

Ansys Fluent Simulation Report

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Table of Contents

[1 System Information](#)

[2 Geometry and Mesh](#)

[2.1 Mesh Size](#)

[2.2 Mesh Quality](#)

[2.3 Orthogonal Quality](#)

[3 Simulation Setup](#)

[3.1 Physics](#)

[3.1.1 Models](#)

[3.1.2 Material Properties](#)

[3.1.3 Cell Zone Conditions](#)

[3.1.4 Boundary Conditions](#)

[3.1.5 Reference Values](#)

[3.2 Solver Settings](#)

[4 Run Information](#)

[5 Solution Status](#)

[6 Report Definitions](#)

[7 Plots](#)

[8 Contours](#)

[9 Pathlines](#)

[10 XY Plots](#)

System Information

Application	Fluent
Settings	2d, double precision, density-based implicit, SST k-omega
Version	21.2.0-10201
Source Revision	fc749f05e
Build Time	May 28 2021 13:54:44 EDT
CPU	AMD Ryzen 5 5500U with Radeon Graphics
OS	Windows

Geometry and Mesh

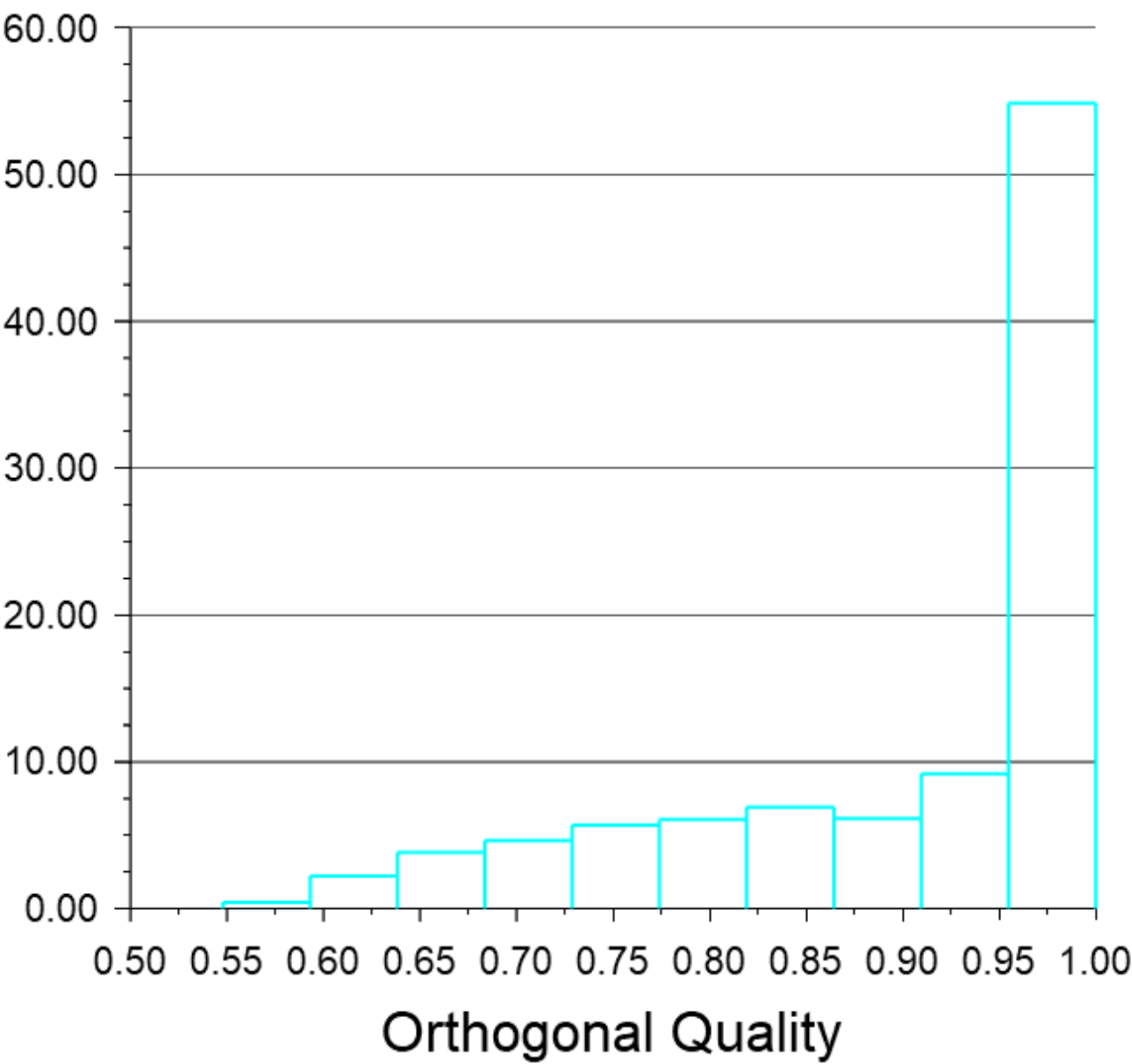
Mesh Size

Cells	Faces	Nodes
150000	300975	150975

Mesh Quality

Name	Type	Min Orthogonal Quality	Max Aspect Ratio
fluid	Quad Cell	0.54788248	6722.3885

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	ideal gas
Cp (Specific Heat)	1006.43 J/(kg K)
Thermal Conductivity	0.0242 W/(m K)
Viscosity	sutherland
Molecular Weight	28.966 kg/kmol
Thermal Expansion Coefficient	0
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	
— fluid	
Material Name	air
Specify source terms?	no
Specify fixed values?	no
Frame Motion?	no
Laminar zone?	no
Porous zone?	no

Boundary Conditions

— Inlet	
— farfield	
Gauge Pressure [Pa]	50000
Mach Number	2
Temperature [K]	150
Component of Flow Direction (x,y)	(1, 0)
Turbulent Specification Method	Intensity and Viscosity Ratio
Turbulent Intensity [%]	1
Turbulent Viscosity Ratio	2
— Wall	
— 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	0
Wall Roughness Height [m]	0
Wall Roughness Constant	0.5
Convective Augmentation Factor	1

Reference Values

Area	0.5 m^2
Density	1.161268 kg/m^3
Depth	1 m
Enthalpy	271437.1 J/kg
Length	1 m
Pressure	50000 Pa
Temperature	150 K
Velocity	490.8616 m/s
Viscosity	1.028485e-05 kg/(m s)
Ratio of Specific Heats	1.4
Yplus for Heat Tran. Coef.	300
Reference Zone	fluid

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	4
Case Read	4.515 seconds
Data Read	0.625 seconds
Virtual Current Memory	0.813904 GB
Virtual Peak Memory	0.829548 GB
Memory Per M Cell	4.45582

