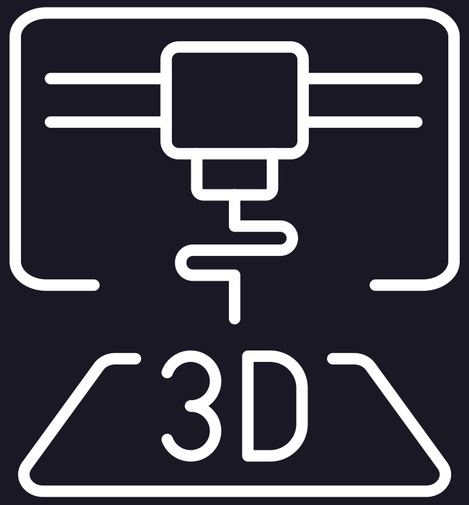


ISTE - CLUTCH

ADDITIVE MANUFACTURING SIMULATION

RAGHAV GANESH

MATCHA NITIN

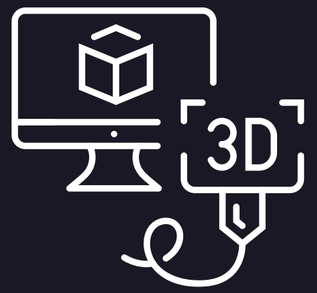
D KARAN

SHAIK DILSHAD

THAKUR OM

LUCKY RAYI

MINI TASKS



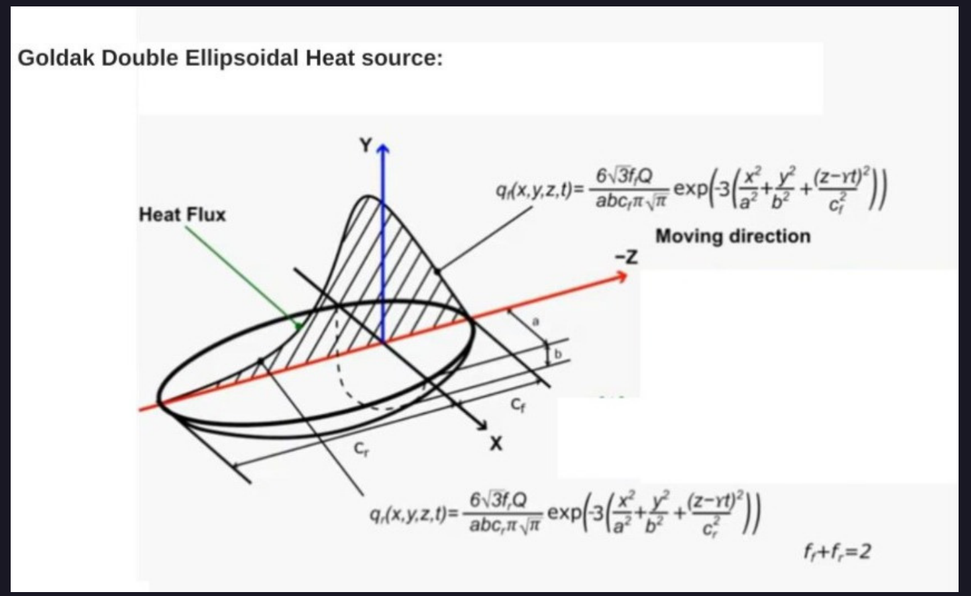
Heat Source Models
-> Uniform x2
-> Gaussian x2
-> Goldaks DE

