WEEK 1

2019年10月6日 18:34

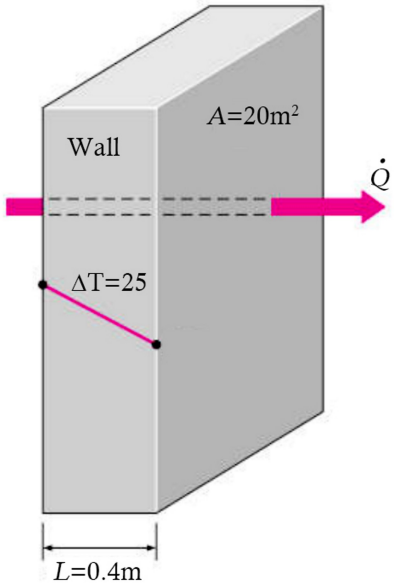
QUESTION:
A short summary about the conductive heat transfer and solving the same exercise with L= 0.4 m, A= 20 m2, DeltaT= 25, and k=0.78 W/m K using both simple method and using the resistance concept

1. SUMMARY OF CONDUCTIVE HEAT TRANSFER:

- The rate of energy transgfered from the more energetic particles of a substance to the adjacent less energetic ones as a result of temperature difference.
- In the steady operation, the rate of heat transfer through the wall is constant.

  * x⟶T(x) is a linear function.

  [Ref: Y. A. Cengel, Heat Transfer, a practical approach]



2. 1) SIMPLE METHOD:

$\dot{Q} = kA\frac{\Delta T}{L} = 0.78 W/m\,K \times 20 m^2 \times 25K \div 0.4m = 975W$

2) THERMAL RESISTANCE CONCEPT:

$R_{wall} = \frac{L}{kA} = 0.4m \div (0.78 W/m\,K \times 20 m^2) \approx 0.02564\ K/W$

$\dot{Q} = \frac{\Delta T}{Rwall} = 25K \div 0.02564 K/W \approx 975.04W$