ENGR 219: Numerical Methods Name: Syeduzzaman Khan

Computer Project# 12

E.

1. Node = 5



Figure 1: The figure shows the 1-D heat conduction using finite element analysis. The numerical solution is plotted for nodes=5. The numerical solution matches with analytical solution almost perfectly.

1. Node=50



Figure 2: The figure shows the 1-D heat conduction using finite element analysis. The numerical solution is plotted for nodes=50. The numerical solution matches with analytical solution almost perfectly.

Accuracy Comparison:

Finite element analysis has been implemented for a simple problem 1-D heat conducting problem. Therefore, the accuracy rate is almost similar for both nodes 5 & 50. The important facts are that the boundary conditions are in derivative format instead of just points. That makes the numerical solution exactly equal to analytical solution at boundary points.

On the other hand, the numerical solutions between boundary values for both nodes does not display huge difference. I have look into the values manually and found the error rate less than 1%.