Ansys
2025 R2

Ansys Fluent Simulation Report of ship

Analyst	skc
Date	12/23/2025 05:43 PM

Table of Contents

System Information

Application	Fluent
Settings	3d, double precision, pressure-based, VOF, SST k-omega
Version	25.2.0-10204
Source Revision	5eecd5d865
Build Time	Jun 16 2025 10:40:34 EDT
CPU	13th Gen Intel(R) Core(TM) i5-13420H
OS	Windows

Geometry and Mesh

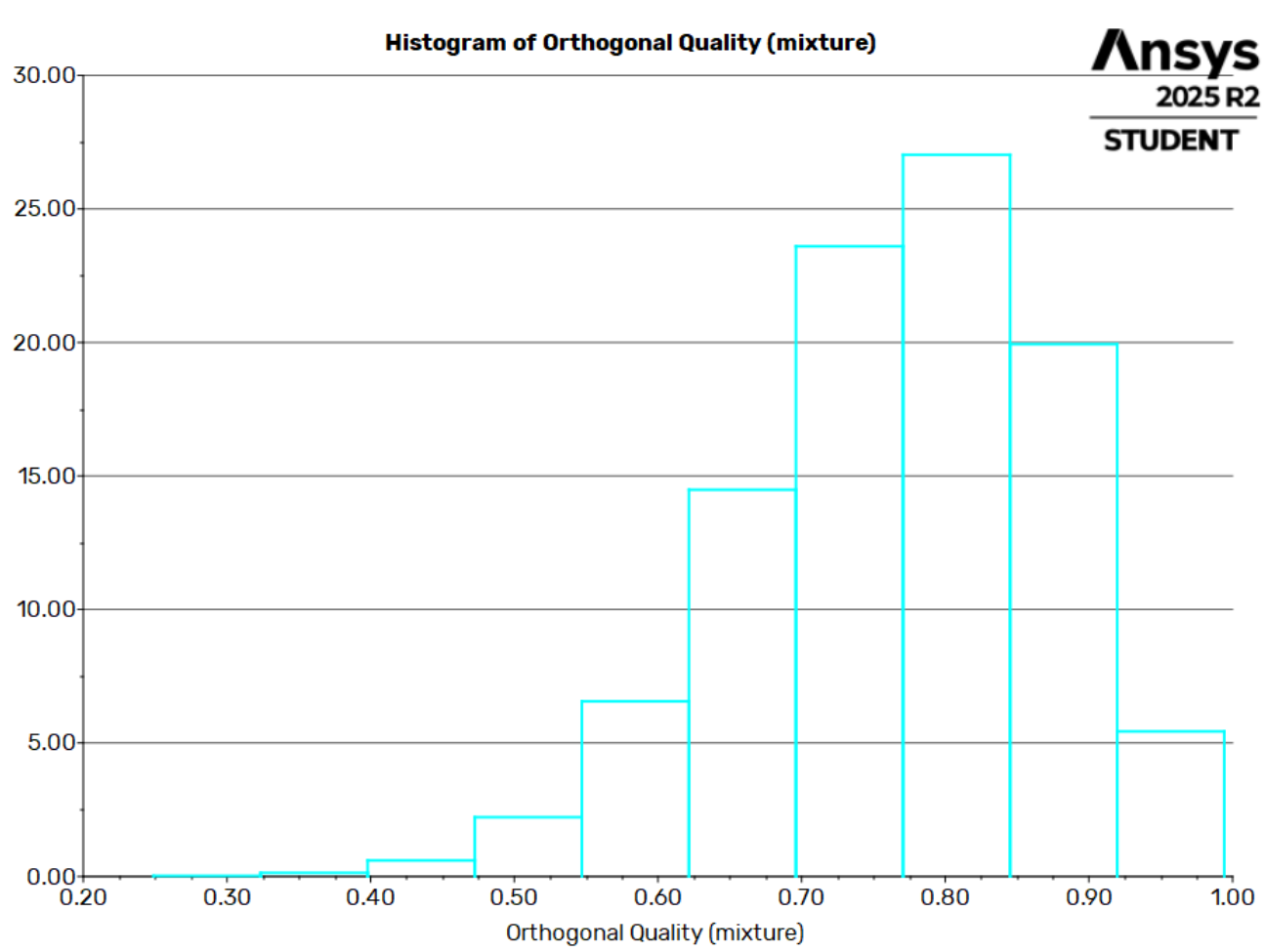
Mesh Size

Cells	Faces	Nodes
865239	1767884	163572

Mesh Quality

Name	Type	Min Orthogonal Quality	Max Aspect Ratio
solid	Tet Cell	0.24889778	15.600255

Orthogonal Quality



Simulation Setup

Physics

Models

Model	Settings
Space	3D
Time	Steady
Viscous	SST k-omega turbulence model
Multiphase	Volume of Fluid

Material Properties

– Fluid	
– water-liquid	
Density	998.2 kg/m^3
Viscosity	0.001003 kg/(m s)
– air	
Density	1.225 kg/m^3
Viscosity	1.7894e-05 kg/(m s)
– Solid	
– aluminum	
Density	2719 kg/m^3

Cell Zone Conditions

– Fluid	
– solid (mixture)	
Specify source terms?	no
Specify fixed values?	no
Frame Motion?	no

Laminar zone?	no
Porous zone?	no
3D Fan Zone?	no
Numerical Beach	no
– solid (phase-1)	
Specify source terms?	no
Specify fixed values?	no
3D Fan Zone?	no
– solid (phase-2)	
Specify source terms?	no
Specify fixed values?	no
3D Fan Zone?	no

Boundary Conditions

– Inlet	
– inlet (mixture)	
Open Channel	yes
Inlet Group ID	1
Secondary Phase for Inlet	phase 2
Reference Frame	Absolute
Direction Specification Method	Normal to Boundary
Flow Specification Method	Free Surface Level and Velocity
Free Surface Level [m]	0.25
Velocity Magnitude [m/s]	10
Bottom Level [m]	-5
Density Interpolation Method	From Neighboring Cell
Turbulence Specification Method	Intensity and Viscosity Ratio
Turbulent Intensity [%]	5
Turbulent Viscosity Ratio	10
inlet (phase-1)	
inlet (phase-2)	

– Outlet	
– atm (mixture)	
Open Channel	yes
Outlet Group ID	1
Pressure Specification Method	Free Surface Level
Free Surface Level [m]	0.25
Bottom Level [m]	-5
Density Interpolation Method	From Neighboring Cell
Backflow Direction Specification Method	From Neighboring Cell
Turbulence Specification Method	Intensity and Viscosity Ratio
Backflow Turbulent Intensity [%]	5
Backflow Turbulent Viscosity Ratio	10
Backflow Pressure Specification	Total Pressure
Radial Equilibrium Pressure Distribution	no
atm (phase-1)	
atm (phase-2)	
– outlet (mixture)	
Open Channel	yes
Outlet Group ID	1
Pressure Specification Method	Free Surface Level
Free Surface Level [m]	0.25
Bottom Level [m]	-5
Density Interpolation Method	From Neighboring Cell
Backflow Direction Specification Method	From Neighboring Cell
Turbulence Specification Method	Intensity and Viscosity Ratio
Backflow Turbulent Intensity [%]	5
Backflow Turbulent Viscosity Ratio	10
Backflow Pressure Specification	Total Pressure
Radial Equilibrium Pressure Distribution	no
outlet (phase-1)	
outlet (phase-2)	

– Symmetry	
symm (mixture)	
symm (phase-1)	
symm (phase-2)	
– Wall	
– walls (mixture)	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	Standard
Wall Roughness Height [m]	0
Wall Roughness Constant	0.5
walls (phase-1)	
walls (phase-2)	
– ship (mixture)	
Wall Motion	Stationary Wall
Shear Boundary Condition	No Slip
Wall Surface Roughness	Standard
Wall Roughness Height [m]	0
Wall Roughness Constant	0.5
ship (phase-1)	
ship (phase-2)	

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
Volume Fraction	True
Turbulence	True
– Numerics	
Absolute Velocity Formulation	True
– Pseudo Time Explicit Relaxation Factors	
Density	1
Body Forces	1
Volume Fraction	0.5
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	PRESTO!
Momentum	Second Order Upwind
Volume Fraction	Compressive
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 Static Temperature [K]	1
Maximum Static 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	14.29 seconds
Data Read	3.108 seconds
Virtual Current Memory	2.94055 GB
Virtual Peak Memory	3.02424 GB
Memory Per M Cell	2.64342