Solution Status

Iterations: 279

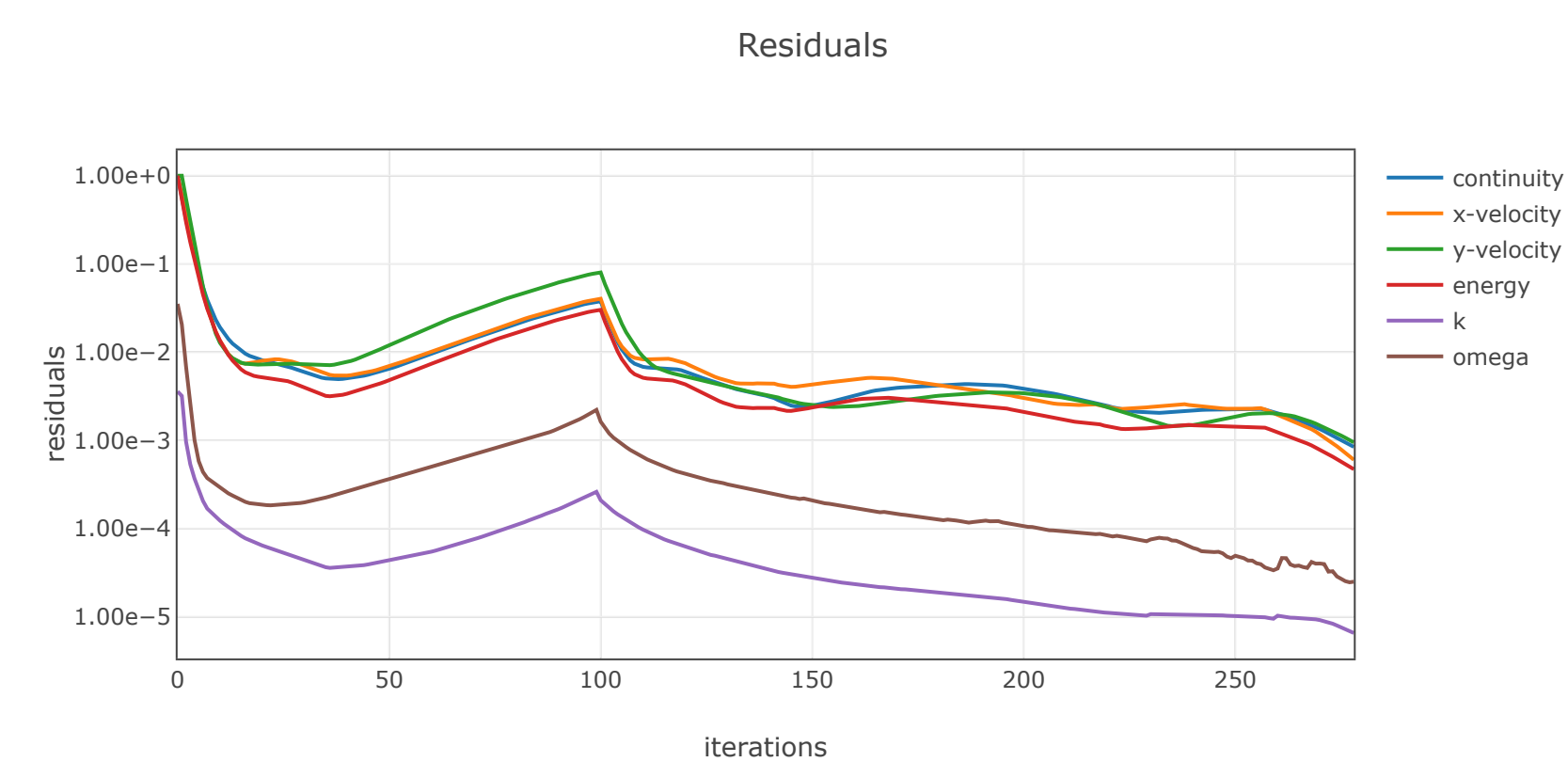
	Value	Absolute Criteria	Convergence Status
continuity	0.0008443743	0.001	Converged
x-velocity	0.0006027418	0.001	Converged
y-velocity	0.0009491361	0.001	Converged
