

BLADE

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Date: Thursday, May 15, 2025

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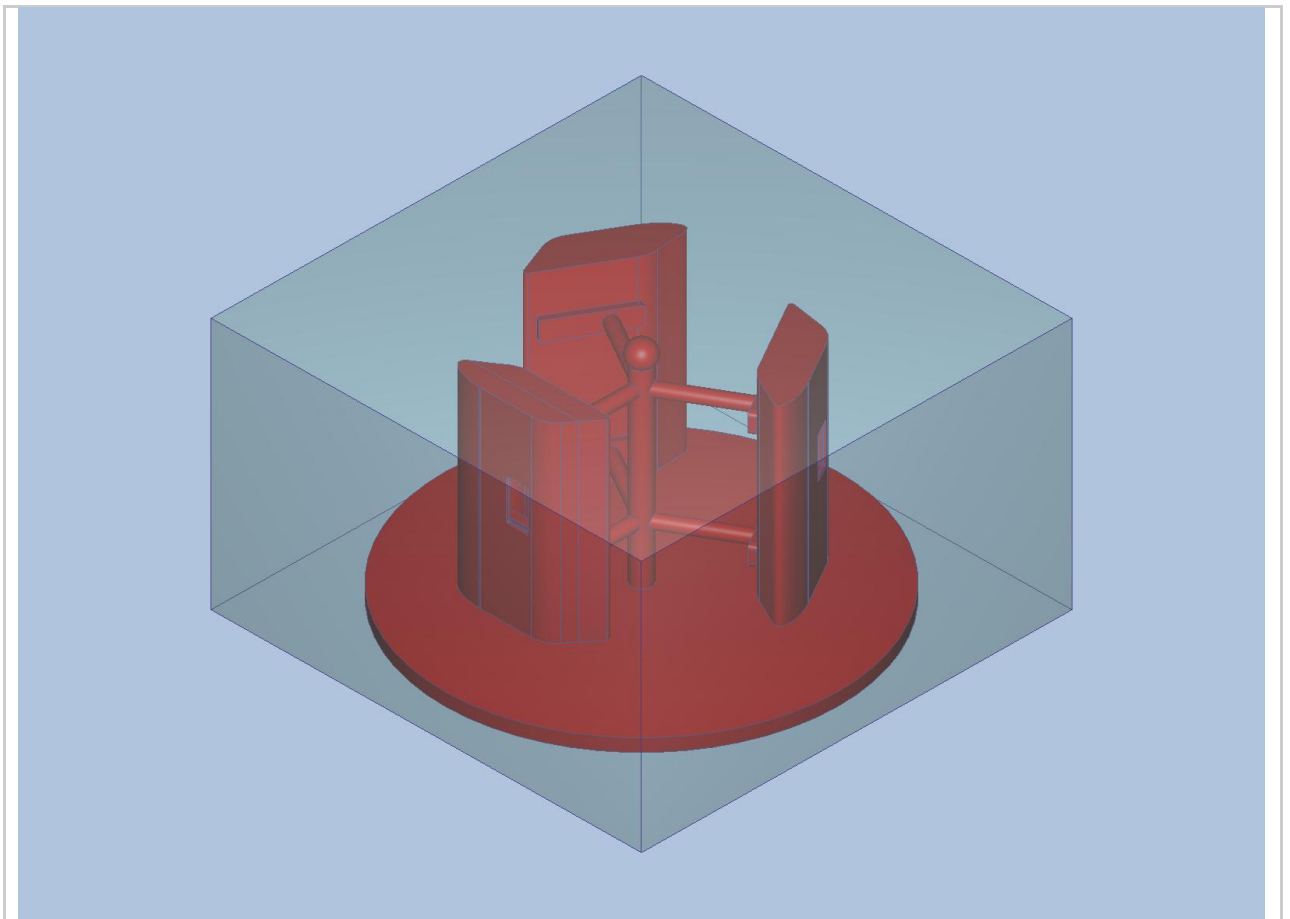
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Design 1