Solution Status

Iterations: 378

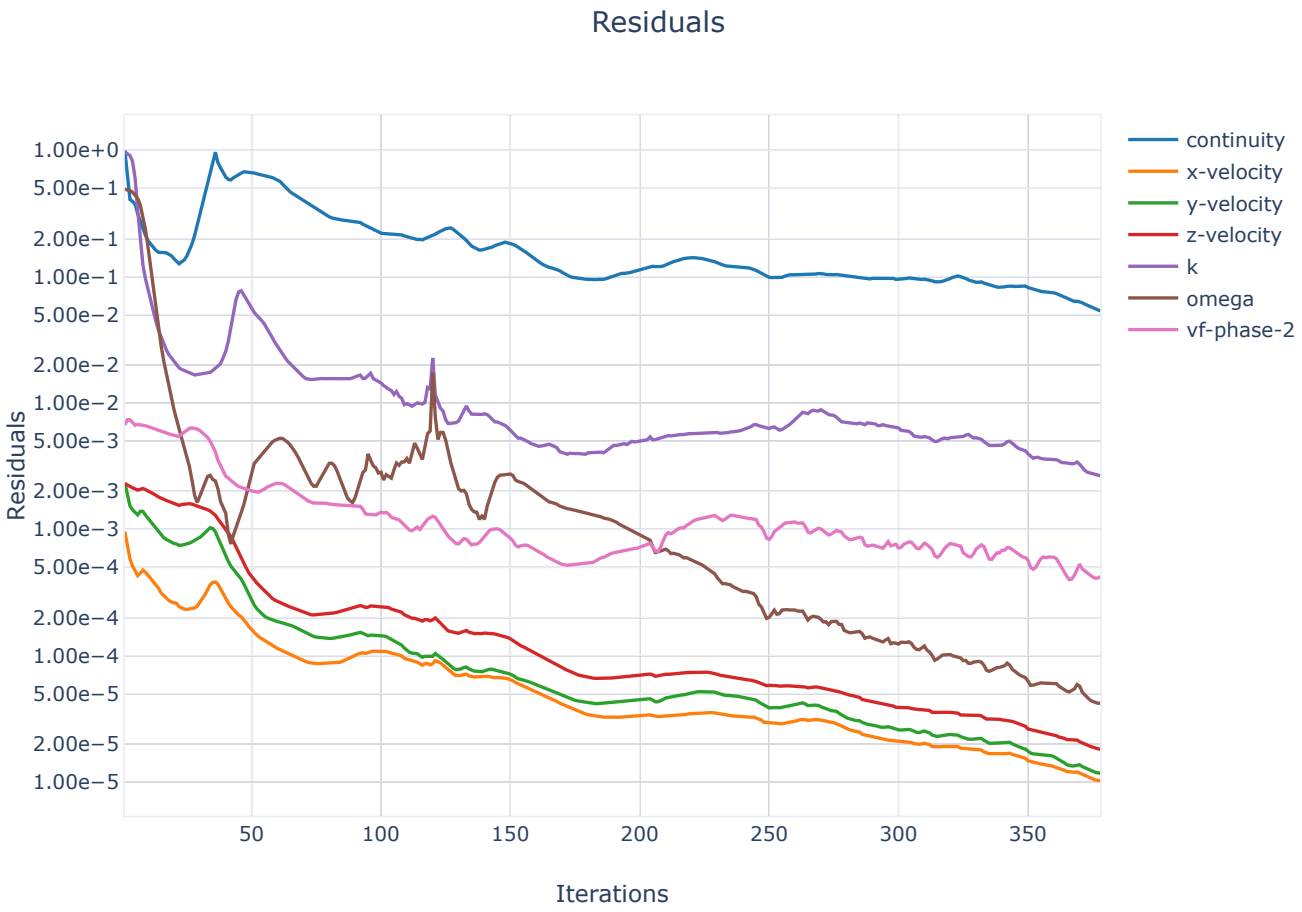
	Value	Absolute Criteria	Convergence Status
continuity	0.05358612	0.001	Not Converged
x-velocity	1.025811e-05	0.001	Converged
y-velocity	1.173483e-05	0.001	Converged
z-velocity	1.812463e-05	0.001	Converged
k	0.002655416	0.001	Not Converged
omega	4.211657e-05	0.001	Converged
vf-phase-2	0.0004249104	0.001	Converged

