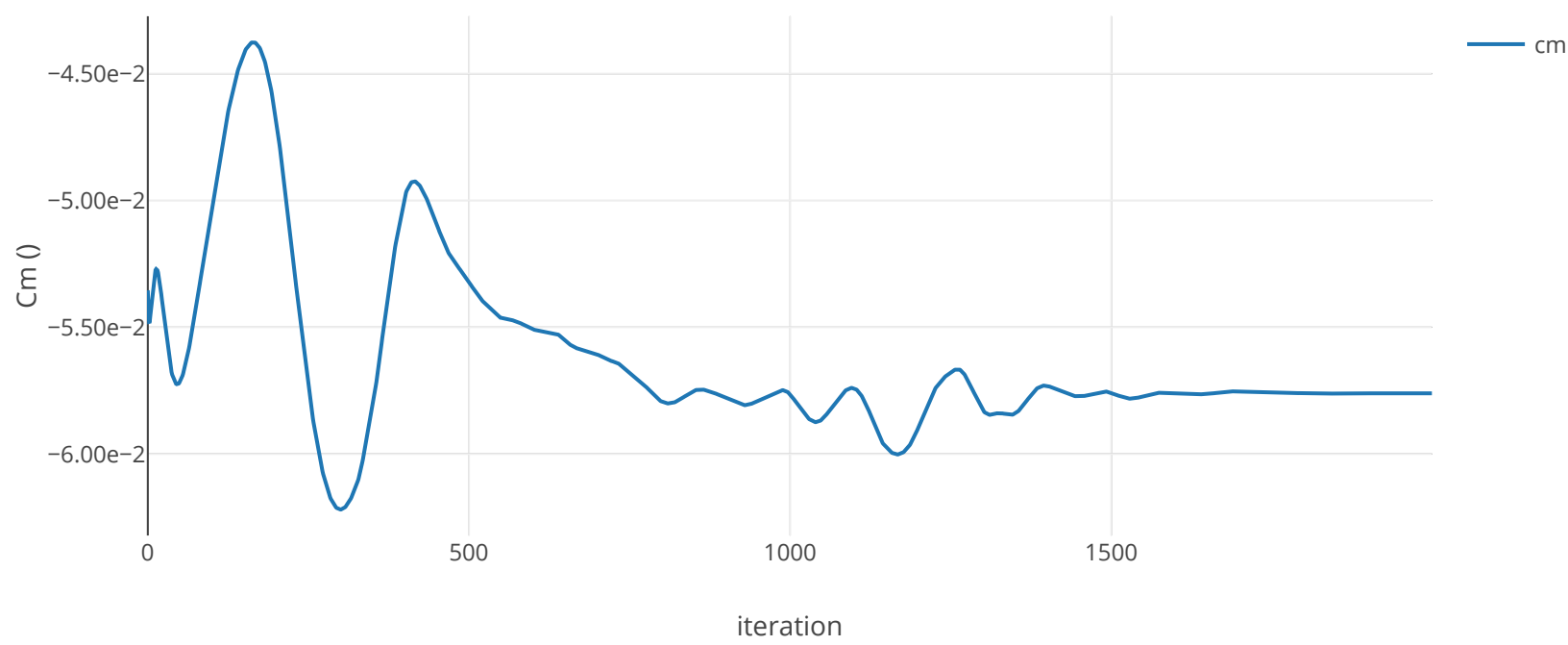
# Plots



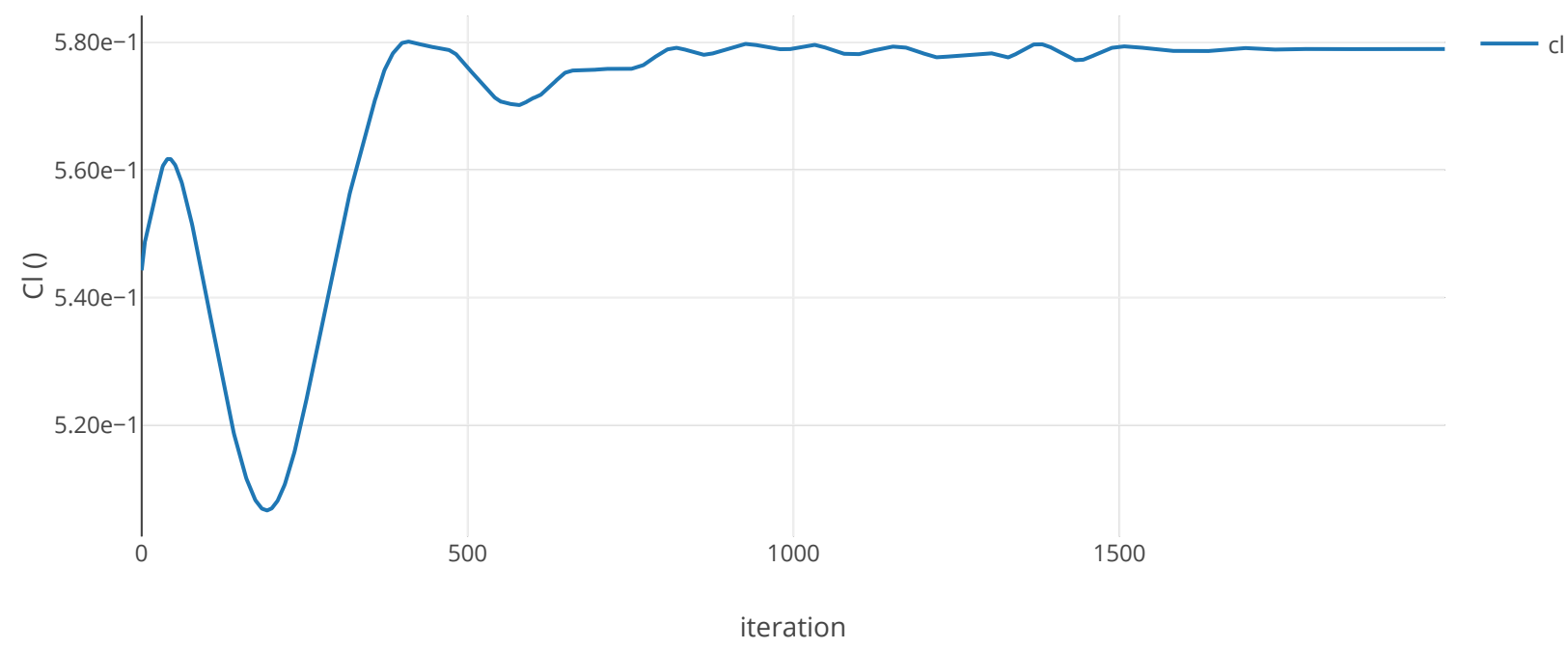