Birth & Death
Simulation

Reverse Engineering
Simulation

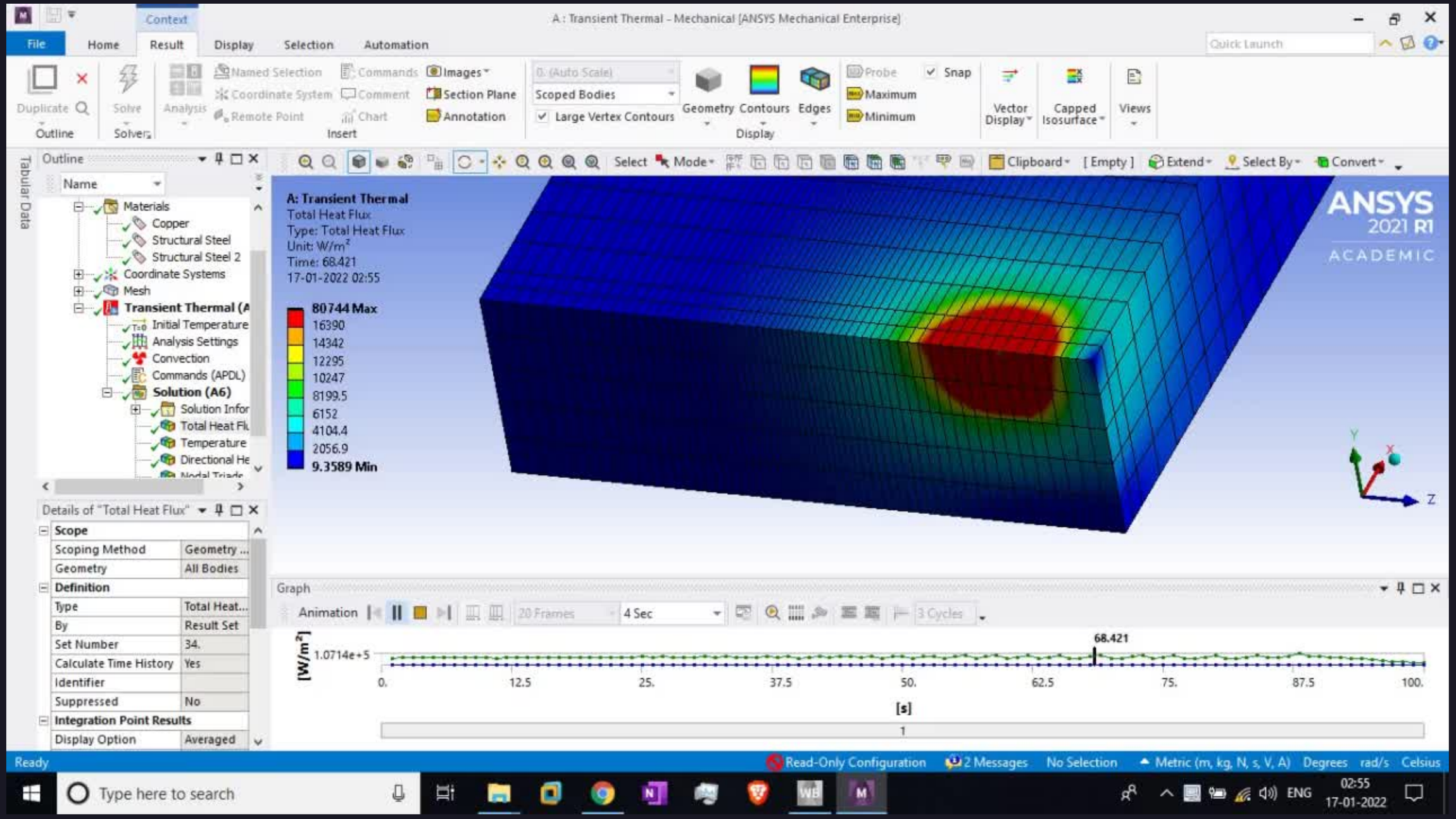
HEAT SOURCE SIMULATIONS

