# CONDUCTIVE HEAT TRANSFER

Monday, October 7, 2019 10:06 PM

Politecnico di Milano
MSc. Sustainable Architecture and Landscape Design
07/october/2019

The heat transfer through the wall of a house can be one-dimensional, one direction only. In this case, the rate of heat transfer is constant.

Heat transfer through a wall is proportional to its area, to the difference of temperature and conductivity of the material; and inversely proportional to the thickness of the wall.

$$\dot{Q} = \frac{dQ}{dt}\ \frac{Energy}{time}\left(\frac{J}{s}\right) \rightarrow W\ Power$$

## Exercises:

Find the rate of heat trasfer through the wall if k=0.78 W/m C, A= 20m2, ΔT=25, L= 0.4m, using both: simple method and using the resistance concept.

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

$$R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78 * 20} = 0.02564\ °C/W$$

$$\dot{Q} = \frac{\Delta T}{R_{Wall}} = \frac{25}{0.02564} = 975.039\ W$$