p\_max-rplot



cm-rplot

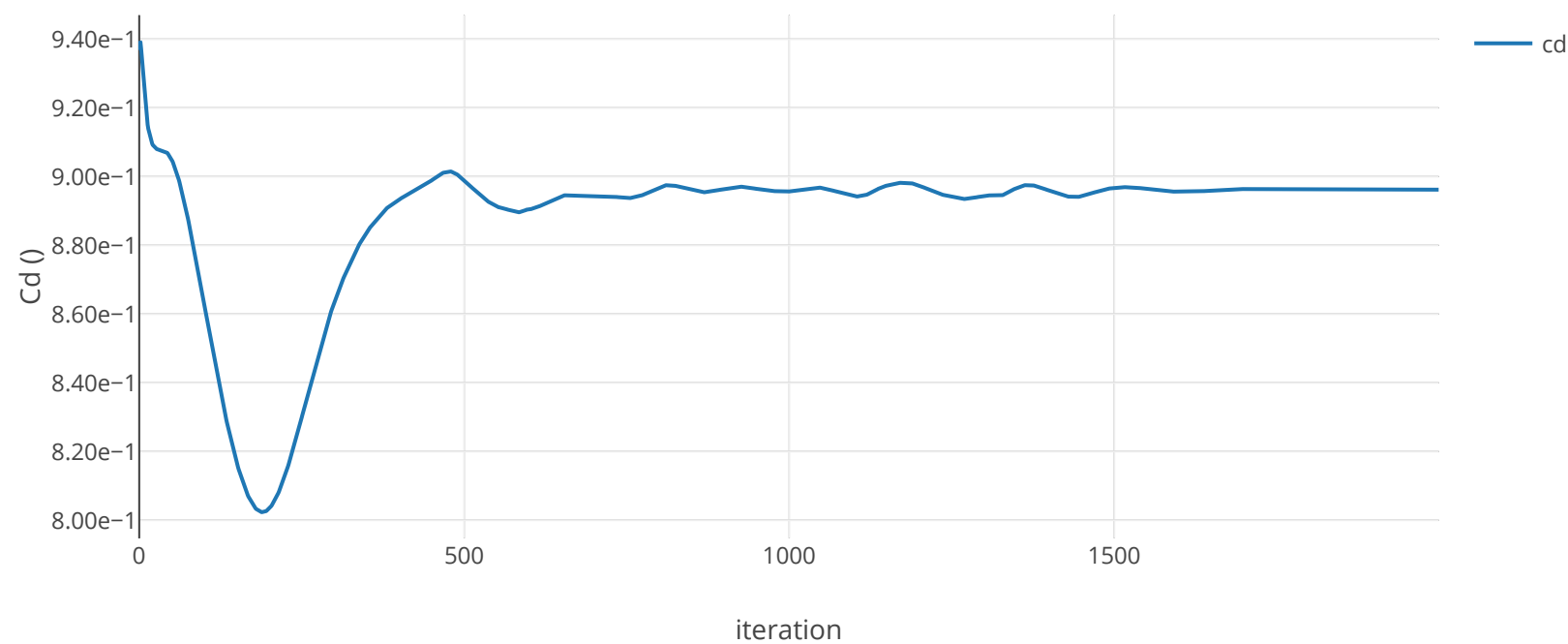


cl-rplot

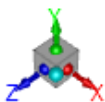
