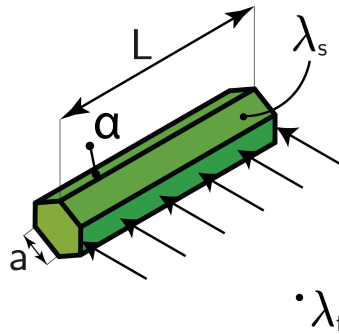


Nusselt Number 05

Give an expression for the Nusselt number in terms of given variables.

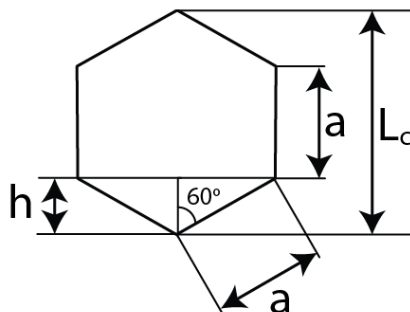


The standard expression for the Nusselt number is:

$$\text{Nu} = \frac{\alpha L_c}{\lambda_{\text{fluid}}}$$

The characteristic length has to be determined. For transverse flow along a cylinder, this is the height of the cylinder from top to bottom.

Which in the given situation can be determined by the use of trigonometry:



$$\cos(60^\circ) = \frac{h}{a}$$

$$h = a \cos(60^\circ) = \frac{a}{2}$$

$$L_c = a + 2h = 2a$$

And therefore the Nusselt number can be expressed as:

$$\text{Nu} = \frac{2\alpha a}{\lambda_f}$$