energy	0.0004710849	0.001	Converged
k	6.556882e-06	0.001	Converged
omega	2.501673e-05	0.001	Converged

Report Definitions

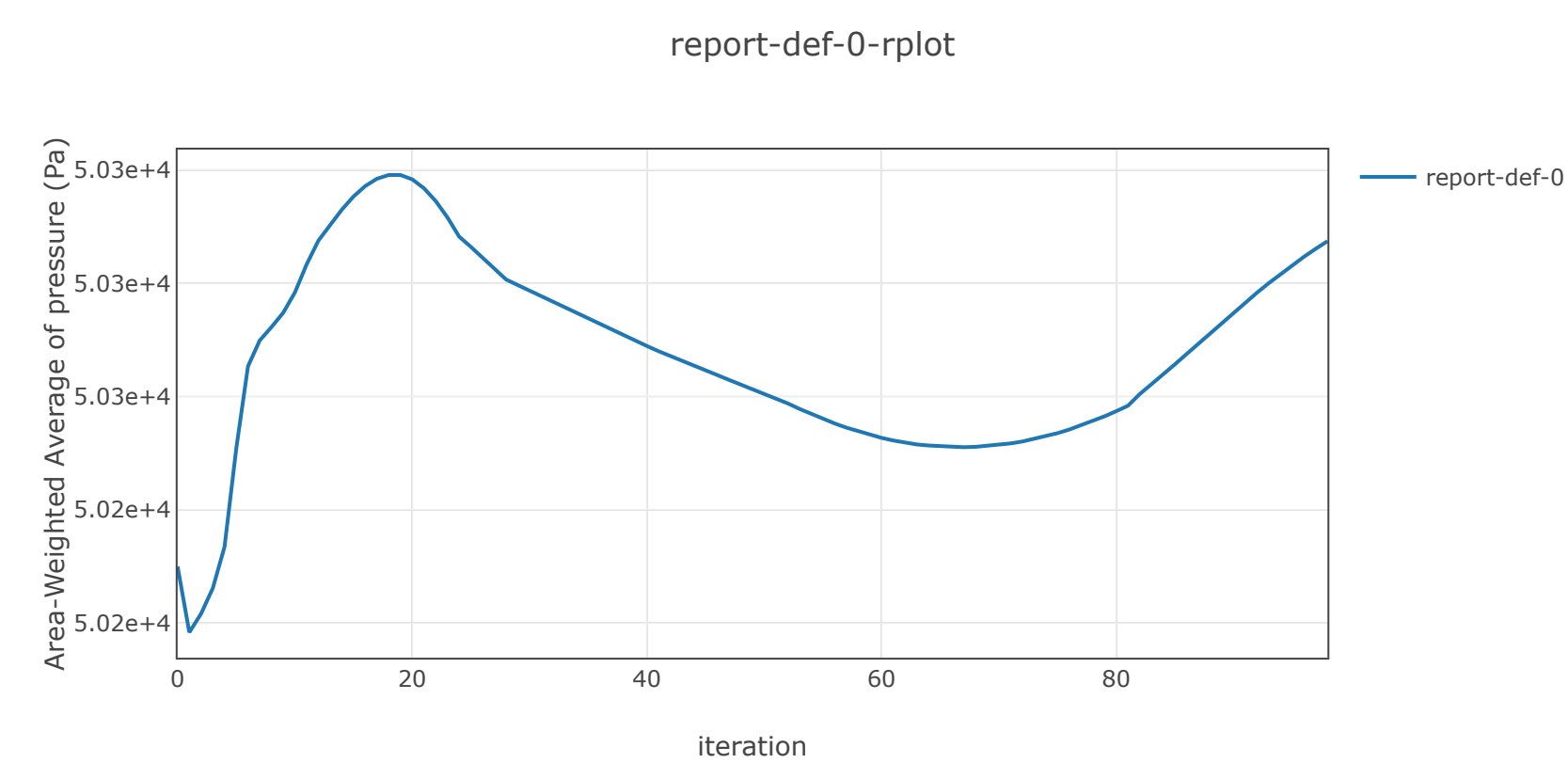
report-def-0	50264.35 Pa
mach-no	1.996212