Length units	cm
Coordinate system	Cartesian 3D

SCENARIO 1

MATERIALS



NAME	ASSIGNED TO	PROPERTIES	
ABS (Polycarbonate)	Part1.Body3_U_Part1.Body2 Part1.Body3 Part1.Body5_U_Part1.Body3 Part1.Body3 Part1.Body4_U_Part1.Body3 Part1.Body3_U_Part1.Body1	X-Direction	0.181 W/m-K
		Y-Direction	Same as X-dir.
		Z-Direction	Same as X-dir.
		Density	1.15 g/cm3
		Specific heat	1.81 J/g-K
		Emissivity	0.9
		Transmissivity	0.0
		Electrical resistivity	1.46e+16 ohm-cm
		Wall roughness	0.0 meter
Air	CFDCreatedVolume	Density	Equation of State
		Viscosity	1.817e-05 Pa-s
		Conductivity	0.02563 W/m-K
		Specific heat	1004.0 J/kg-K
		Compressibility	1.4
		Emissivity	1.0
		Wall roughness	0.0 meter
		Phase	Vapor Pressure

BOUNDARY CONDITIONS

TYPE	ASSIGNED TO
Rotational Velocity(40 RPM {{(0,0,0):(0,0,1)}})	Surface:231
Temperature(50 Celsius)	Surface:270 Surface:271 Surface:273 Surface:275
Slip/Symmetry	Surface:270 Surface:271 Surface:273 Surface:275
Pressure(0 Pa Gage)	Surface:272
Velocity Normal(3 m/s)	Surface:274