Report Definitions

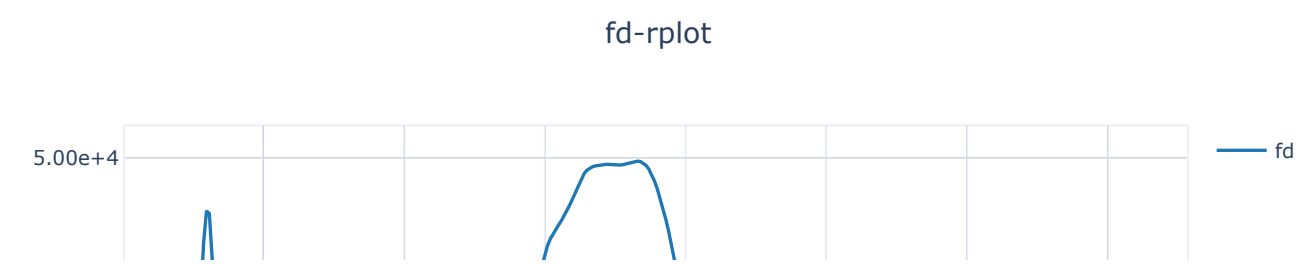
report-def-0	14330.4	
fd	8777.37	N

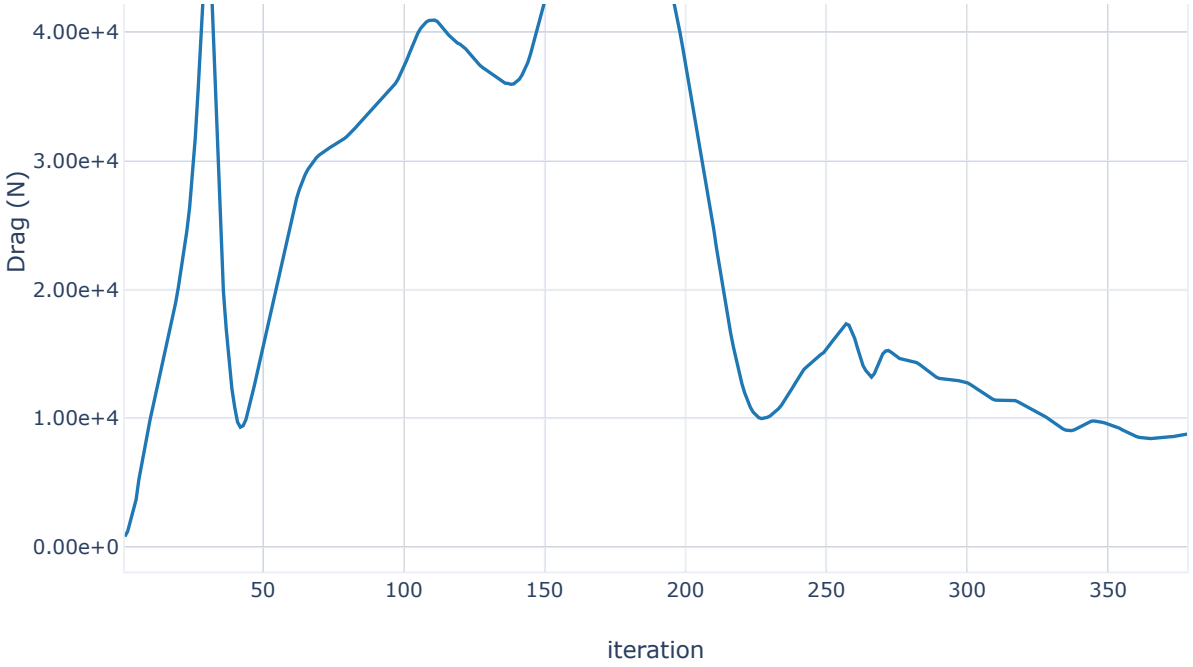
Plots

Residuals



fd-rplot





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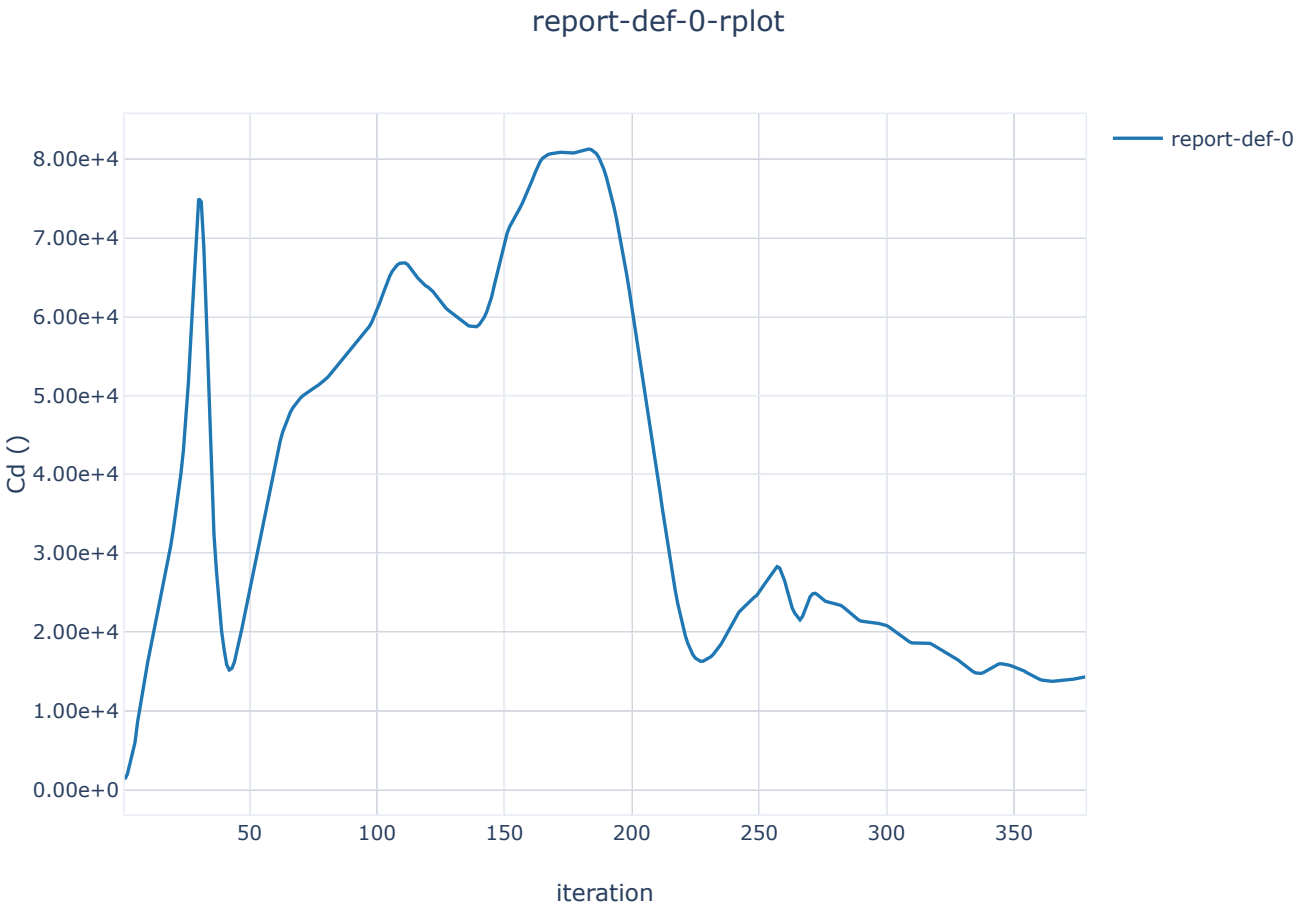
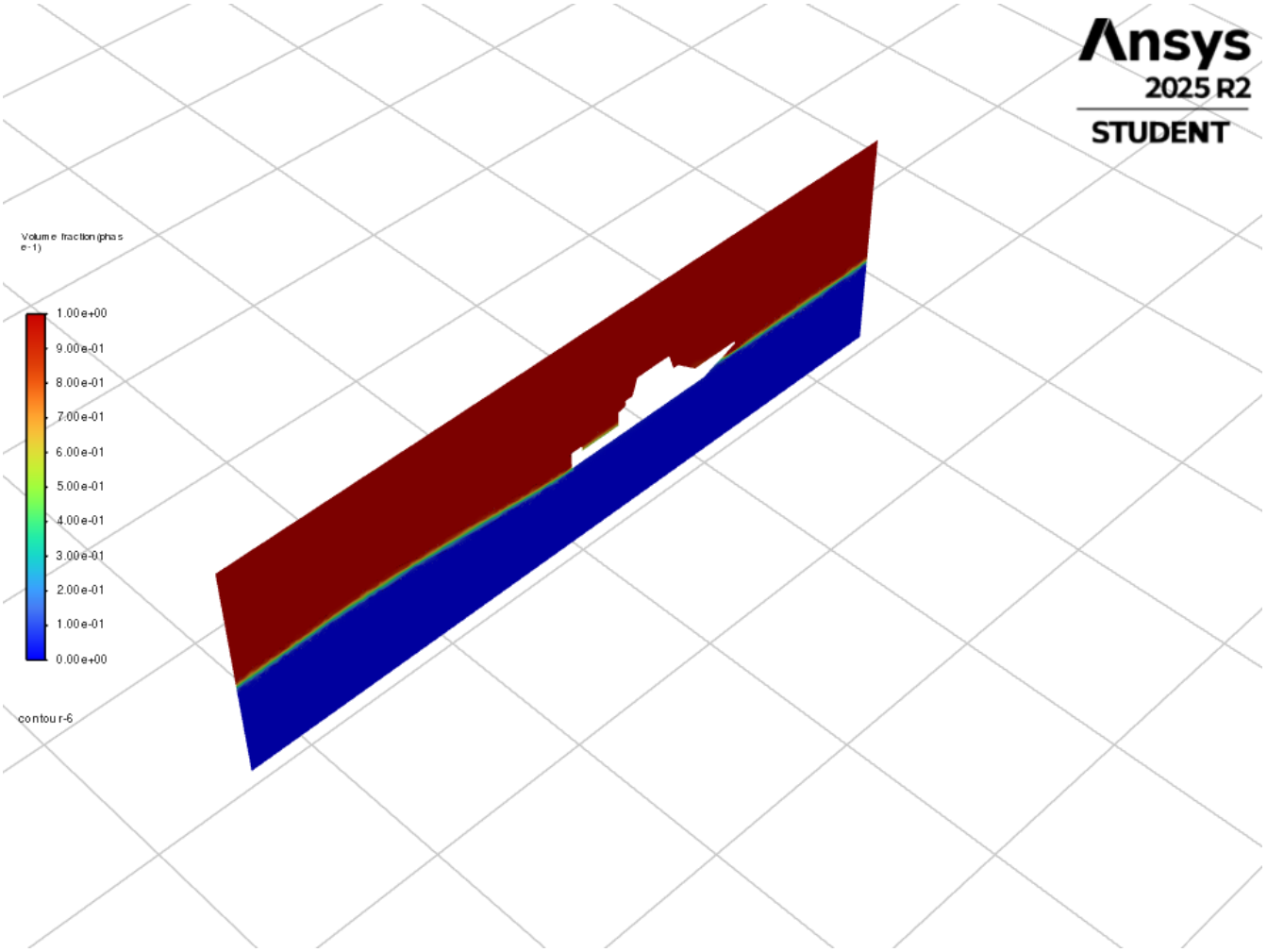
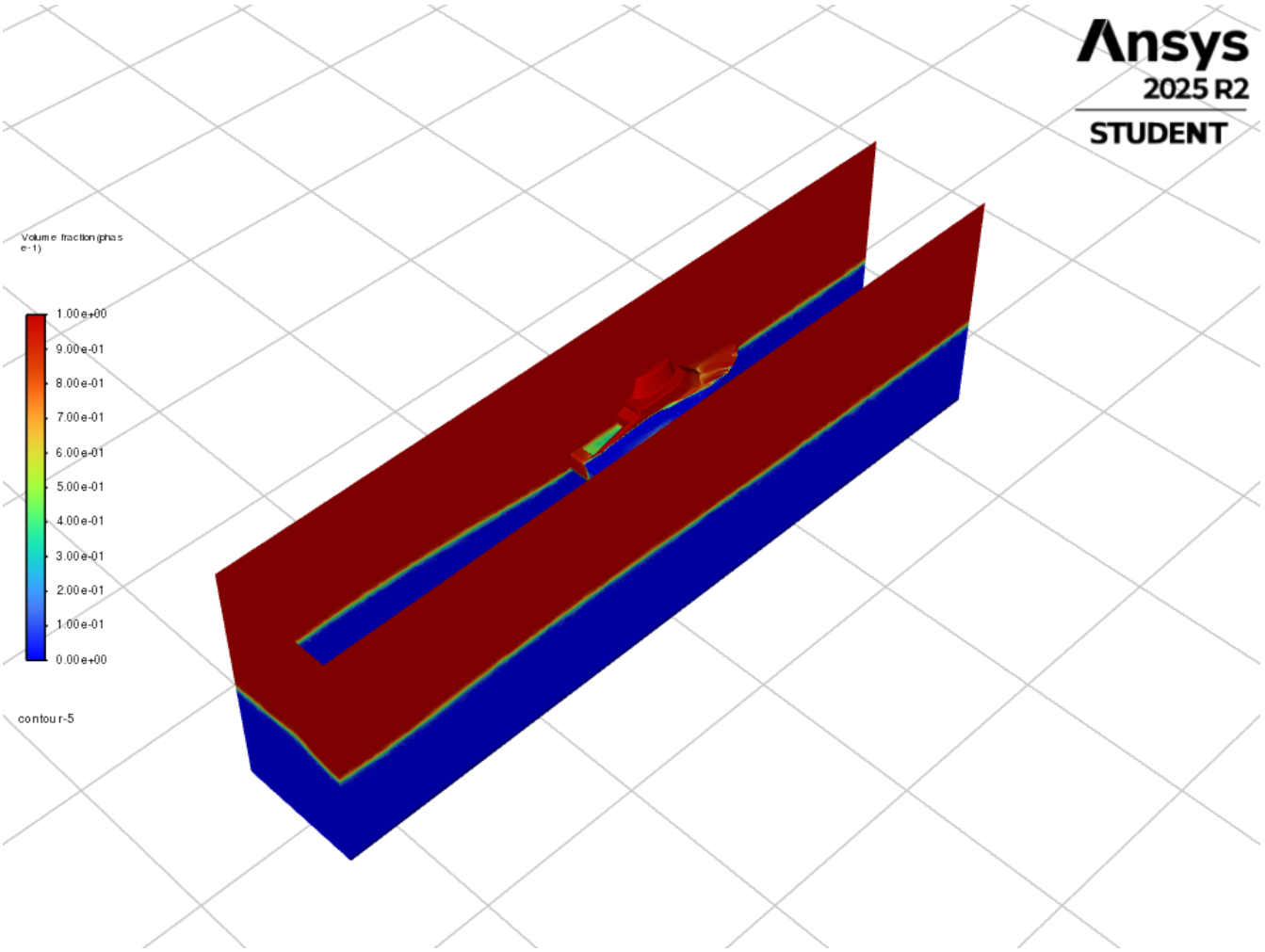