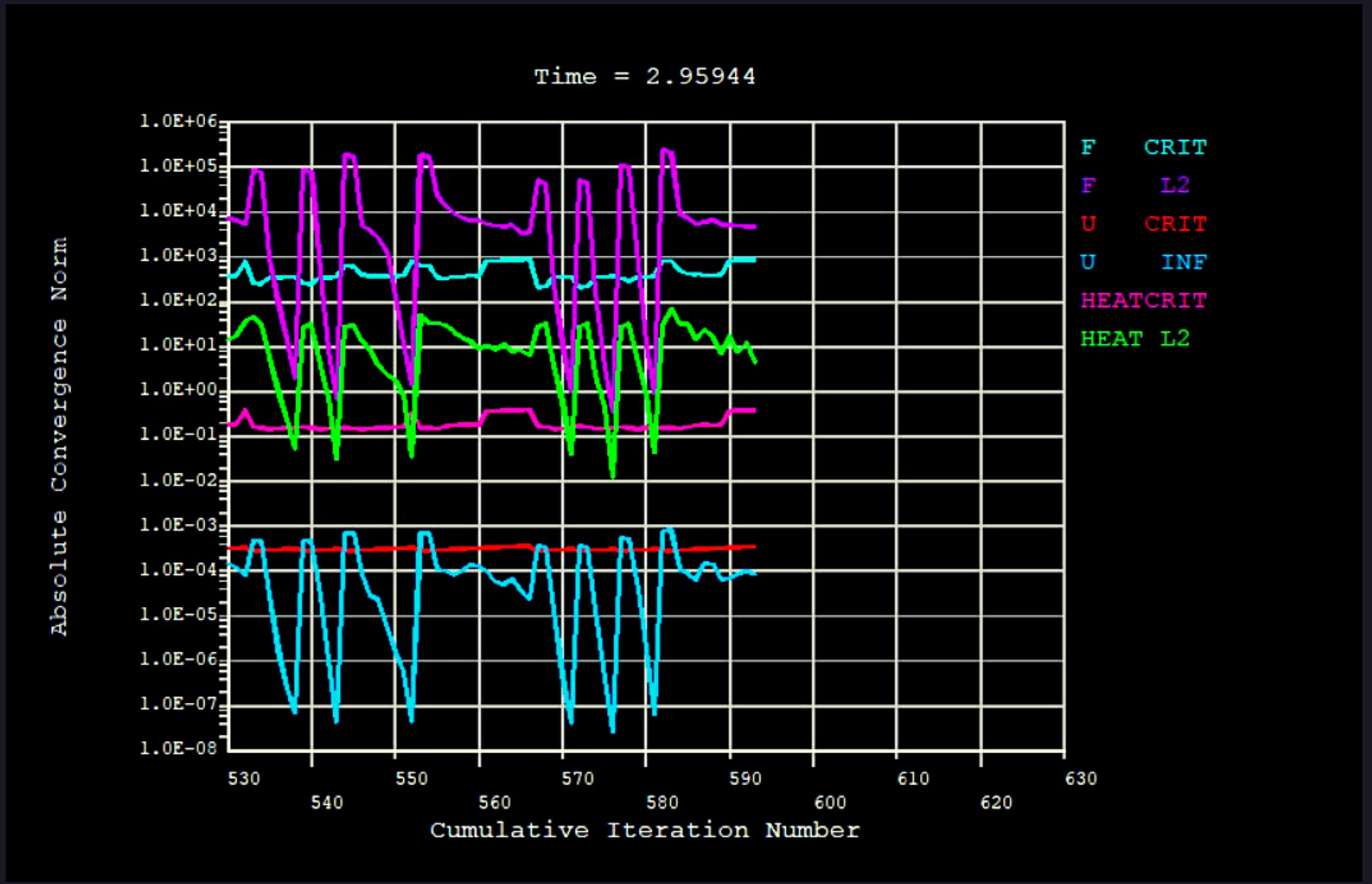
- APDL Scripting.
- Transient thermal analysis.
- Encountered several errors.
- Debugging.

