

DSG Ansys R&D Meeting Minutes

Date: August 10, 2023

Time: 2:00 PM – 3:00 PM

Attendees: Aaron Brown, Pablo Campero, Brian Eng, Tyler Lemon, and Marc McMullen

1. NPS thermal analysis with Ansys Mechanical

Aaron Brown, Brian Eng, and Tyler Lemon

1. Redoing plots of Ansys transient thermal simulation results
 - Removed slopes from each plot
 - Curve fitting for the data acquired is in progress
2. Discussed completed Python plots with different functions
 - Made plots fitting the data with exponential functions
 - A better fit curve for the data worked using an arctangent function if x -axis is shifted to start at $t=0$. Function: $y = -2.59 * \arctan(-0.06*t) + 21.01$

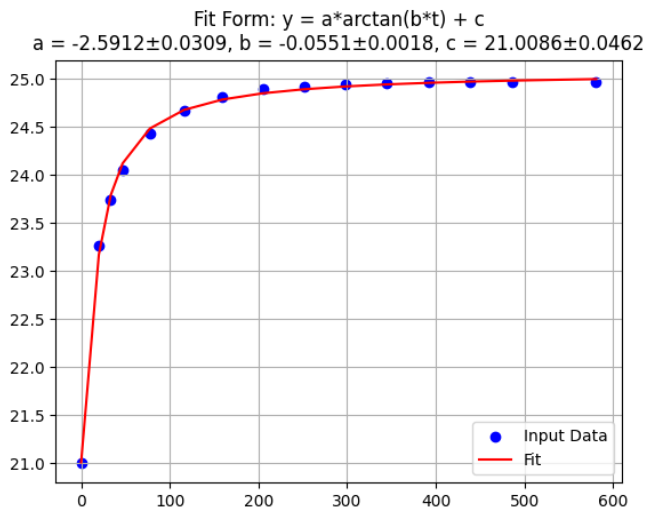


Fig.1. Red line is the curve fitted with the arctangent function. Y-axis is the temperature in $^{\circ}$ C and the x-axis is the time in seconds

2. NPS thermal analysis with Ansys Fluent

Pablo Campero and Brian Eng

1. Completed surface mesh of the model
 - Sent CAD and surface mesh files (archived version) to Ansys support
2. Received error message during volume mesh, due to memory allocation failure
 - Contacted Ansys Fluent support to solve issue
 - Per Ansys support, the volume mesh for the sent model was completed, but with 160 M cells and using Ansys cluster for the amount of computer memory (RAM) in the computer used for the mesh
3. Researched the relation between the number of cells for the mesh and computer memory
 - Ansys recommends 1M cells per 2GB of RAM; the computer used (EXP-CAMPERO-PC) cannot handle that number of cells
 - EXP-CAMPERO-PC has 64 GB of memory and 10 processors; maximum RAM that could be installed is 512 GB distributed in 8 slots

4. Contacted JLAB support for access to the High-Performance Computing (HPC) licenses and to a computer with larger RAM and processors
 - All JLAB Ansys users should have access to the “anshpc” licenses; six licenses are available
 - Access to PHYCOMP2 computer, with 256 GB of RAM and 12 processors, was given
 - Migrated Ansys project files to PHYCOMP2 and started mesh of the model
5. As an alternative, researching methods of reducing the number of cells for the mesh without affecting quality of simulation
 - Reducing cells will make the simulation faster
 - Technique may help with future complex models