Plots

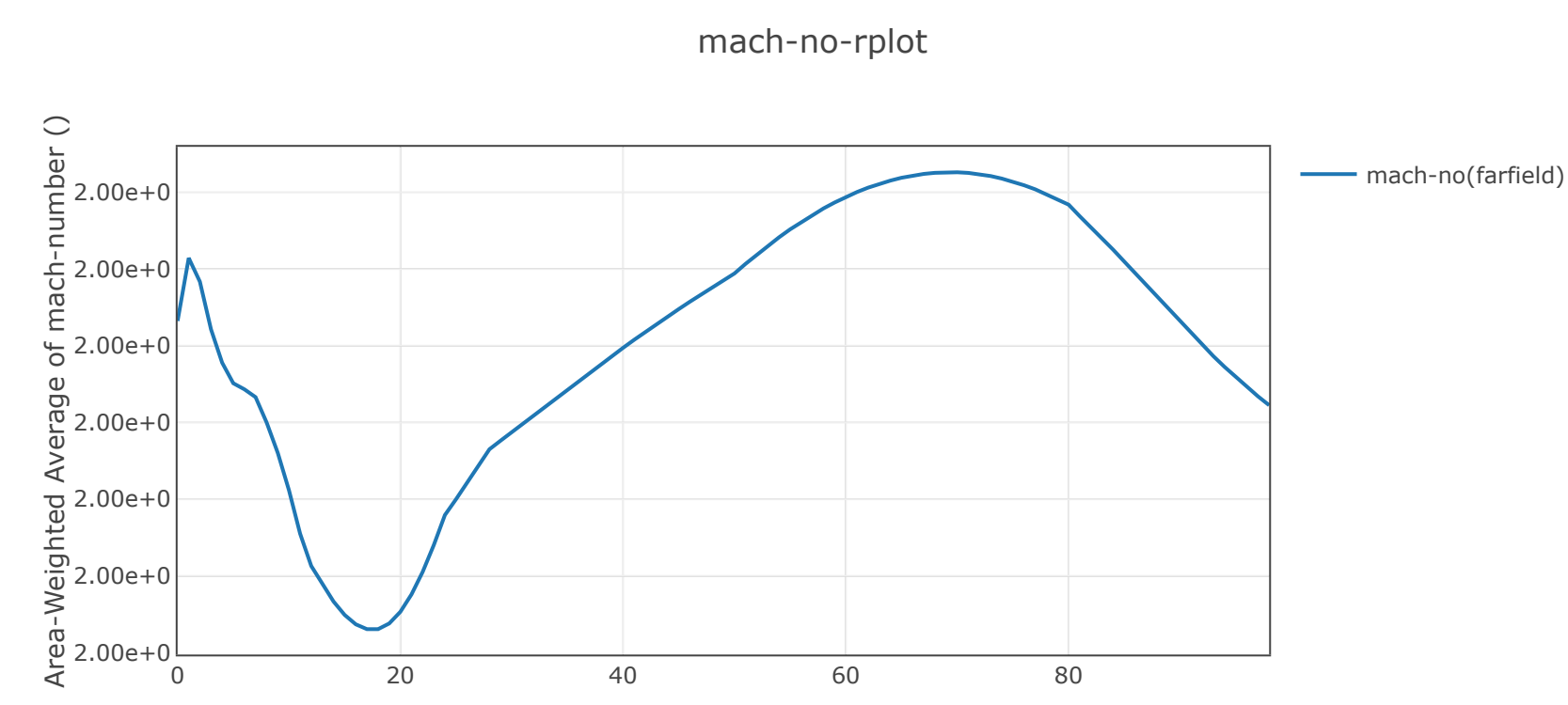
Residuals



report-def-0-rplot

