Special case of LMTD

(1) $\Theta_1 = \Theta_2 = \Theta$

$$\Theta_m = \frac{\Theta_2 - \Theta_1}{\ln \Theta_2/\Theta_1}$$

$$\Theta_m = \frac{0}{\ln 1} = \frac{0}{0}$$

Indeterminate form.

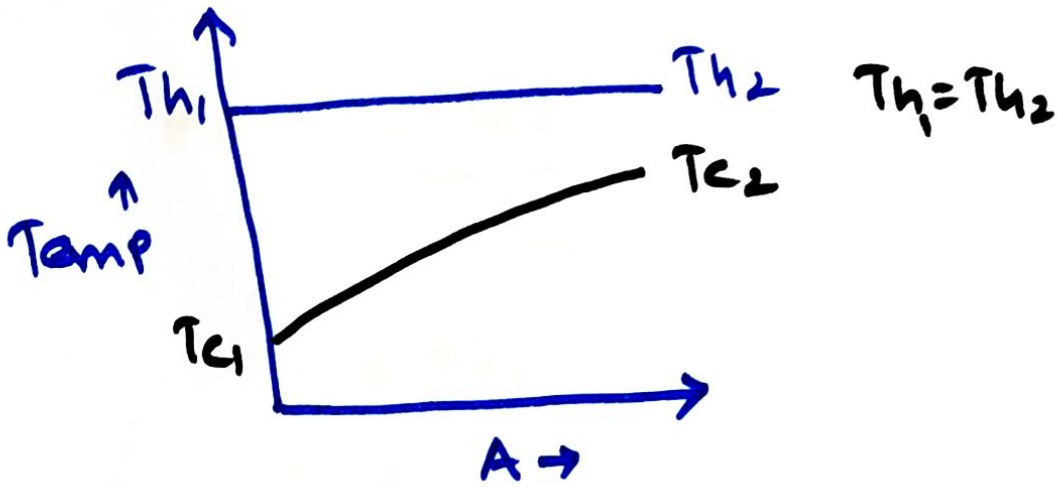
L hospital's Rule

$$\lim_{\Theta_2 \to \Theta_1} \frac{\frac{\partial}{\partial \Theta_1}(\Theta_2 - \Theta_1)}{\frac{\partial}{\partial \Theta_1}(\ln \Theta_2/\Theta_1)}$$

$$= 1/1/\Theta_1 = \Theta_1 = \Theta_2 = \Theta$$

$$Q = UA\Theta_1 = UA\Theta_2 = UA\Theta$$

LMTD for condenser.



$Th_1 = Th_2$

$\Theta_1 = Th_1 - Tc_1$

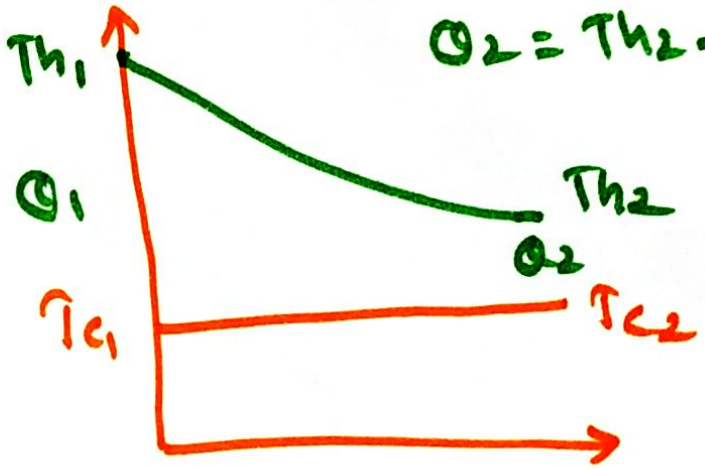
$\Theta_2 = Th_2 - Tc_2$

$$\Theta_m = \frac{\Theta_1 - \Theta_2}{\ln \Theta_1/\Theta_2}$$

evaporator.