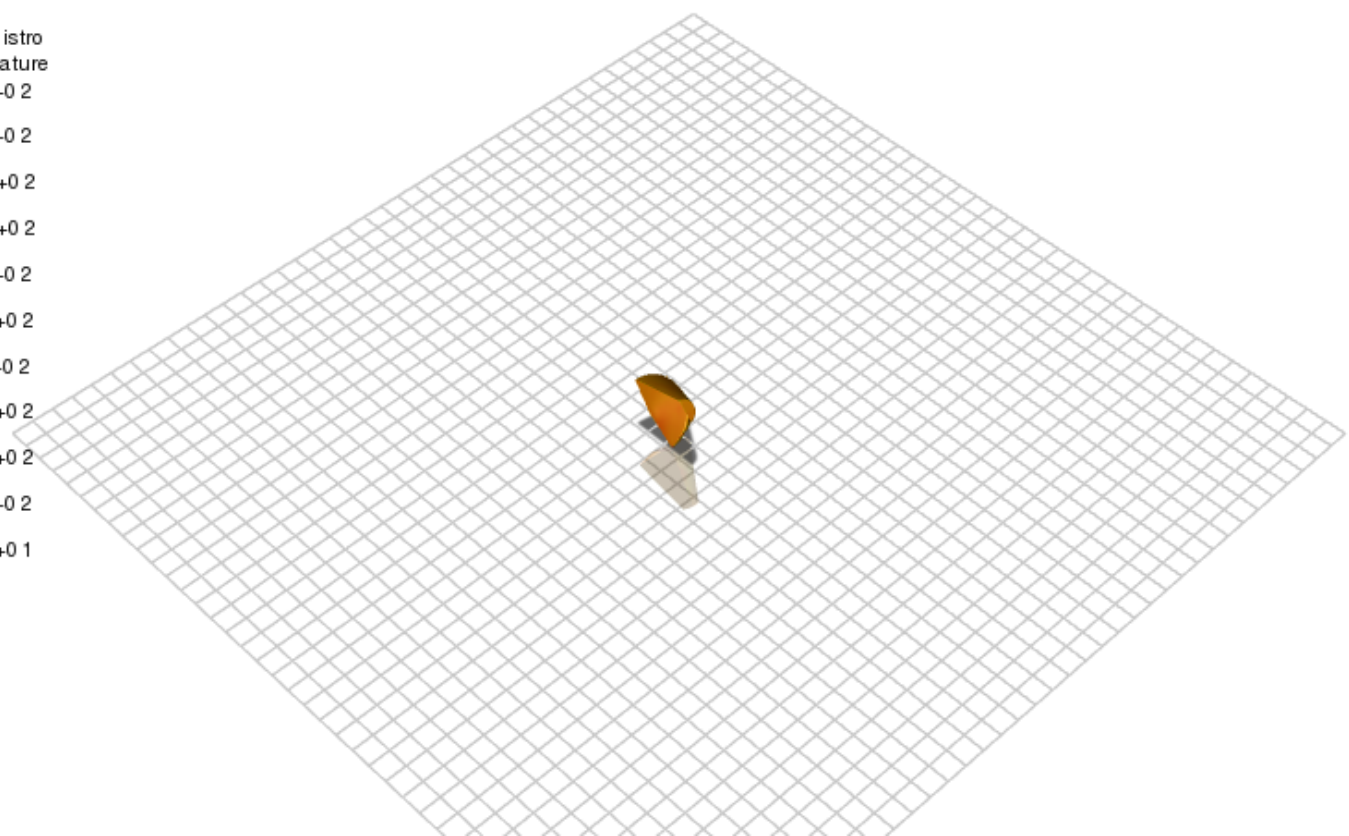
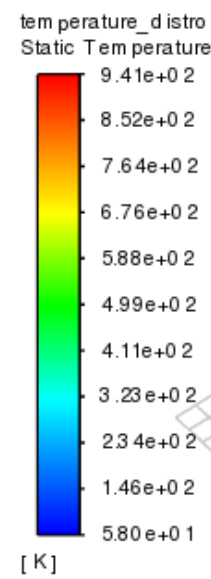