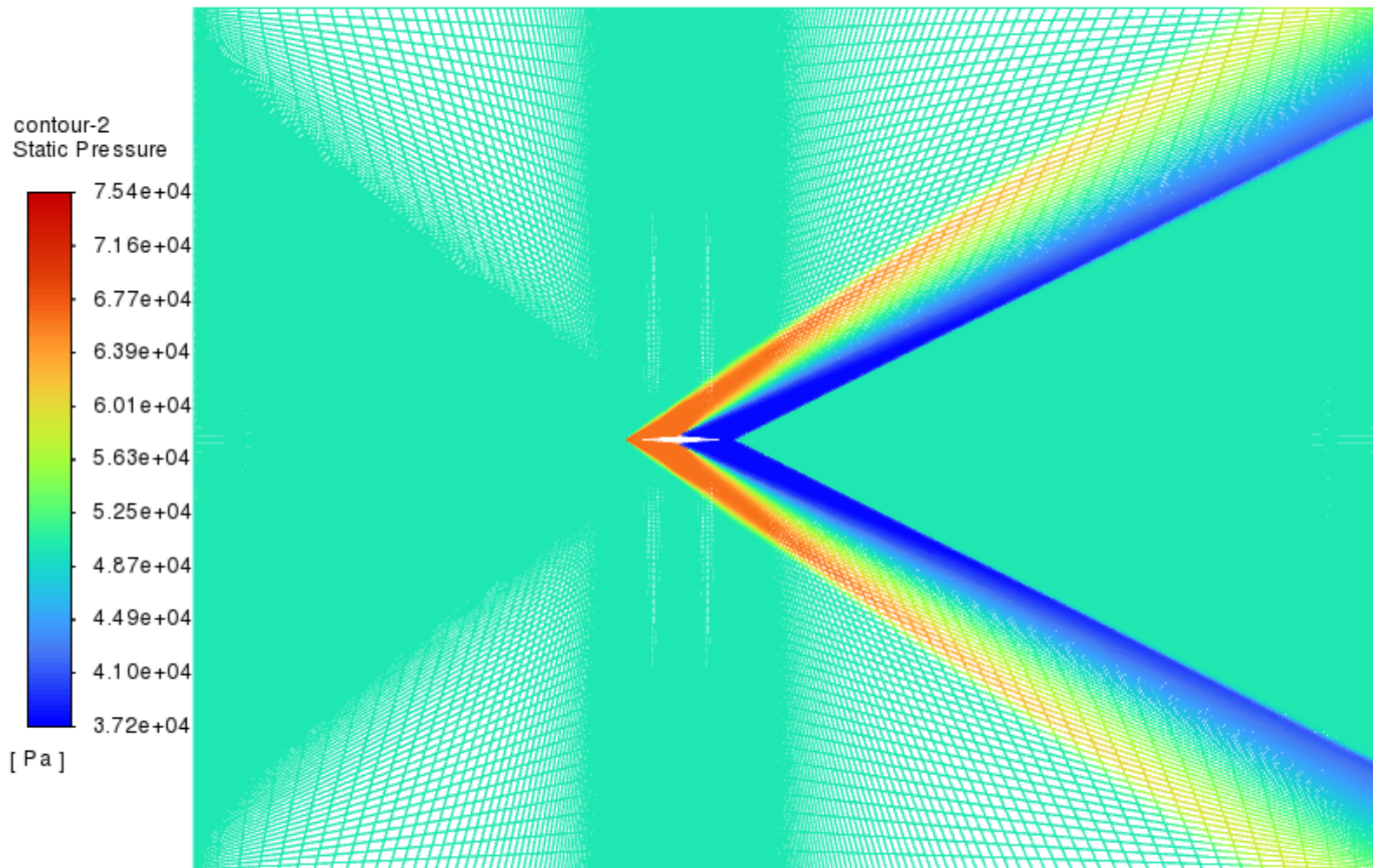


mach-no-rplot