$\Theta_1 = Th_1 - Tc_1$

$\Theta_2 = Th_2 - Tc_2$



⇒ Correction factor for multipass Heat Exchanger

$$Q = U A \Theta_m F$$

$$R = \frac{(mc)_{min}}{(m \cdot c)_{max}}$$

$$m_c c_c (T_{c_2} - T_{c_1}) = m_h c_h (T_{h_1} - T_{h_2})$$

$$R = \frac{T_{h_2} - T_{h_1}}{T_{c_2} - T_{c_1}}$$

$$R = \frac{\text{Temp. Drop of heat fluid}}{\text{Temp. rise of cold fluid}}$$

$$P = \frac{T_{c_2} - T_{c_1}}{T_{h_1} - T_{c_1}}$$

$T_{c_2} = T_{h_1}$

$P = 1$

$T_{c_2} = T_{c_1}$

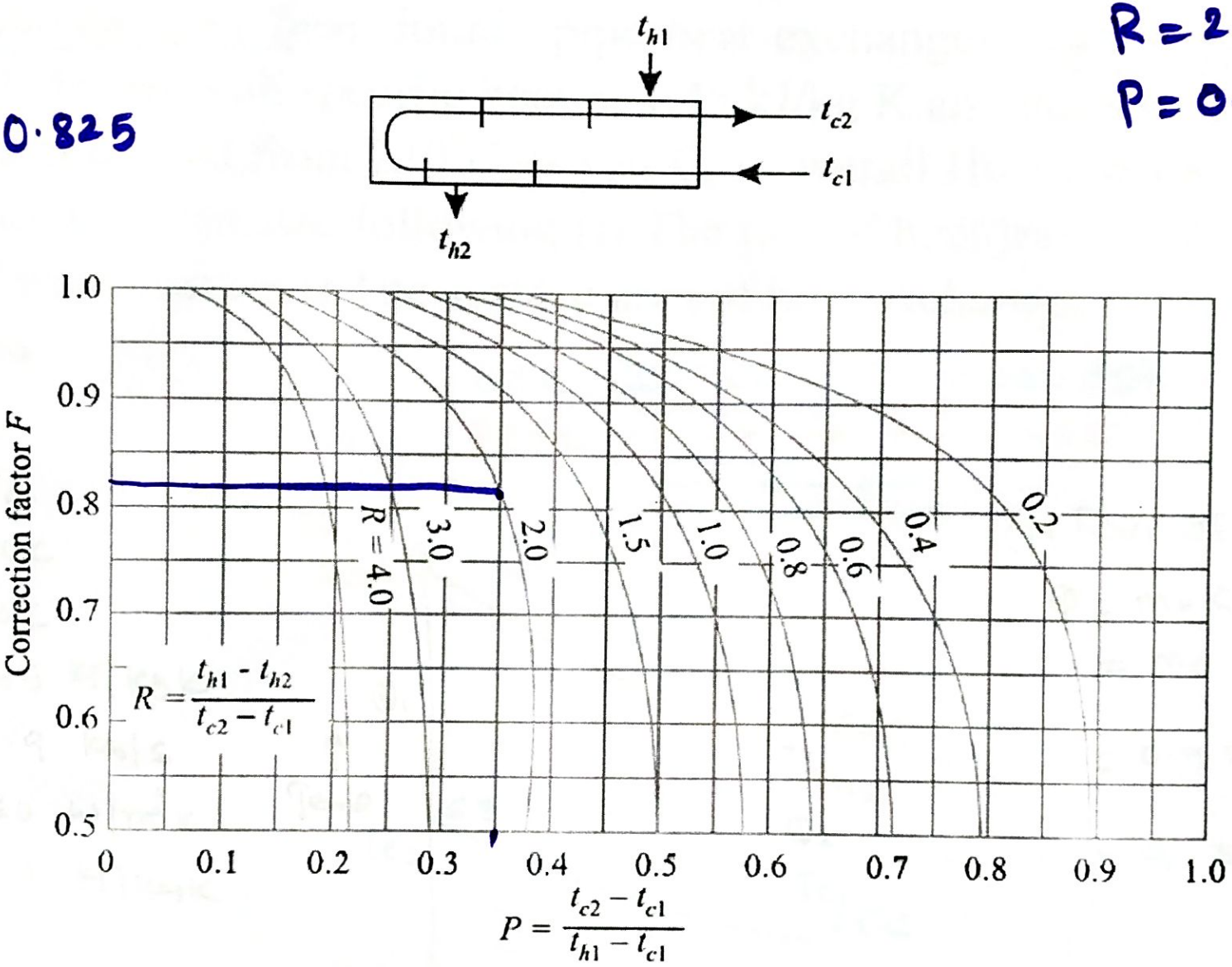
$P = 0$

P vary in the Range of 0 to 1

R = 2.0

P = 0.35

F = 0.825



Correction factor plot for heat exchanger with one shell pass and two, four or any multiple of tube passes.