**Property values and parameters used:**

**Now doing analytical calculations:**

Cladding inner temperature,

Fuel surface temperature,

Fuel center-line temperature,

From the analytical solution, minimum and maximum temperatures were found as 550 K and 1762.97 K, respectively, and according to the simulation conditions provided for the project, two different modes of simulation were run, steady state and transient state.

**Steady State:** For steady state, a graph was obtained from the paraview software using the output file of the moose input file that was obtained from the simulation. Both the input and output files were submitted with the project. The graph below shows the temperature range of up to 720k from 550k. Which is very less in range and too much of an error. The problems can lie in defining the parameters in specific units.

A red and blue gradient

Description automatically generated

Fig-1: Steady state heat transport

**Transient:** A similar approach was taken for transient analysis as well. And the temperature range is much higher than it was in steady state. If the problem lies in using proper units as assumed for steady state, this can be explained. Because for transient analysis, more types of property values were used. So, the error increased.

A red and blue rectangle

Description automatically generated

Fig-2: Transient heat transport

**In conclusion,** Moose was used to perform both the steady state and transient heat transfer analysis for a specific geometry and conditions with the property values taken as mentioned in the first sections. Large error was encountered maybe due to –

1. Meshing number being very small in both sides (x, y direction)
2. Problems using units and other properties. For analytical calculation, only LHR and other given parameters were used. But for transient analysis, specific heat capacity, density etc. was used which may lead to a very large error in transient state analysis. As more property value was used, the error may be increased for this reason of using proper units for the properties.