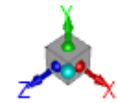
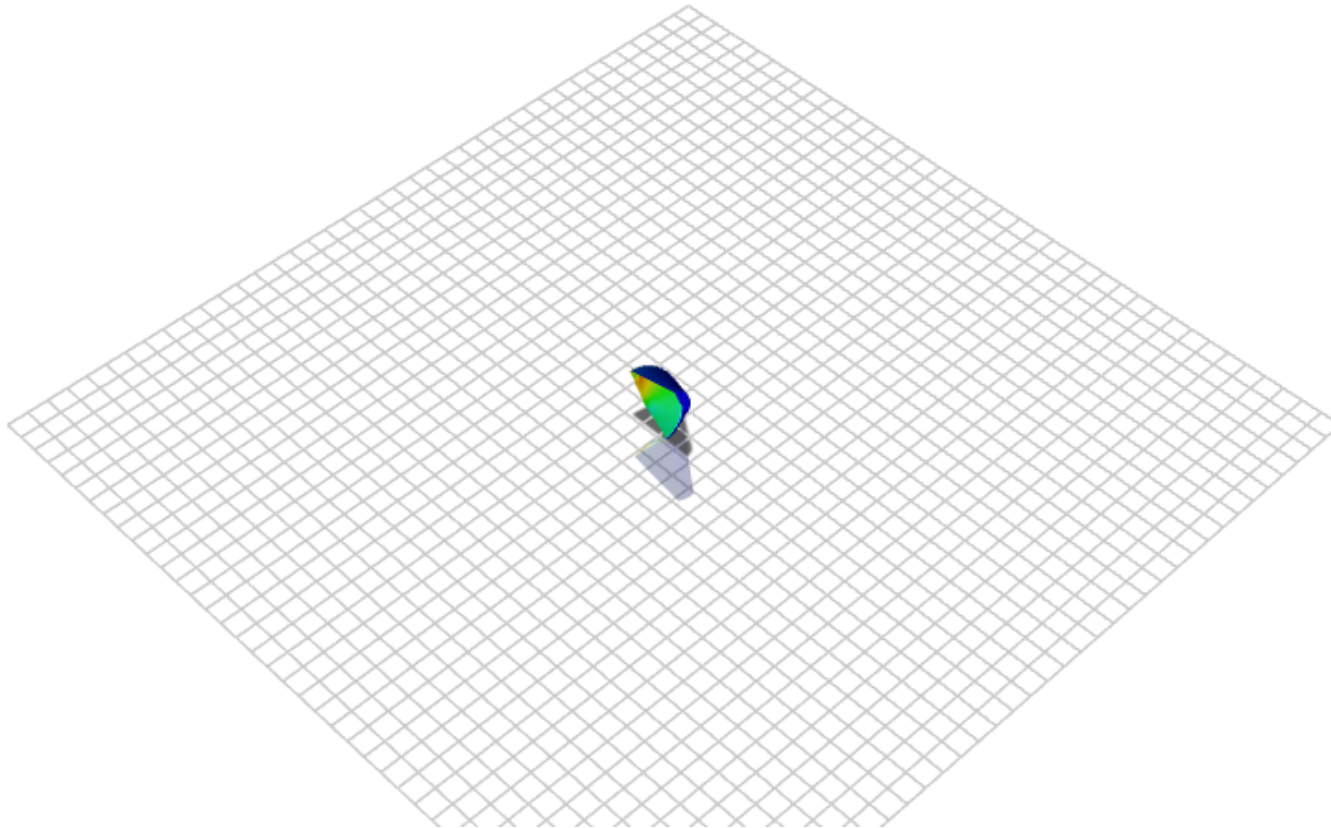
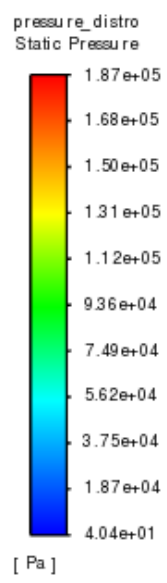