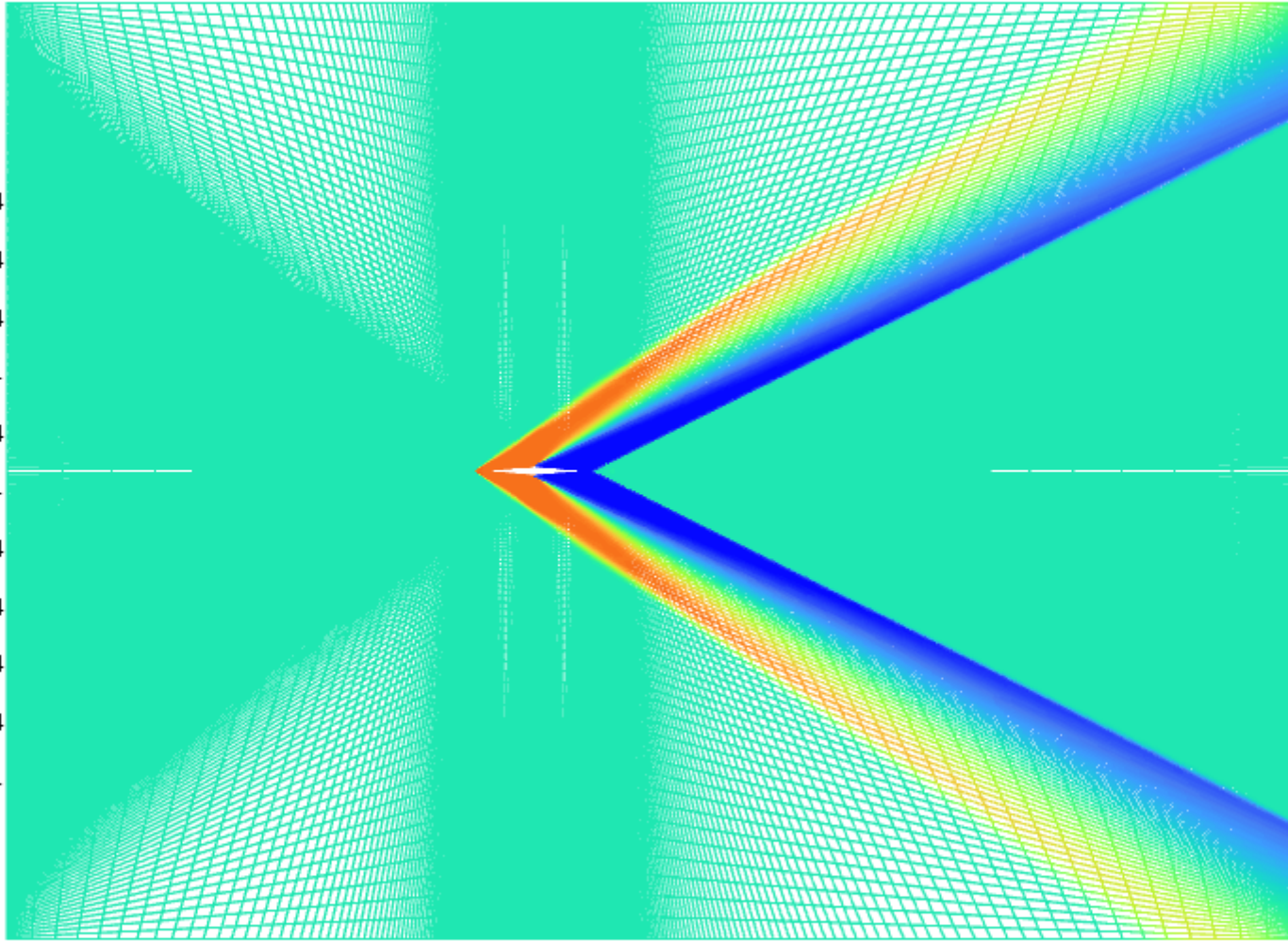
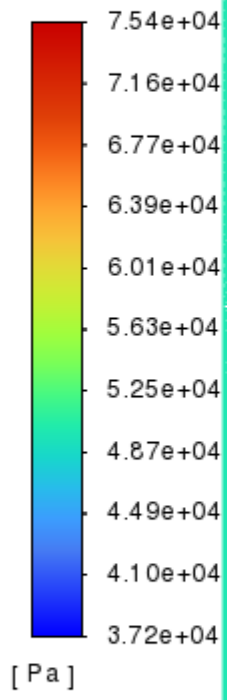
Contours