INITIAL CONDITIONS

TYPE	ASSIGNED TO

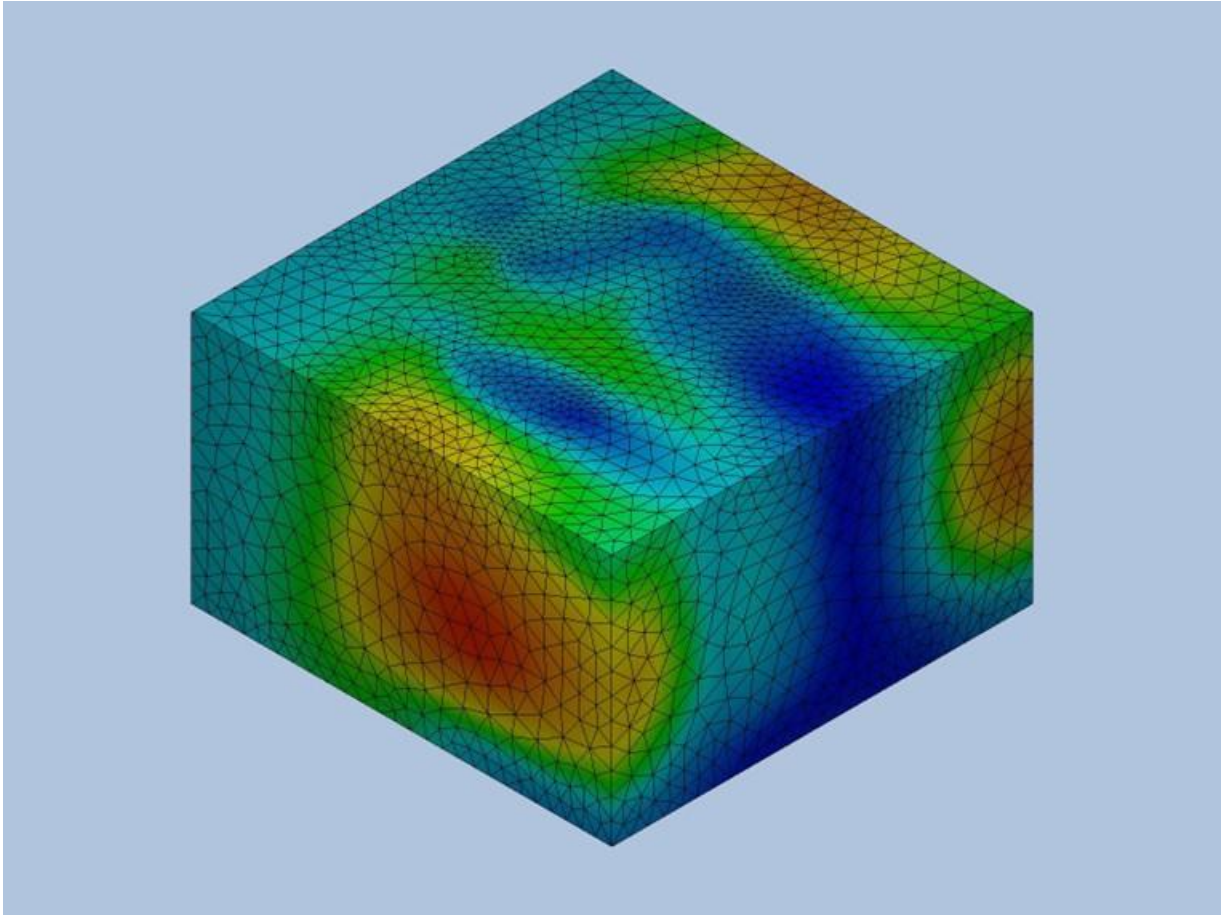
MESH

Automatic Meshing Settings

Surface refinement	True
Gap refinement	True
Resolution factor	1.0
Edge growth rate	1.1
Minimum points on edge	2
Points on longest edge	10
Surface limiting aspect ratio	20
Surface growth rate	1.2
Enhancement growth rate	1.1
Refinement length	0.12
Fluid gap elements	1.0
Thin solid elements	0.2

Mesh Enhancement Settings

Mesh enhancement	True
Enhancement blending	False
Number of layers	3
Layer factor	0.45
Layer gradation	1.05

Meshed Model

Number of Nodes	149158
Number of Elements	575239

PHYSICS

Flow	On
Compressibility	Incompressible
Heat Transfer	On
Auto Forced Convection	On
Gravity Components	0.0, 0.0, 0.0
Radiation	Off
Scalar	No scalar
Turbulence	On

SOLVER SETTINGS

Solution mode	Steady State
Solver computer	MyComputer
Intelligent solution control	Off
Advection scheme	ADV 5
Turbulence model	k-epsilon