cd-rplot

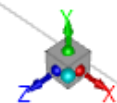
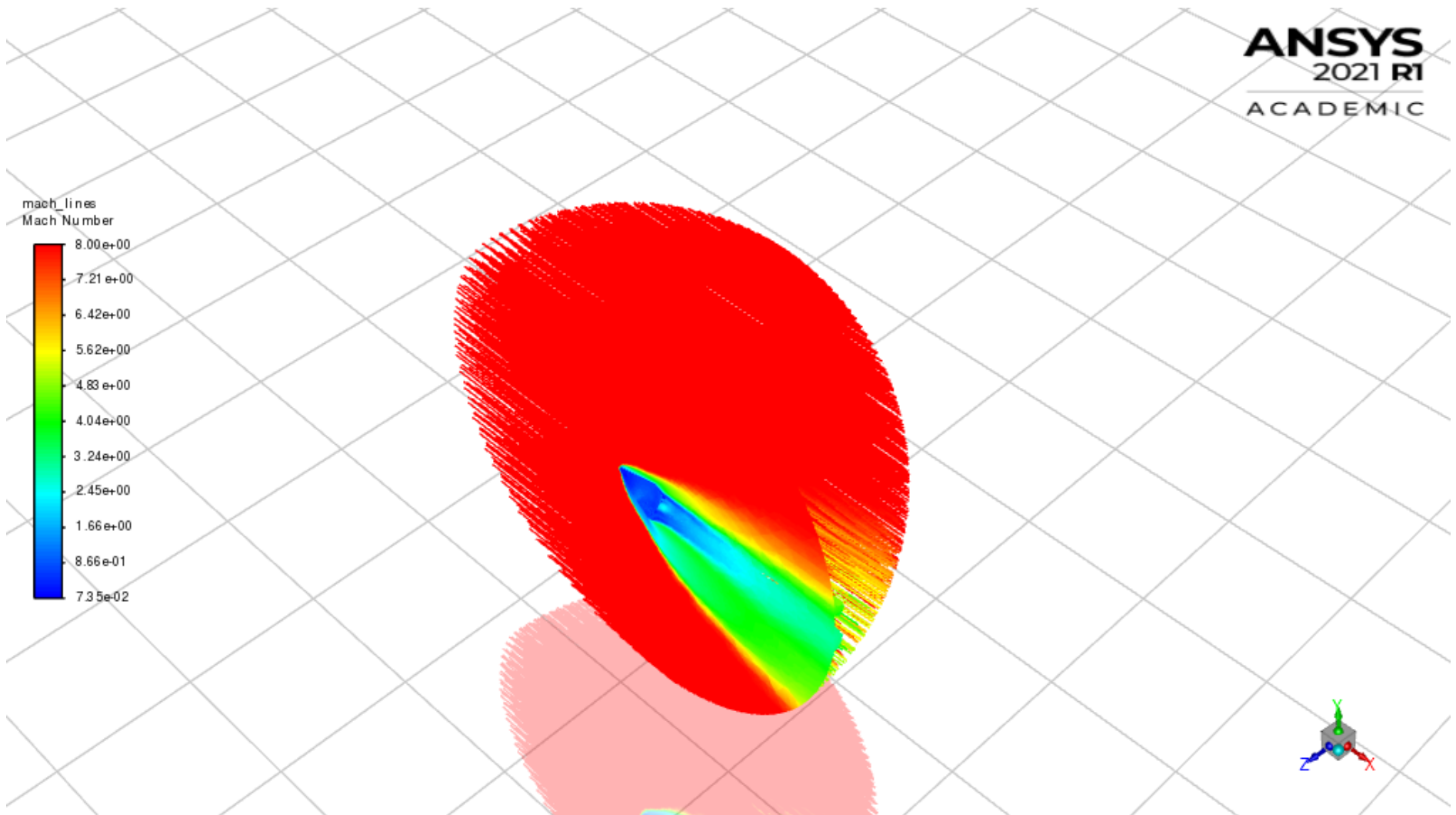
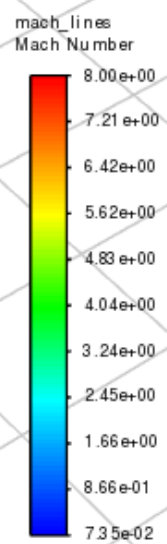