Contours

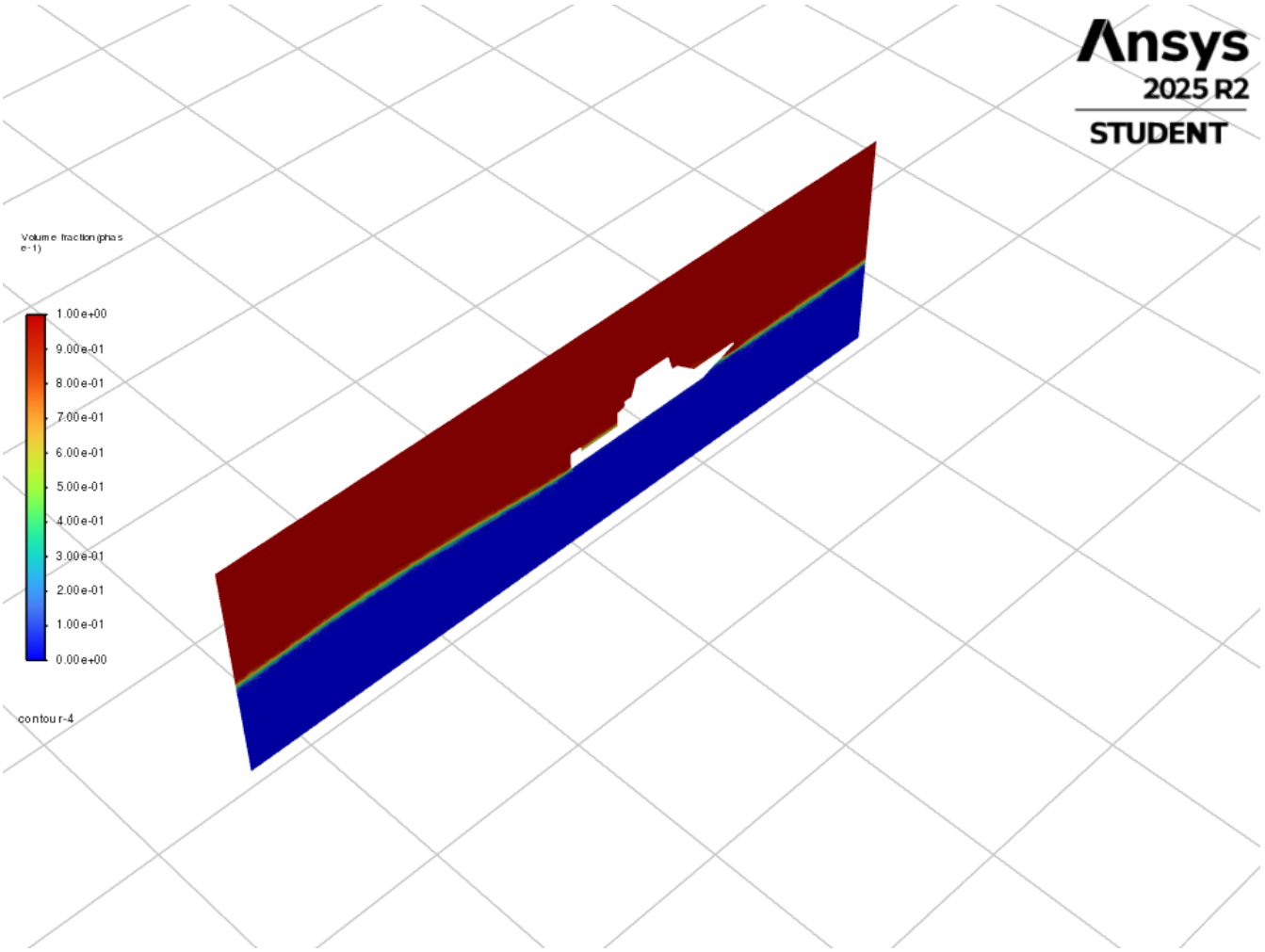
contour-6



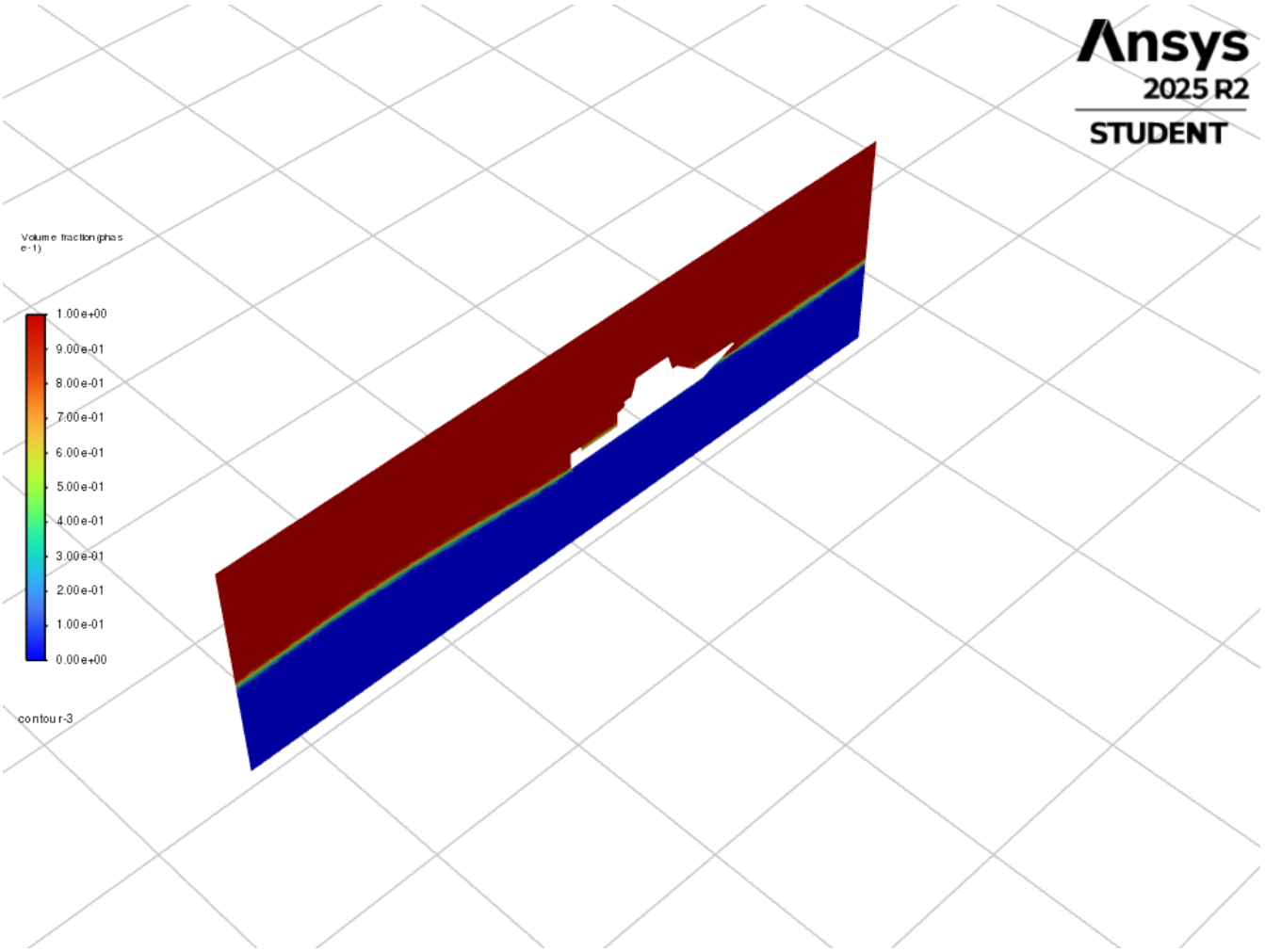
contour-5


Ansys
2025 R2
STUDENT
Volume fraction (phase-1)
1.00e+00
9.00e-01
8.00e-01
7.00e-01
6.00e-01
5.00e-01
4.00e-01
3.00e-01
2.00e-01
1.00e-01
0.00e+00
contour-5

contour-4


Ansys
2025 R2
STUDENT
Volume fraction (phase-1)
1.00e+00
9.00e-01
8.00e-01
7.00e-01
6.00e-01
5.00e-01
4.00e-01
3.00e-01
2.00e-01
1.00e-01
0.00e+00
contour-4