contour-2



contour-1

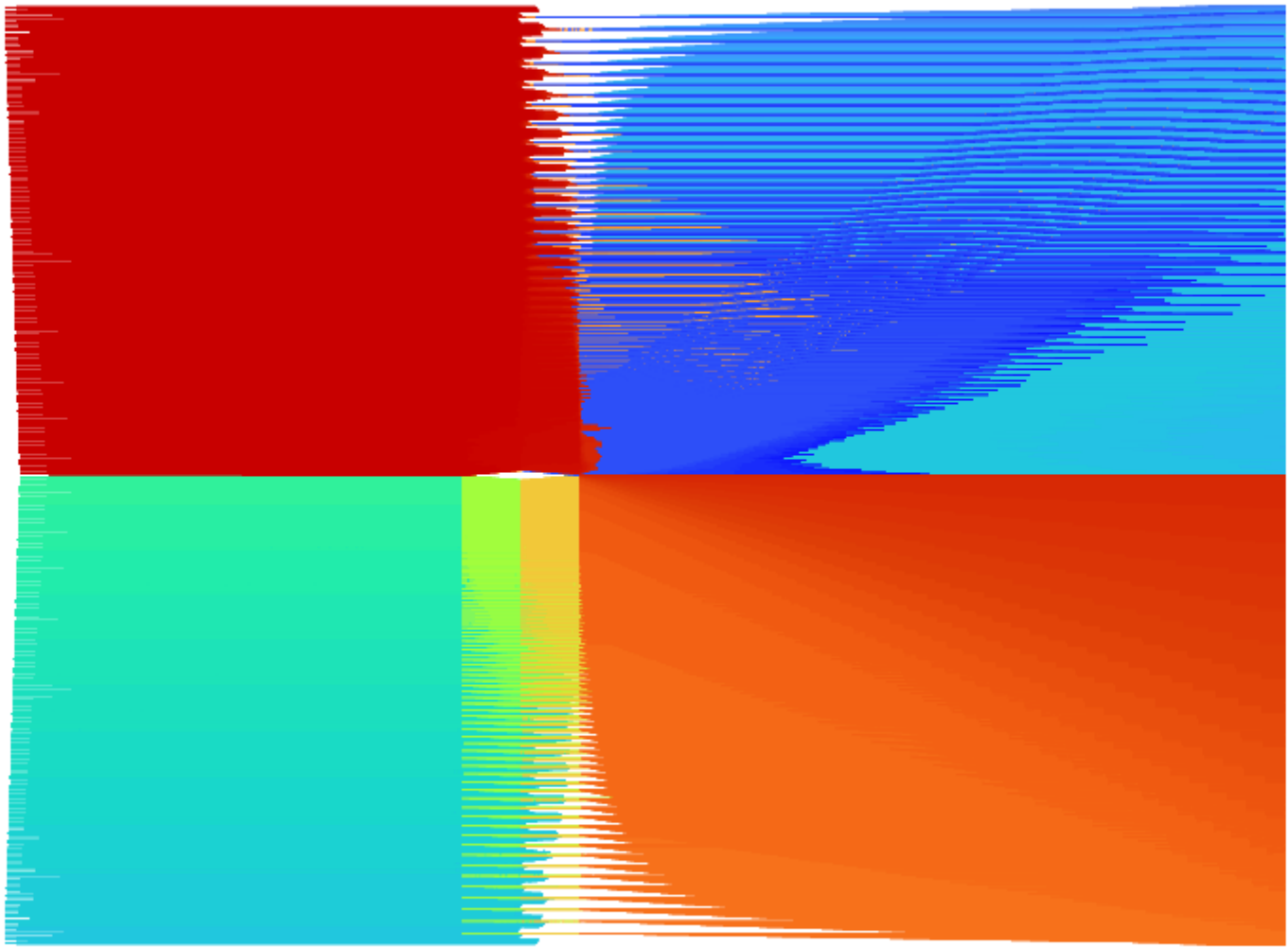
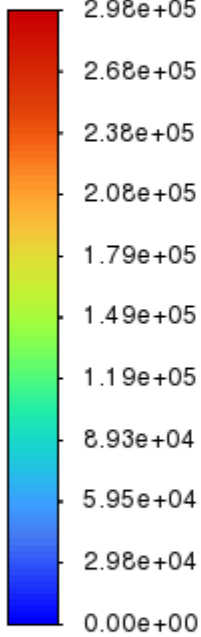
contour-1
Static Pressure



