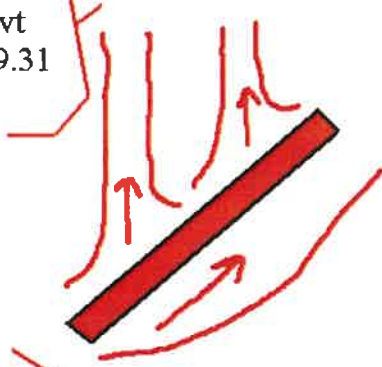


$$h = \cos(\theta) h_{hz} + (1 - \cos(\theta)) h_{vt}$$

h\_hz: eq. 9.30/9.31  
h\_vt: eq. 9.26

Upper surface

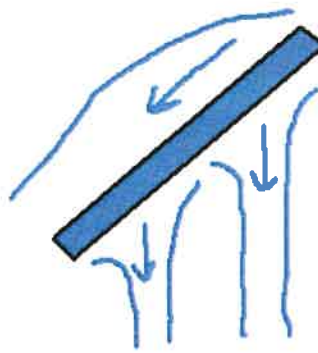


$$h = \cos(\theta) h_{hz} + (1 - \cos(\theta)) h_{vt}$$

h\_hz: eq. 9.32  
h\_vt: eq. 9.26

Lower surface

Upper surface



$$h = \cos(\theta) h_{hz} + (1 - \cos(\theta)) h_{vt}$$

h\_hz: eq. 9.32  
h\_vt: eq. 9.26

$$h = \cos(\theta) h_{hz} + (1 - \cos(\theta)) h_{vt}$$

h\_hz: eq. 9.30/9.31  
h\_vt: eq. 9.26

Lower surface

Upper Surface

$$h = (\cos \theta)(1) + (1 - \cos \theta)(2)$$

$$(1) = \overline{Nu}_L = 0.27 Re_L^{1/4} \rightarrow \text{For } (1) \quad L = \frac{A_s}{P}$$

$$(2) = \overline{Nu}_L = \left\{ 0.825 + \frac{0.387 Re_L^{1/6}}{\left[ 1 + \left( \frac{0.492}{Pr} \right)^{9/16} \right]^{8/27}} \right\}^2 \rightarrow \text{For } (2) \quad L = L$$

Lower Surface

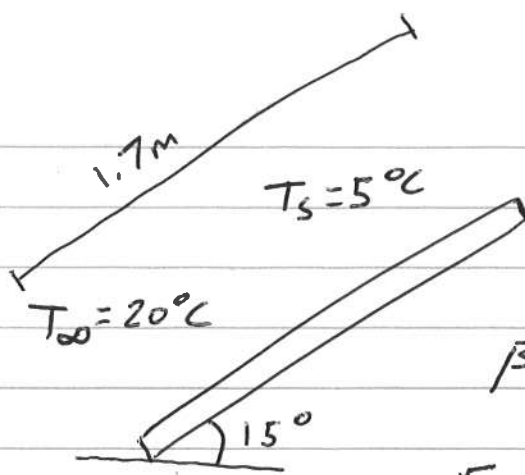
$$h = (\cos \theta)(3) + (1 - \cos \theta)(2)$$

$$(3) = 0.15 Re_L^{1/3} \rightarrow \text{For } (3) \quad L = \frac{A_s}{P}$$

$$Re_L = \frac{g \beta (T_s - T_\infty) L^3}{\nu \alpha}$$

$\Delta T$

$$\overline{Nu}_L = \frac{\bar{h} L}{K}$$



$$A_s = 1.36 \text{ m}^2$$

$$P = 5 \text{ m}$$

$$k = 0.02428 \text{ W/mK}$$

$$g = 9.8 \text{ m/s}^2$$

$$Pr = 0.713$$

$$T_f = \frac{25}{2} = 12.5^\circ\text{C}$$

$$\beta = \frac{1}{285.5}$$

$$\Gamma = 1.343 \times 10^{-5} \text{ m}^2/\text{s}$$

$$\alpha = 14.2 \times 10^{-6} \text{ m}^2/\text{s}$$

$$\Delta T = 15 \text{ K}$$

$$\textcircled{1} \text{ For } Ra_L = \frac{9.81 \left( \frac{1}{285.5} \right) 15 \times 0.272^3}{1.343 \times 10^{-5} \times 14.2 \times 10^{-6}} = 40223849$$

$$\textcircled{2} \text{ For } Ra_L = \frac{9.81 \left( \frac{1}{285.5} \right) 15 \times 1.7^3}{1.343 \times 10^{-5} \times 14.2 \times 10^{-6}} = 9820275610$$

$$\textcircled{1} = 0.27 \times 40223849^{1/4} = 21.5 \Rightarrow h = \frac{21.5 \times 0.02428}{0.272} = 1.92 \text{ W/m}^2\text{K}$$

$$\textcircled{2} \left[ 0.825 + \frac{17.91}{1.193} \right]^2 = 215.02 \Rightarrow h = \frac{215.02 \times 0.02428}{1.7} = 3.6 \text{ W/m}^2\text{K}$$

$$\textcircled{3} = 0.15 \times 40223849^{1/3} = 51.4 \Rightarrow h = \frac{51.4 \times 0.02428}{0.272} = 4.6 \text{ W/m}^2\text{K}$$

$$\text{Upper } S = (\cos(15^\circ) \times 1.92) + ((1 - \cos(15^\circ)) \times 3.6) = 1.99 \text{ W/m}^2\text{K}$$

$$\text{Lower } S = (\cos 15 \times 4.6) + ((1 - \cos 15) \times 3.6) = 4.57 \text{ W/m}^2\text{K}$$

$$Q_u = h A (\pi) = 1.99 \times 1.36 \times 15 = 40.6 \text{ W}$$

$$Q_L = 4.57 \times 1.36 \times 15 = 93.3 \text{ W}$$