CONVERGENCE

Iterations run	43
Solve time	317 seconds
Solver version	26.0.70

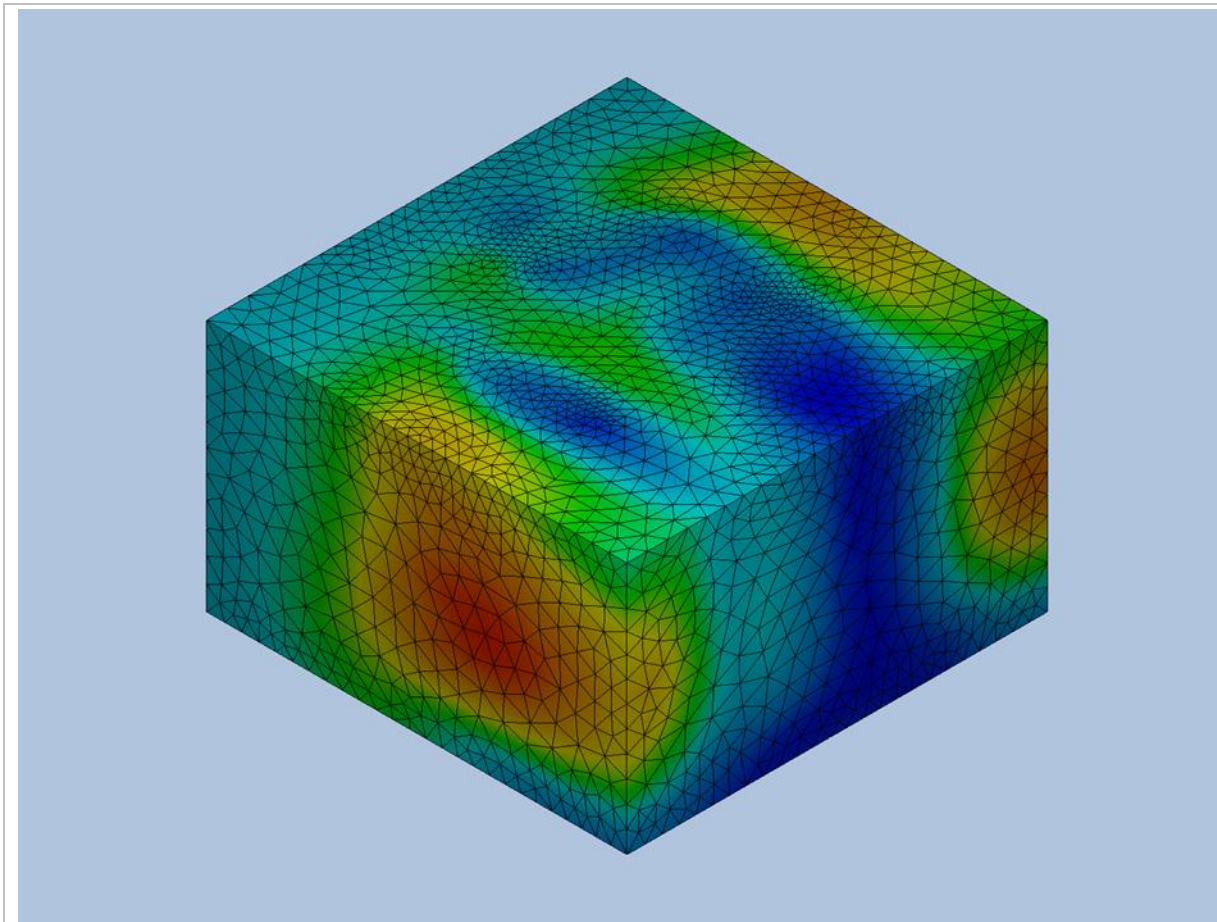
Energy Balance

Fluid Energy Balance Information	(numerical) energy out -	3.4562e-12 Watts
	heat transfer due to sources in	0.0 Watts
	heat transfer from wall to	3.9482e-15 Watts
	$\dot{m} \times c_p \times (t_{out} - t_{in})$	-5.391e-11 Watts
Solid Energy Balance Information	heat transfer due to sources in	0.0 Watts
	heat transfer from exterior to	0.0 Watts
	heat transfer from fluid to	-3.9482e-15 Watts

Mass Balance

	IN	OUT
Mass flow	236.152 g/s	-237.767 g/s
Volume flow	196020.0 cm ³ /s	-197360.0 cm ³ /s

RESULTS



Inlets and Outlets

inlet 1	inlet bulk pressure	190.701 dyne/cm ²
	inlet bulk temperature	50.0 C
	inlet mach number	0.00832485
	mass flow in	236.152 g/s
	minimum x,y,z of	0.0
	node near minimum	392.0
	reynolds number	50844.9
	surface id	274.0
	total mass flow in	236.152 g/s
	total vol. flow in	196020.0 cm ³ /s
	volume flow in	196020.0 cm ³ /s
outlet 1	mass flow out	-237.767 g/s
	minimum x,y,z of	0.0
	node near minimum	393.0

outlet bulk pressure	-0.0 dyne/cm ²
outlet bulk	50.0 C
outlet mach number	0.00805209
reynolds number	51192.5
surface id	272.0
total mass flow out	-237.767 g/s
total vol. flow out	-197360.0 cm ³ /s
volume flow out	-197360.0 cm ³ /s