Pathlines

pathlines-1

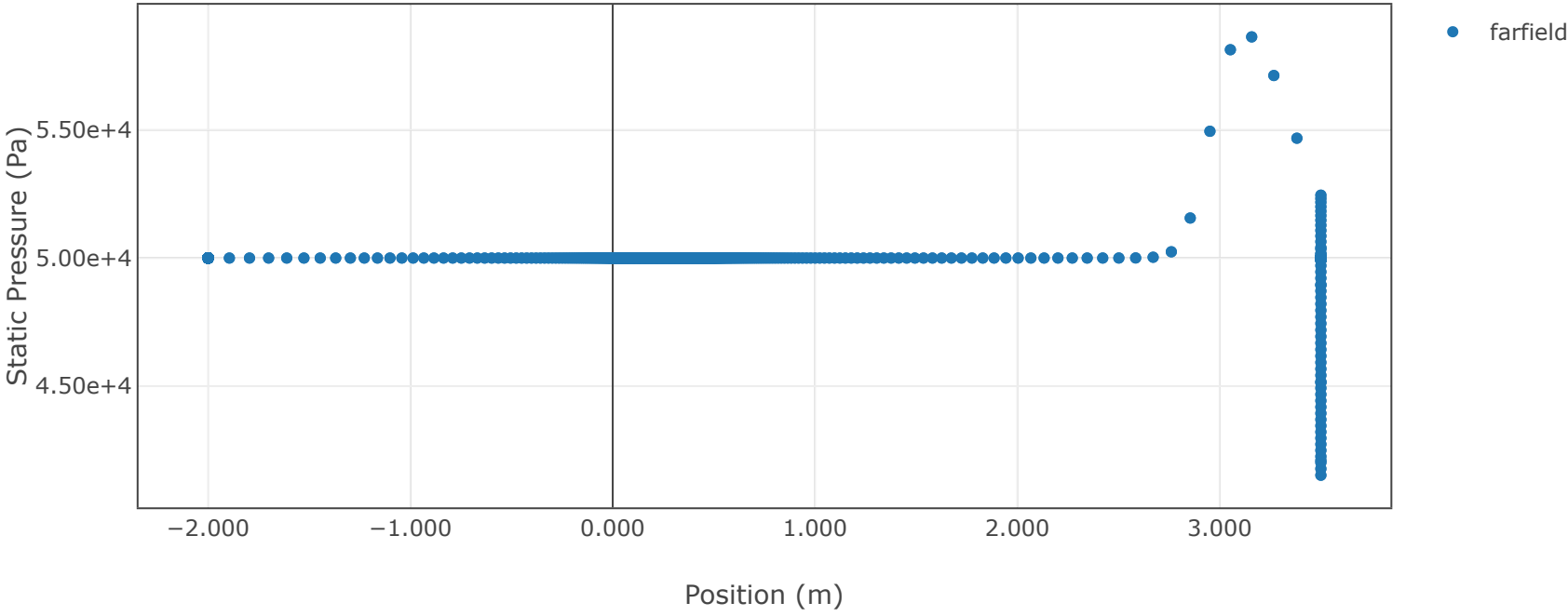
pathlines-1
Particle ID



XY Plots

xy-plot-1

Static Pressure



xy-plot-2