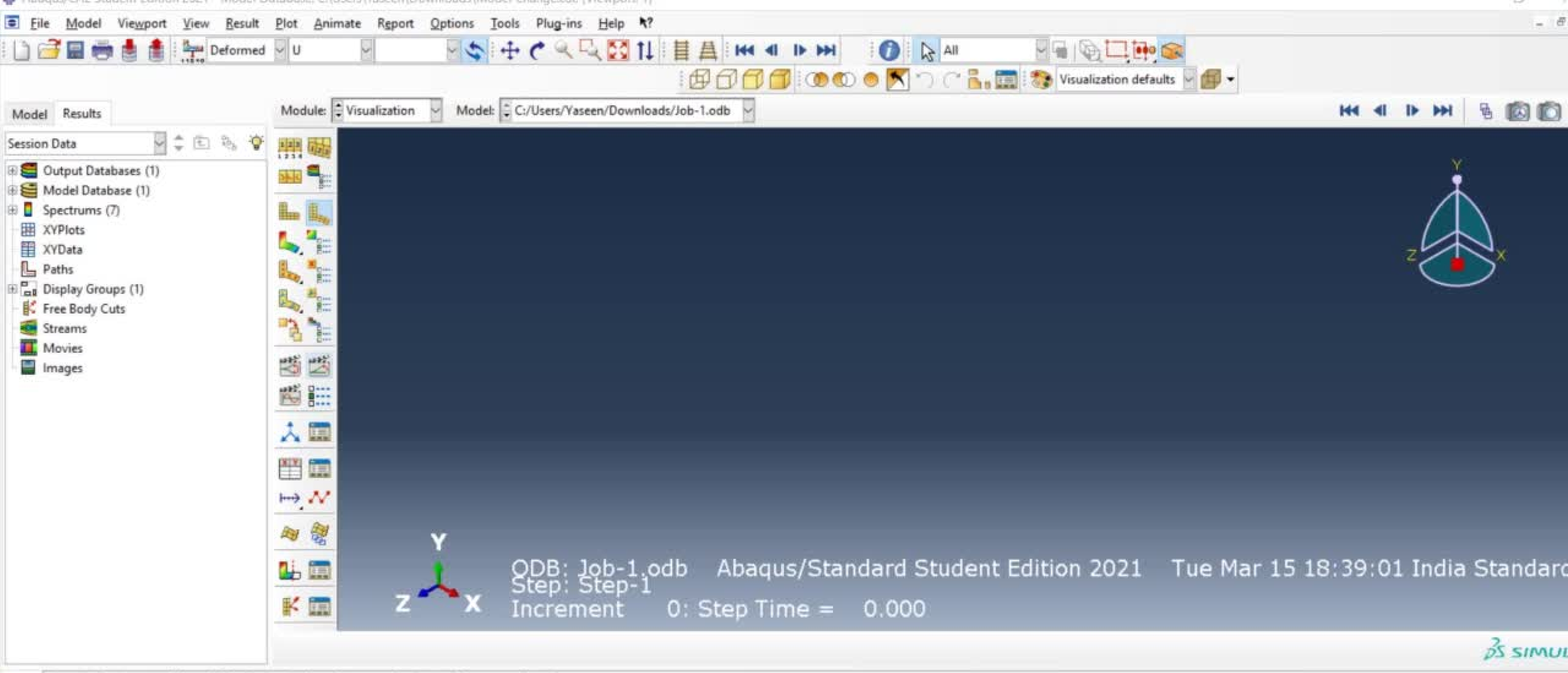


REVERSE ENGINEERING

- Analyzing .dat and .cdb files of FSW.
- Documenting the findings.


