

Week 1 homework

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 method and using the resistance concept.

Conductive heat transfer: conductive heat transfer is the transfer of heat between two elements due to temperature difference. And it depends on some factors like area, thickness, material of objects and temperature difference.

Simple method:

$$\dot{Q} = kA \frac{\Delta T}{L} = 0.78 \times 20 \times \frac{25}{0.4} = 975 \text{ W}$$

Resistance concept:

$$R_{\text{wall}} = \frac{L}{kA} = \frac{0.4}{0.78 \times 20} = 0.0256 \text{ K/W}$$

$$\dot{Q} = \frac{\Delta T}{R_{\text{wall}}} = \frac{25}{0.0256} = 975.039 \text{ W}$$