

Week1 Assignment

Question:

A short summary about the conductive heat transfer and solving the same exercise with $L=0.4\text{m}$, $A=20\text{ m}^2$, $\Delta T=25$, and $k=0.78\text{W/m K}$ using both simple and using the resistance concept

Summary:

Heat transfer through the wall of a house can be modeled as steady and one-dimensional. The temperature of the wall in this case depends on one direction only (say the x-direction) and can be expressed as $T(x)$.

Solution:

Simple Method:

$$Q = KA \frac{\Delta T}{L} = 0.78 \times 20 \times \frac{25}{0.4} = 975(\text{W})$$

Resistance Method:

$$R_{WALL} = \frac{L}{KA} = \frac{0.4}{0.78 \times 20} \approx 0.0256(^{\circ}\text{C} / \text{W})$$
$$Q = \frac{\Delta T}{R_{WALL}} = \frac{25}{0.0256} \approx 976.6(\text{W})$$