A : Transient Thermal - Mechanical [ANSYS Mechanical Enterprise]
File
Home
Result
Display
Selection
Automation
Context
Duplicate
Outline
Solve
Solver
Analysis
Named Selection
Coordinate System
Remote Point
Commands
Comment
Chart
Images
Section Plane
Annotation
Insert
Scoped Bodies
Large Vertex Contours
Geometry
Contours
Edges
Display
Probe
Maximum
Minimum
Snap
Vector Display
Capped Isosurface
Views
Outline
Name
Materials
Copper
Structural Steel
Structural Steel 2
Coordinate Systems
Mesh
Transient Thermal (A
Initial Temperature
Analysis Settings
Convection
Commands (APDL)
Solution (A6)
Solution Infor
Total Heat Flu
Temperature
Directional He
Tabular Data
Details of "Total Heat Flux"
Scope
Scoping Method
Geometry ...
Geometry
All Bodies
Definition
Type
Total Heat...
By
Result Set
Set Number
34.
Calculate Time History
Yes
Identifier
Suppressed
No
Integration Point Results
Display Option
Averaged
Select
Mode
Clipboard
[Empty]
Extend
Select By
Convert
A: Transient Thermal
Total Heat Flux
Type: Total Heat Flux
Unit: W/m²
Time: 68.421
17-01-2022 02:55
80744 Max
16390
14342
12295
10247
8199.5
6152
4104.4
2056.9
9.3589 Min
ANSYS
2021 R1
ACADEMIC
Y
X
Z
Graph
Animation
20 Frames
4 Sec
3 Cycles
68.421
1.0714e+5
[W/m²]
0.
12.5
25.
37.5
50.
62.5
75.
87.5
100.
[s]
1
Ready
Read-Only Configuration
2 Messages
No Selection
Metric (m, kg, N, s, V, A)
Degrees
rad/s
Celsius
Type here to search
ENG
02:55
17-01-2022