contour-3


Ansys
2025 R2
STUDENT
Volume fraction (phase-1)
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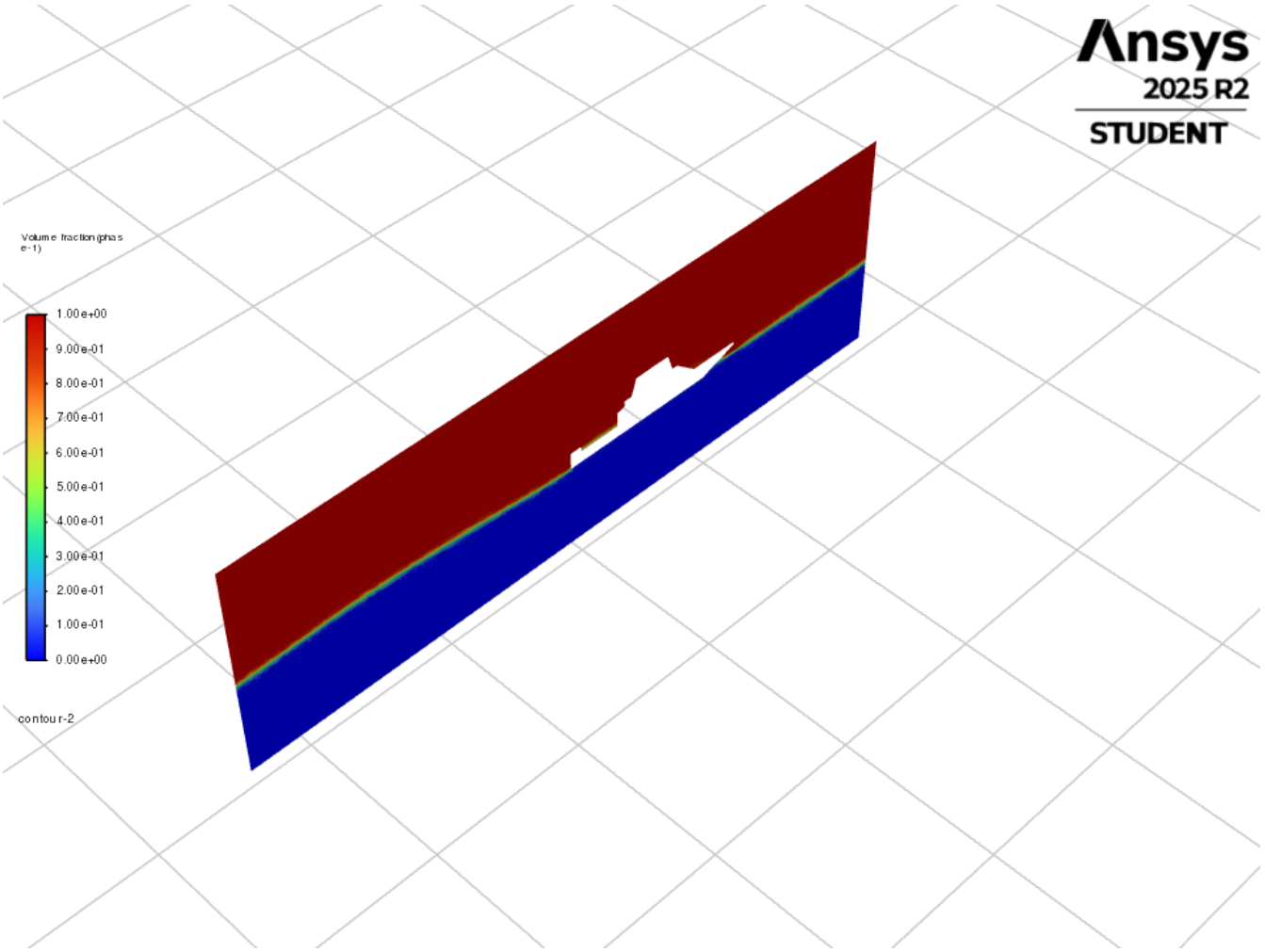
7.00e-01
6.00e-01
5.00e-01
4.00e-01
3.00e-01
2.00e-01
1.00e-01
0.00e+00
contour-3

contour-2


Ansys
2025 R2
STUDENT
Volume fraction (phase-1)
1.00e+00
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8.00e-01
7.00e-01
6.00e-01
5.00e-01
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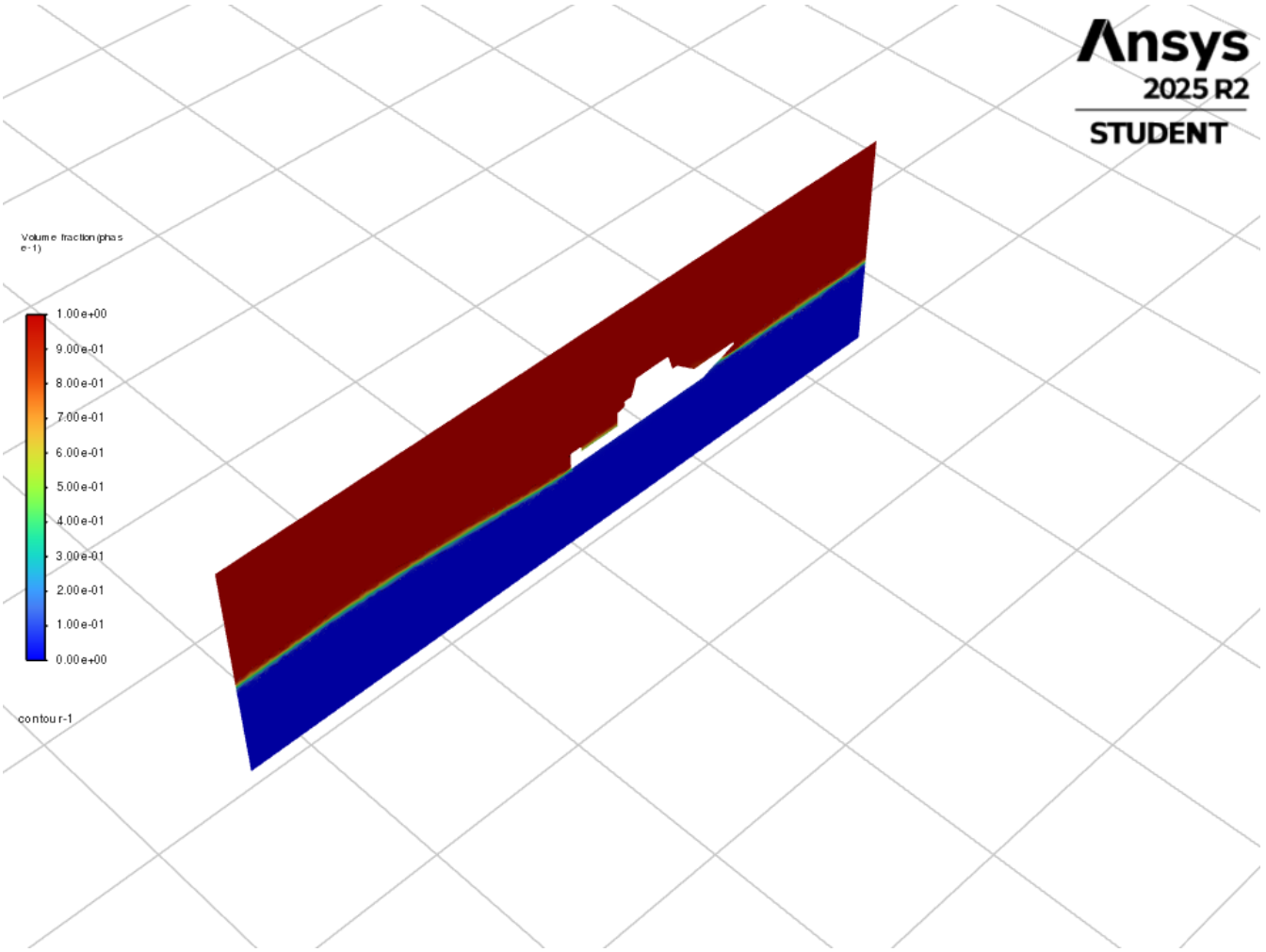
3.00e-01
2.00e-01
1.00e-01
0.00e+00
contour-2