# Contours





## Pathlines



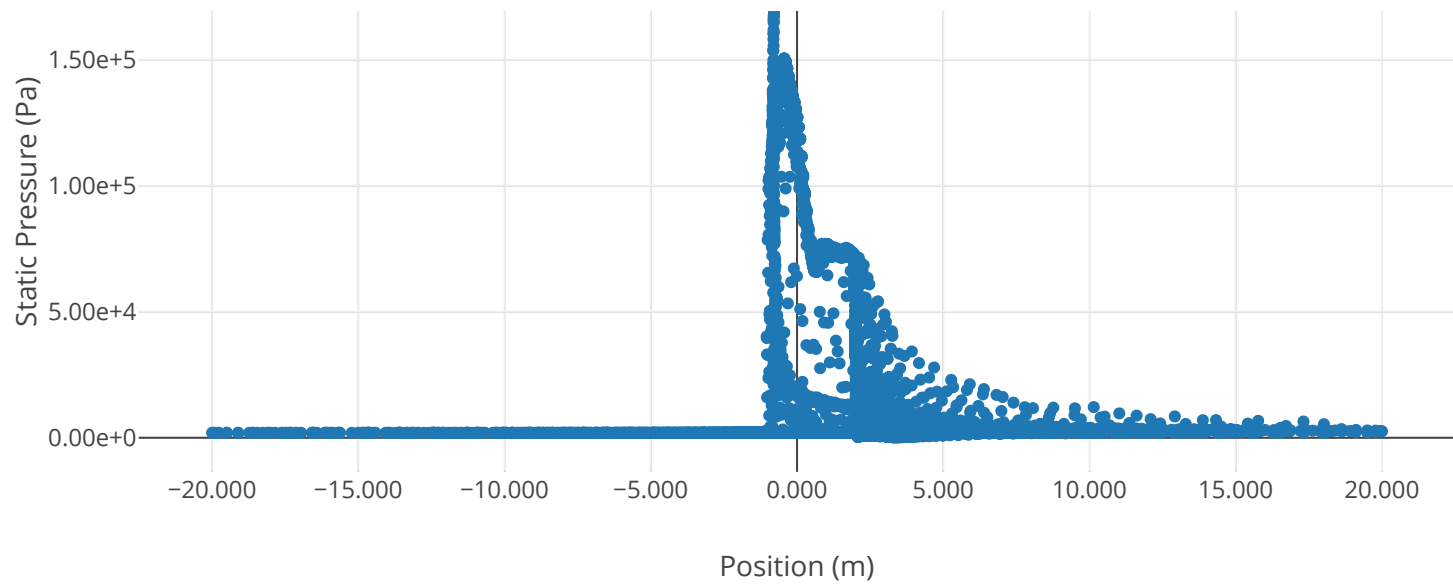
## XY Plots

Static Pressure

2.00e+5



• symmetry



Static Temperature