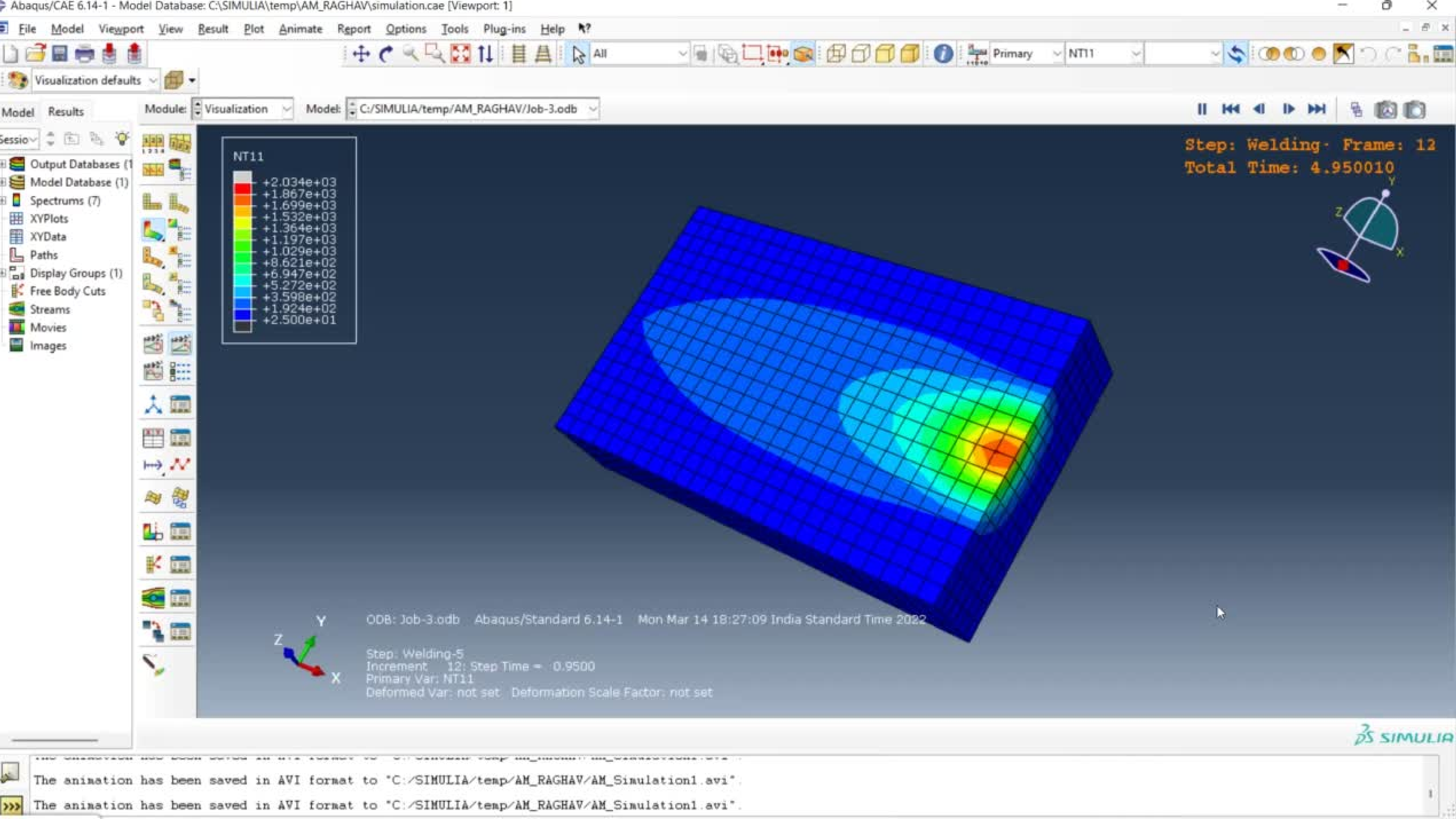

Time = 2.95944
Absolute Convergence Norm
1.0E+06
1.0E+05
1.0E+04
1.0E+03
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
1.0E-03
1.0E-04
1.0E-05
1.0E-06
1.0E-07
1.0E-08
530
540
550
560
570
580
590
600
610
620
630
Cumulative Iteration Number
F CRIT
F L2
U CRIT
U INF
HEATCRIT
HEAT L2



BIRTH AND DEATH SIMULATION

POINTERS

- Built MVP for simulation
- Integrated & Analyzed Goldak's Double ellipsoidal model for AM simulation
- Wrote several scripts in fortran for HeatFlux simulations
- Implemented Birth and Death technique using python
- Heterogenous Computing + Advanced threading + parallelization
- Implemented Residual Stress analysis to validate Product Quality Testing


Abaqus/CAE 6.14-1 - Model Database: C:\SIMULIA\temp\AM_RAGHAV\simulation.cae [Viewport: 1]
File Model Viewport View Result Plot Animate Report Options Tools Plug-ins Help
Visualization defaults
Model Results
Module: Visualization
Model: C:/SIMULIA/temp/AM_RAGHAV/Job-3.odb
Output Databases (1)
Model Database (1)
Spectrums (7)
XYPlots
XYData
Paths
Display Groups (1)
Free Body Cuts
Streams
Movies
Images
NT11
+2.034e+03
+1.867e+03
+1.699e+03
+1.532e+03
+1.364e+03
+1.197e+03
+1.029e+03
+8.621e+02
+6.947e+02
+5.272e+02
+3.598e+02
+1.924e+02
+2.500e+01
Step: Welding- Frame: 12
Total Time: 4.950010
ODB: Job-3.odb Abaqus/Standard 6.14-1 Mon Mar 14 18:27:09 India Standard Time 2022
Step: Welding-5
Increment 12: Step Time = 0.9500
Primary Var: NT11
Deformed Var: not set Deformation Scale Factor: not set
The animation has been saved in AVI format to "C:/SIMULIA/temp/AM_RAGHAV/AM_Simulation1.avi".
The animation has been saved in AVI format to "C:/SIMULIA/temp/AM_RAGHAV/AM_Simulation1.avi".

THANK YOU