contour-1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2025 R2
STUDENT
Volume fraction (phase-1)
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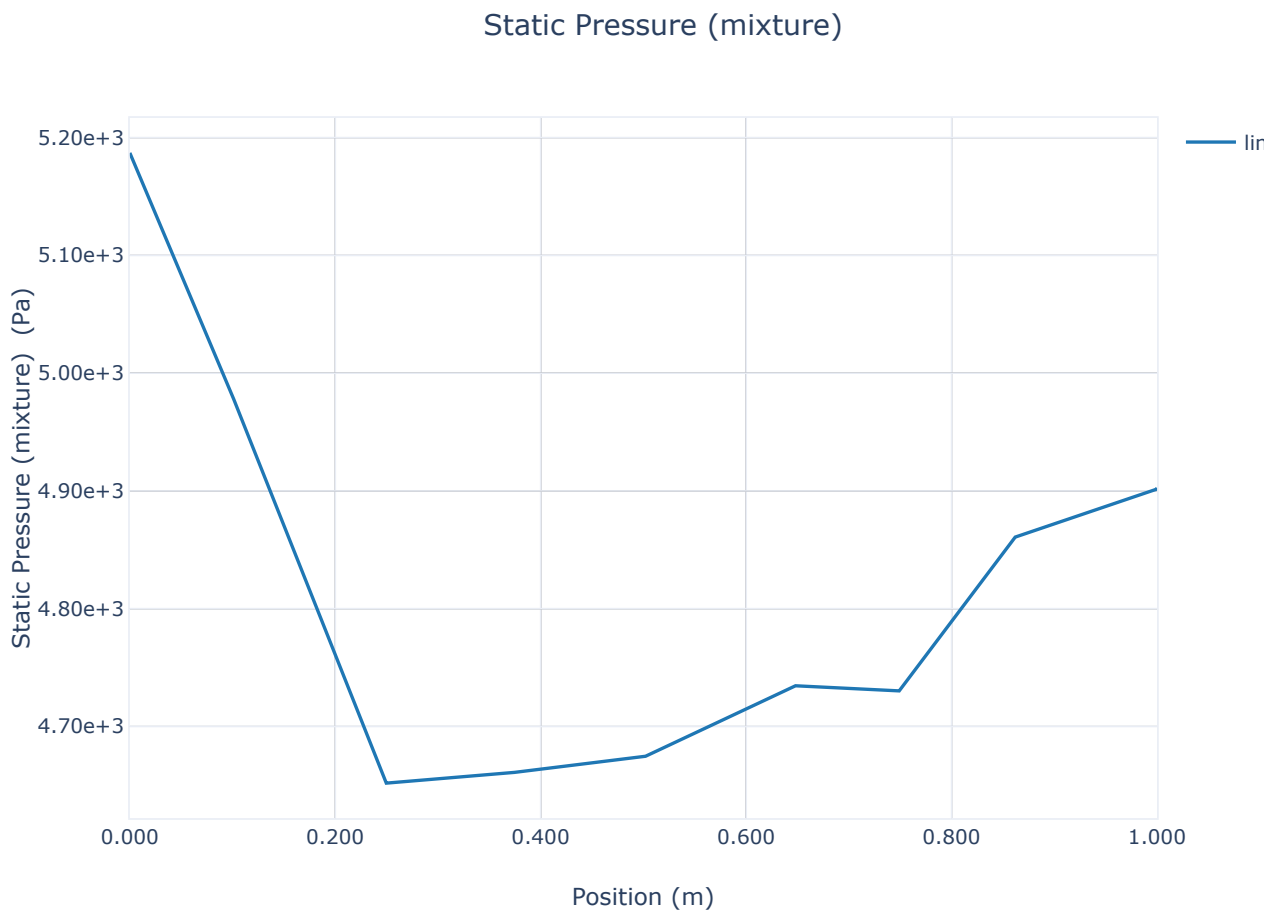
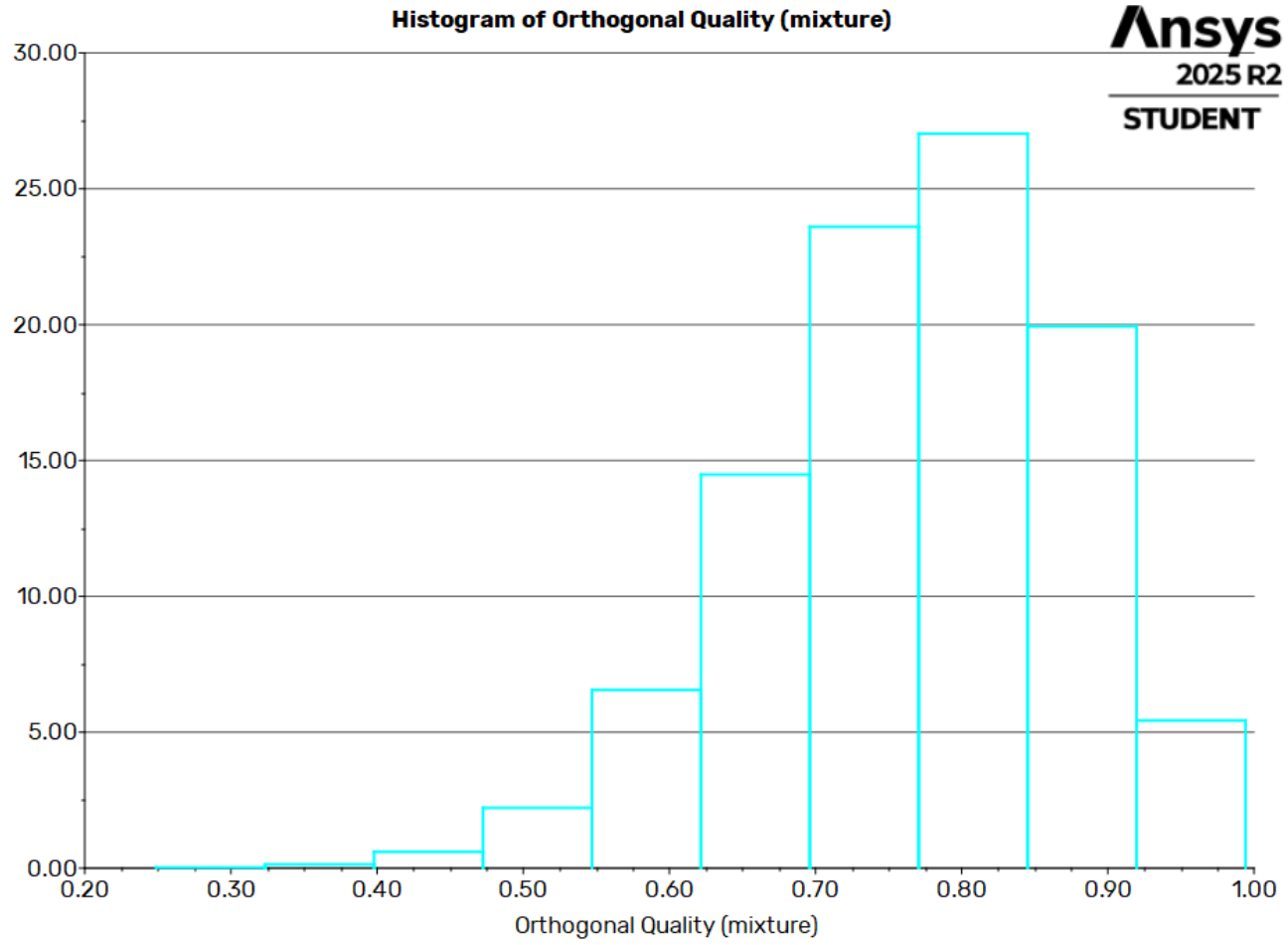
8.00e-01
7.00e-01
6.00e-01
5.00e-01
4.00e-01
3.00e-01
2.00e-01
1.00e-01
0.00e+00
contour-1

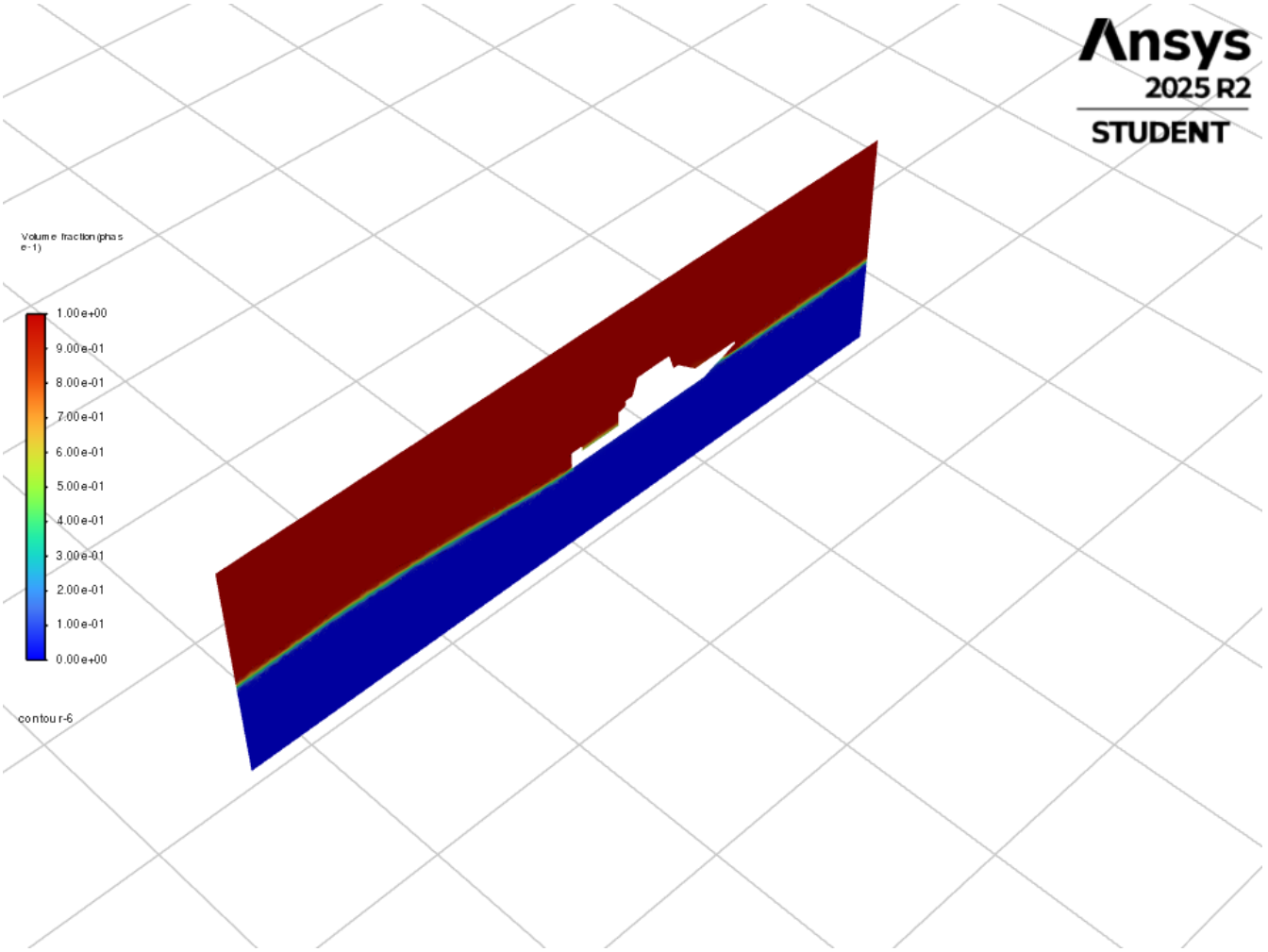
XY Plots

xy-plot-1



Scenes


Histogram of Orthogonal Quality (mixture)
Ansys
2025 R2
STUDENT
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
Orthogonal Quality (mixture)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1.00e+00
9.00e-01
8.00e-01
7.00e-01
6.00e-01
5.00e-01
4.00e-01
3.00e-01
2.00e-01
1.00e-01
0.00e+00
contour-6

