

If we have a wire or other material of cross-section $A(x)$ then the thermal transport between point x_1 and x_2 is given by

$$\dot{Q} = -G(\theta_2 - \theta_1) \text{ where } \theta_1 = \int_0^{T_1} K(T)dT \text{ and } \frac{1}{G} = \int_{x_1}^{x_2} \frac{dx}{A(x)}. \text{ For } A(x) = \text{constant } G=A/L$$