Field Variable Results

VARIABLE	MAX	MIN
cond	0.00181 W/cm-K	0.0002563 W/cm-K
dens	1.15 g/cm ³	0.00120473 g/cm ³
econd	0.474163 W/cm-K	0.0 W/cm-K
emiss	1.0	0.0
evisc	0.01817 g/cm-s	0.0 g/cm-s
gent	202452.0 1/s	6.80621e-06 1/s
press	462.764 dyne/cm ²	-60.1592 dyne/cm ²
ptotl	671.338 dyne/cm ²	-57.7675 dyne/cm ²
scal1	0.0	0.0
seebeck	0.0 V/K	0.0 V/K
shgc	0.0	0.0
spech	1.81 J/g-K	1.004 J/g-K
temp	50.0 C	50.0 C
transmiss	0.0	0.0
turbd	49946800000000.0 cm ² /s ³	2.21244e-10 cm ² /s ³
turbk	9677350.0 cm ² /s ²	1.83829e-08 cm ² /s ²
ufactor	0.0	0.0
visc	0.0001817 g/cm-s	0.0 g/cm-s
vx vel	1081.68 cm/s	-80.1574 cm/s
vy vel	297.436 cm/s	-291.217 cm/s
vz vel	190.432 cm/s	-198.357 cm/s
wrough	0.0 cm	0.0 cm

Component Thermal Summary

PART	MINIMUM TEMPERATURE	MAXIMUM TEMPERATURE	VOLUME AVERAGED TEMPERATURE
Part1.Body3_U_Part1.Body2	50	50	50
Part1.Body3	50	50	50
Part1.Body5_U_Part1.Body3	50	50	50
Part1.Body3	50	50	50
Part1.Body4_U_Part1.Body3	50	50	50
Part1.Body3_U_Part1.Body1	50	50	50
CFDCreatedVolume	50	50	50

Fluid Forces on Walls

pressx	50059.0 dynes
pressy	-8823.3 dynes
pressz	31120.0 dynes
shearx	4754.1 dynes
sheary	-64.769 dynes
shearz	53.518 dynes