Ansys
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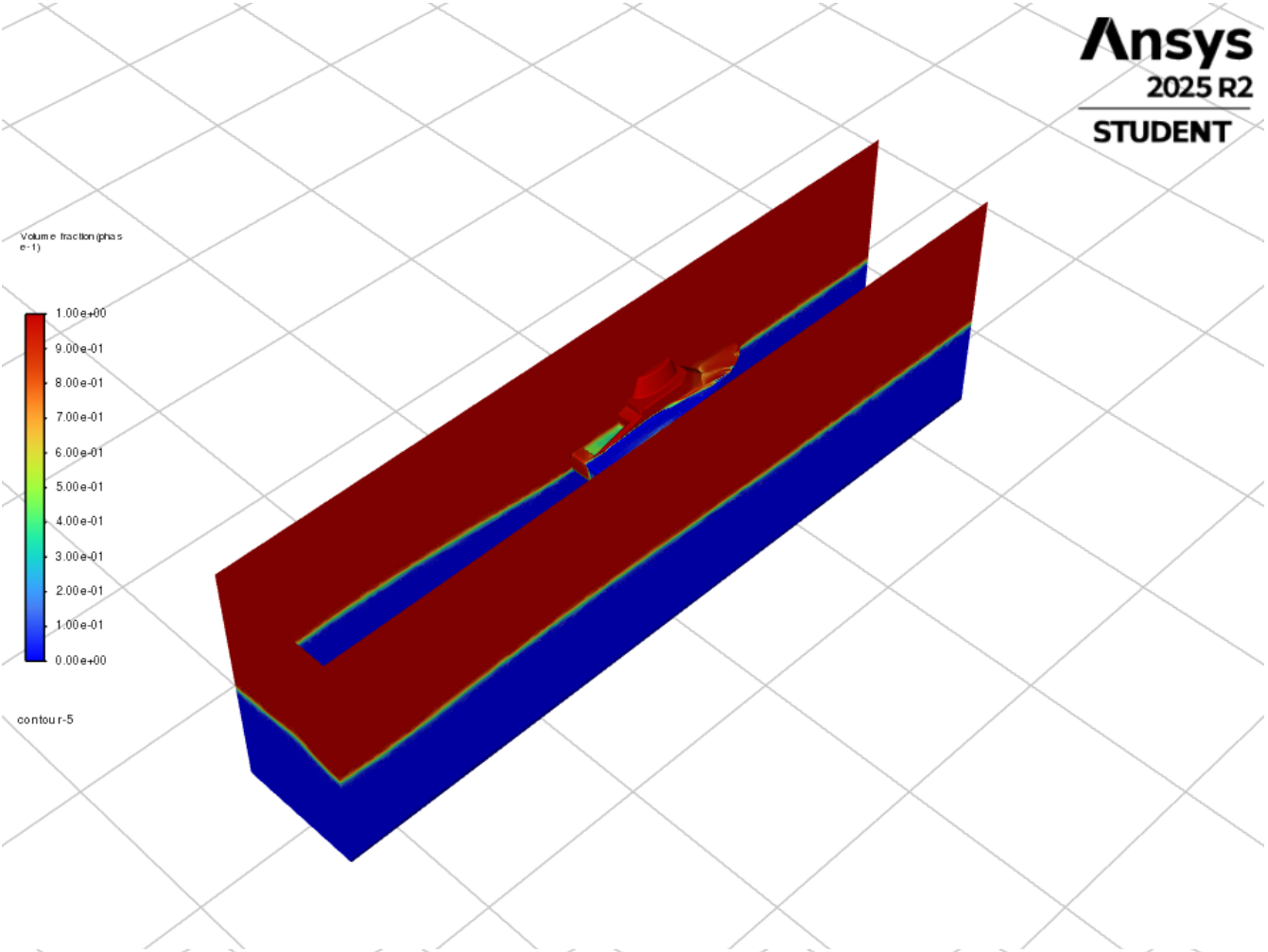
STUDENT



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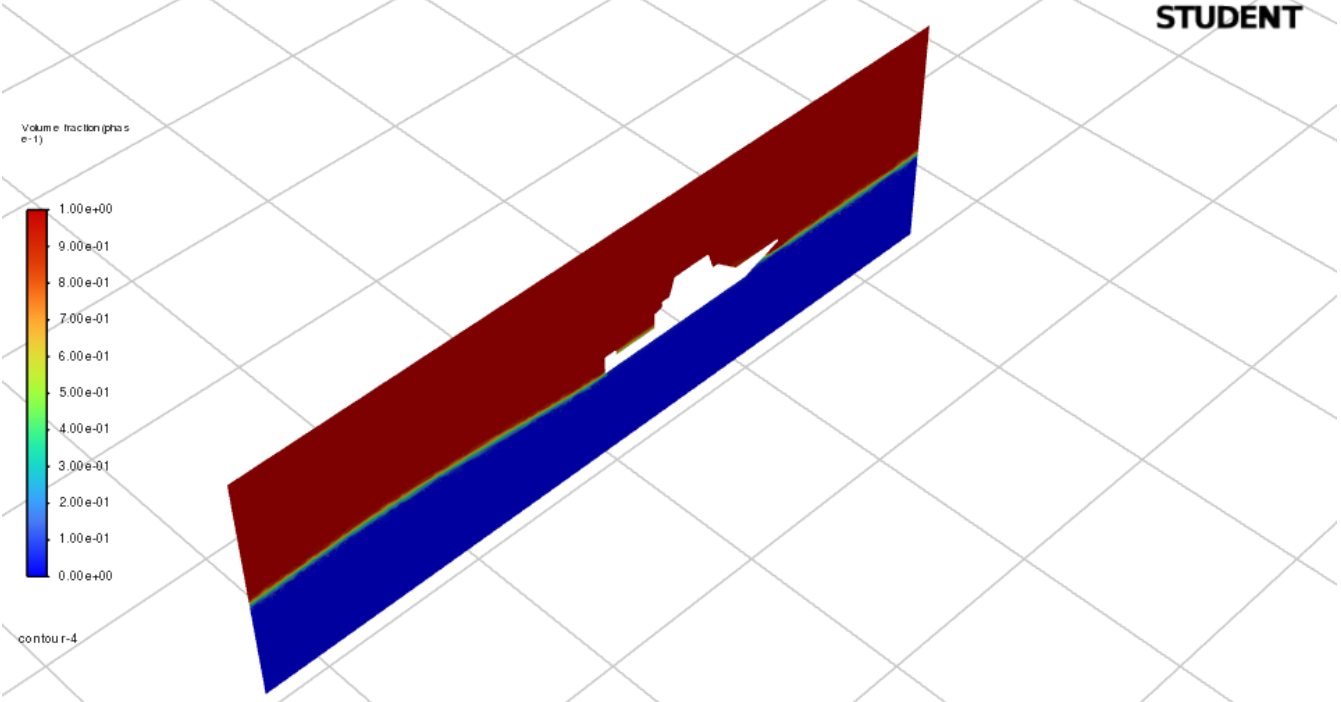

