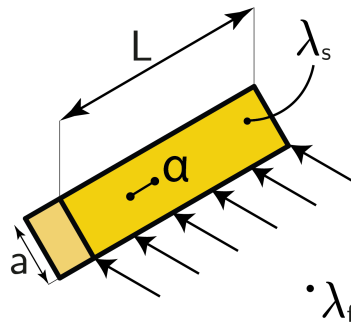


# Nusselt Number 03

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

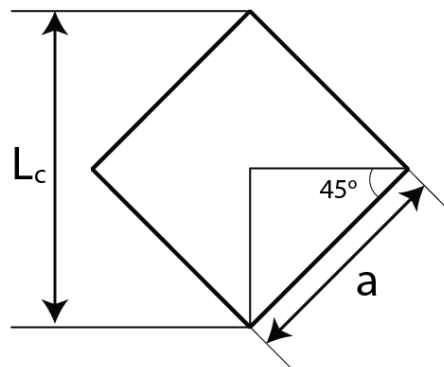


The standard expression for the Nusselt number is:

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

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:



$$\sin(45^\circ) = \frac{0.5L_c}{a}$$

$$L_c = 2a \sin(45^\circ) = \frac{2a}{\sqrt{2}} = a\sqrt{2}$$

And therefore the Nusselt number can be expressed as:

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