Decision Center

SUMMARY IMAGES

IMAGE 01

Design 1::Scenario 1

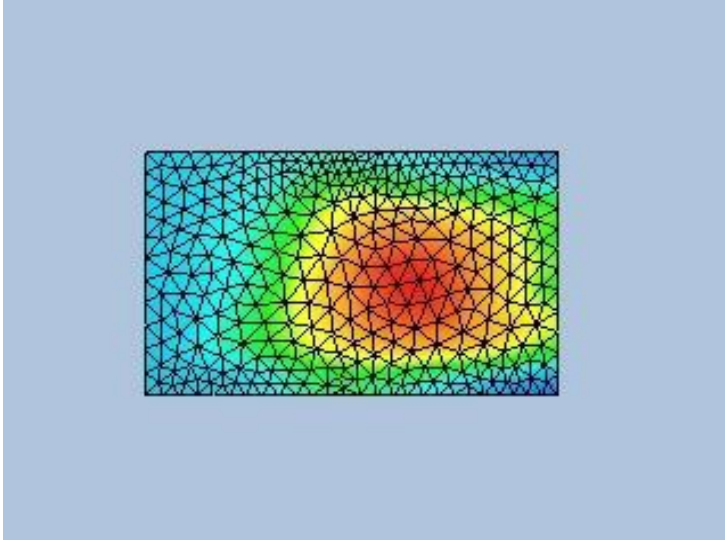


IMAGE 02

Design 1::Scenario 1

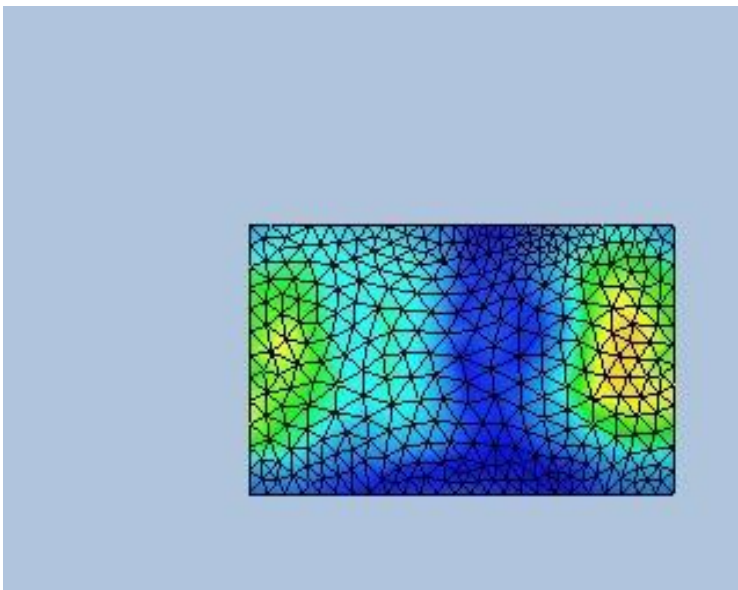


IMAGE 03

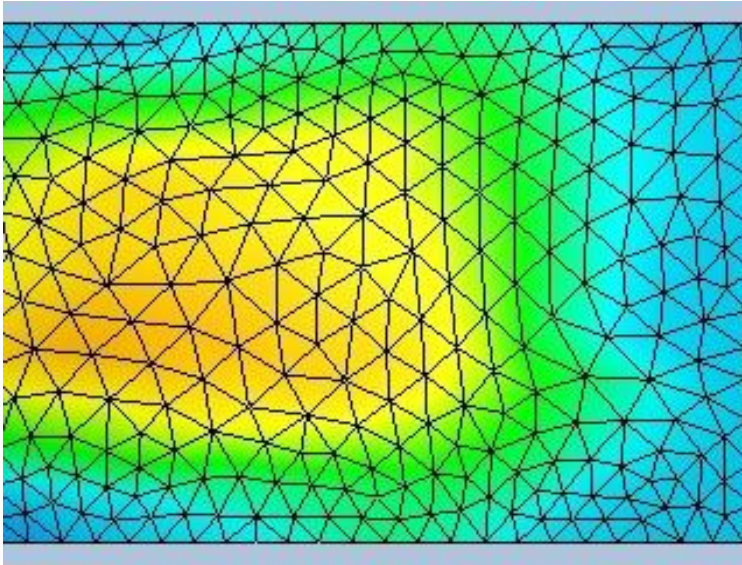
Design 1::Scenario 1

IMAGE 04

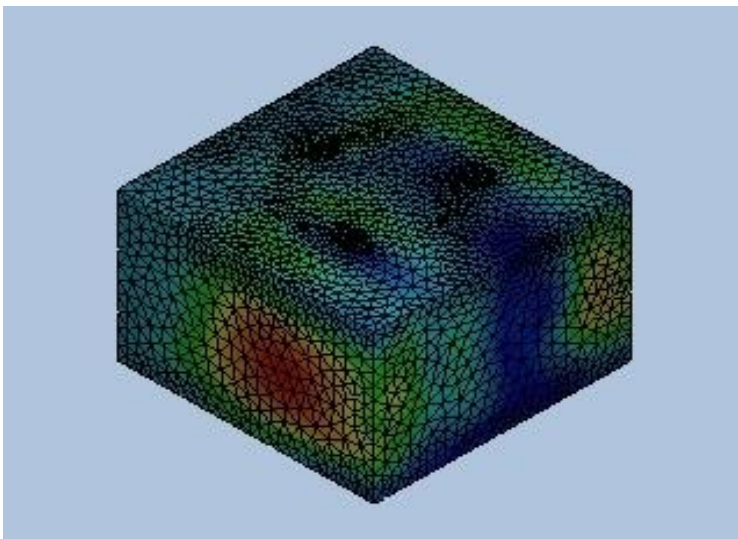
Design 1::Scenario 1

IMAGE 05

Design 1::Scenario 1

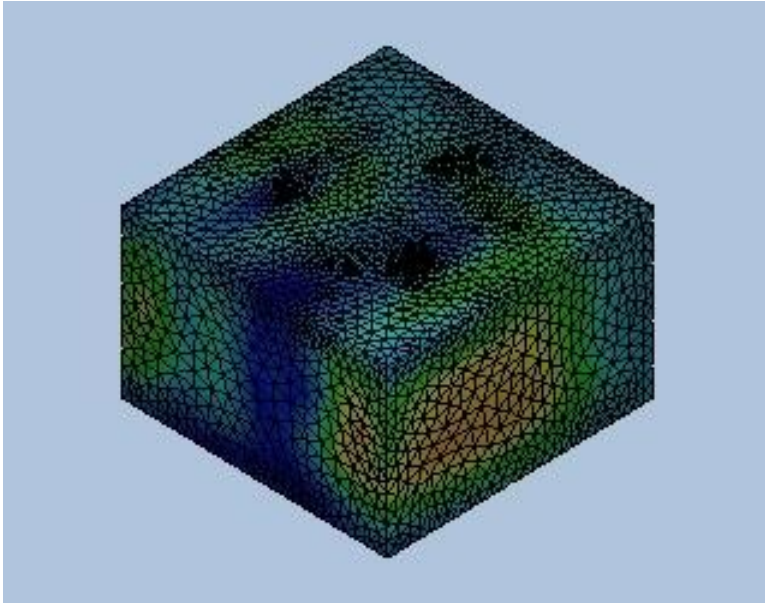
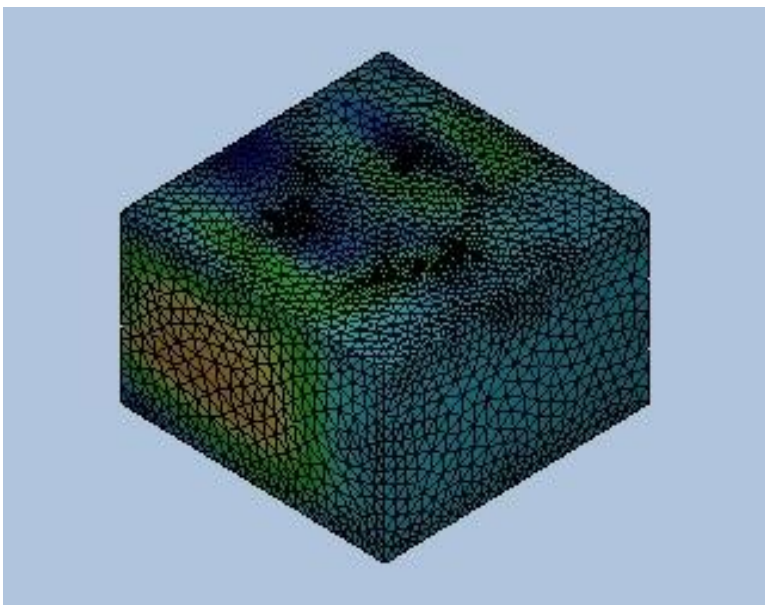


IMAGE 06

Design 1::Scenario 1



SUMMARY PARTS

SUMMARY PART 1

RESULT QUANTITY	DESIGN 1::SCENARIO 1
Avg Temperature	50.0
Max Temperature	50.0
Min Temperature	50.0
Volume	40.8291

SUMMARY PART 2

RESULT QUANTITY	DESIGN 1::SCENARIO 1
Avg Temperature	50.0
Max Temperature	50.0
Min Temperature	50.0
Volume	941.711

SUMMARY PART 7

RESULT QUANTITY	DESIGN 1::SCENARIO 1
Avg Temperature	50.0
Max Temperature	50.0
Min Temperature	50.0
Volume	20521.1