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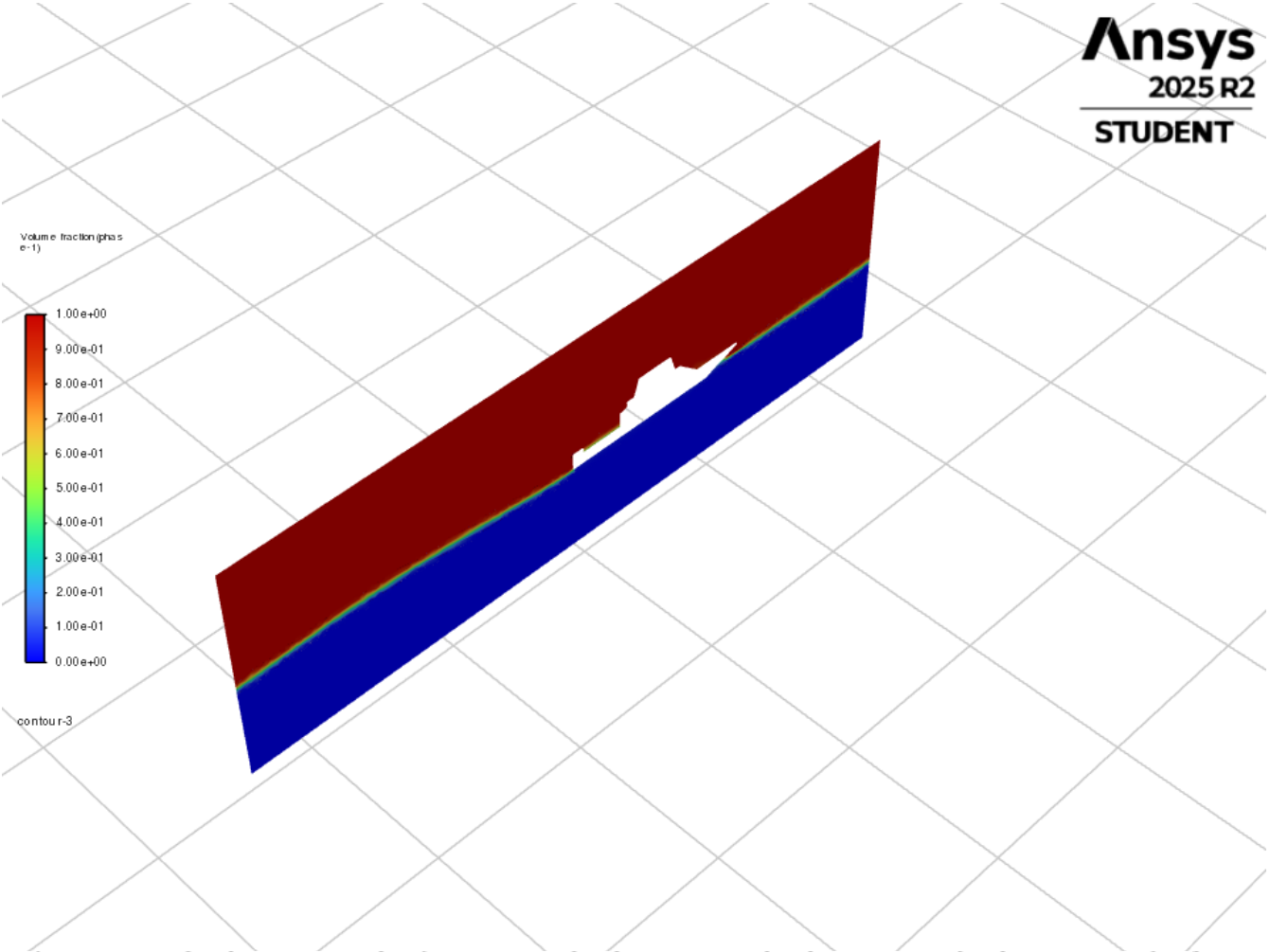

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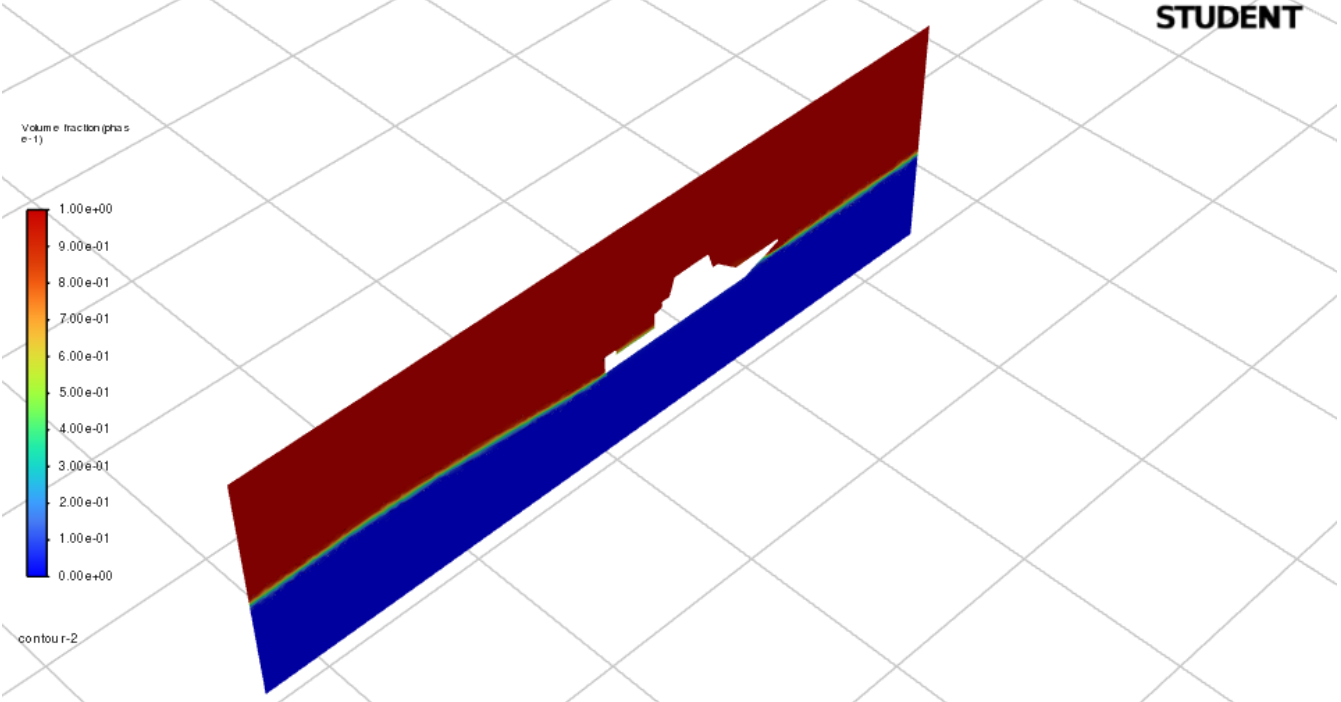

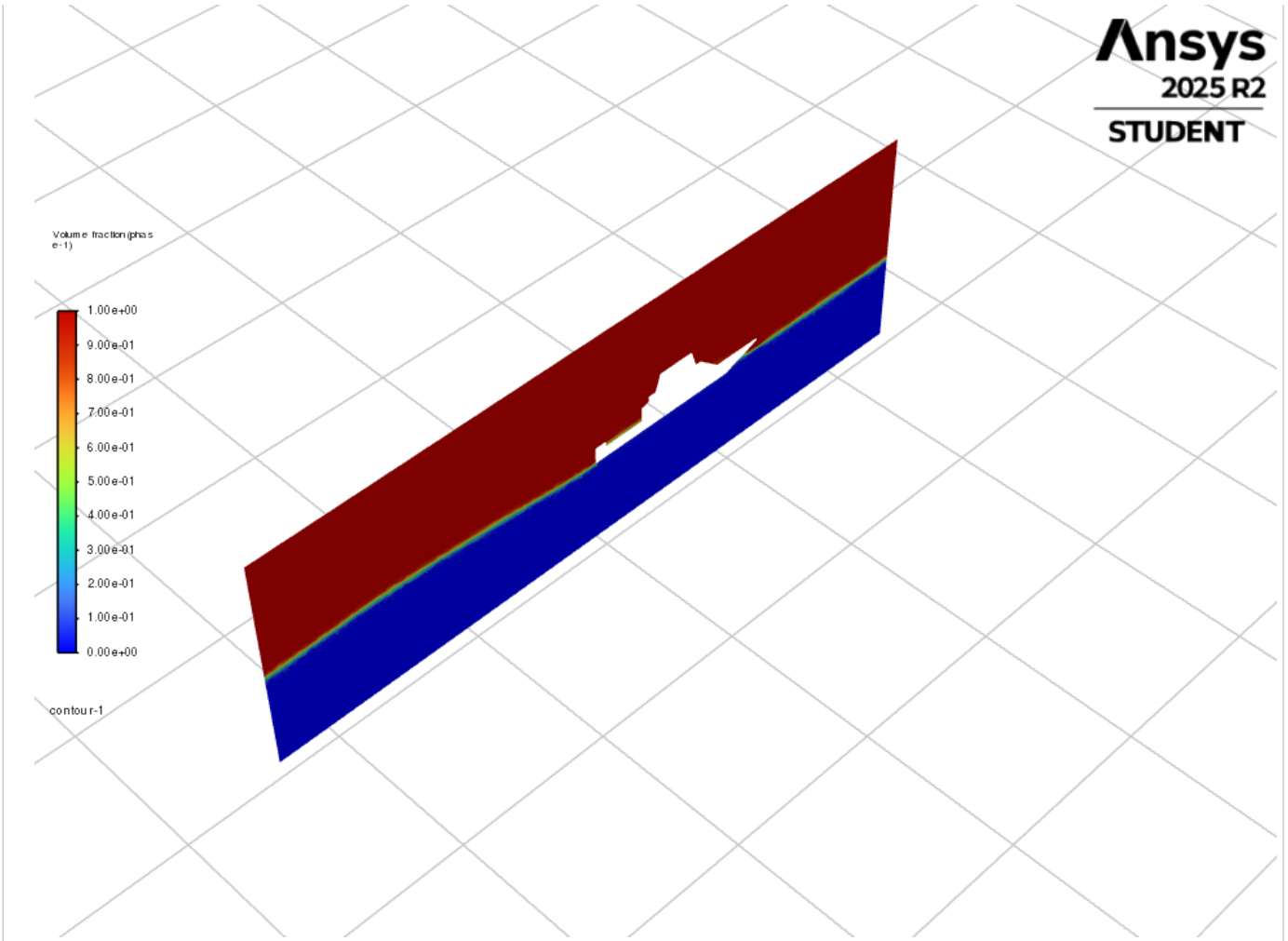
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3.00e-01
2.00e-01
1.00e-01
0.00e+00
contour-1