PARTE II

EXERCÍCIO I

CONDIÇÃO DE ALETA INFINITA

$$\frac{T - T_\infty}{T_b - T_\infty} = e^{-m \cdot x} = e^{-\sqrt{\frac{h \cdot P}{k \cdot A_{tr}}} \cdot x}$$

CONDIÇÃO A

$$\frac{T_a - T_\infty}{T_{base} - T_\infty} = e^{-\sqrt{\frac{h \cdot P}{k_a \cdot A_{tr}}} \cdot x}$$

CONDIÇÃO B

$$\frac{T_b - T_\infty}{T_{b_b} - T_\infty} = e^{-\sqrt{\frac{h \cdot P}{k_b \cdot A_{tr}}} \cdot x}$$

DIVIDINDO UM PELO OUTRO

$$\frac{T_a - T_\infty}{T_{b_a} - T_\infty} \cdot \frac{T_{b_b} - T_\infty}{T_b - T_\infty} = e^{\sqrt{\frac{h \cdot P}{k_b \cdot A_{tr}}} \cdot x - \sqrt{\frac{h \cdot P}{k_a \cdot A_{tr}}} \cdot x}$$

$$\frac{T_a \cdot T_{b_b} - T_\infty \cdot T_{b_b} - T_\infty \cdot T_a + T_\infty^2}{T_{b_a} \cdot T_b - T_b \cdot T_\infty - T_{b_a} \cdot T_\infty + T_\infty^2} = e^{\sqrt{\frac{h \cdot P}{k_b \cdot A_{tr}}} \cdot x - \sqrt{\frac{h \cdot P}{k_a \cdot A_{tr}}} \cdot x}$$

$$\ln\left(\frac{T_a \cdot T_{b_b} - T_\infty \cdot T_{b_b} - T_\infty \cdot T_a + T_\infty^2}{T_{b_a} \cdot T_b - T_b \cdot T_\infty - T_{b_a} \cdot T_\infty + T_\infty^2}\right) = \sqrt{\frac{h \cdot P}{k_b \cdot A_{tr}}} \cdot x - \sqrt{\frac{h \cdot P}{k_a \cdot A_{tr}}} \cdot x$$

$$\ln\left(\frac{T_a \cdot T_{b_b} - T_\infty \cdot T_{b_b} - T_\infty \cdot T_a + T_\infty^2}{T_{b_a} \cdot T_b - T_b \cdot T_\infty - T_{b_a} \cdot T_\infty + T_\infty^2}\right) = \frac{\sqrt{h \cdot P} \cdot x}{\sqrt{k_b} \cdot \sqrt{A_{tr}}} - \frac{\sqrt{h \cdot P} \cdot x}{\sqrt{k_a} \cdot \sqrt{A_{tr}}}$$

$$\ln\left(\frac{T_A \cdot T_{b_b} - T_\infty \cdot T_{b_b} - T_\infty \cdot T_A + T_\infty^2}{T_{b_a} \cdot T_B - T_B \cdot T_\infty - T_{b_a} \cdot T_\infty + T_\infty^2}\right) = \left(\frac{1}{\sqrt{k_b}} - \frac{1}{\sqrt{k_a}}\right) \cdot \left(\frac{\sqrt{h \cdot P} \cdot x}{\sqrt{A_{tr}}}\right)$$

$$\left(\ln\left(\frac{T_A \cdot T_{base} - T_\infty \cdot T_{base} - T_\infty \cdot T_A + T_\infty^2}{T_{base} \cdot T_B - T_B \cdot T_\infty - T_{b_a} \cdot T_\infty + T_\infty^2}\right)\right) \cdot \frac{\sqrt{A_{tr}}}{\sqrt{h \cdot P} \cdot x} = \left(\frac{1}{\sqrt{k_b}} - \frac{1}{\sqrt{k_a}}\right)$$

$$\left(\ln\left(\frac{T_A \cdot T_{base} - T_\infty \cdot T_{base} - T_\infty \cdot T_A + T_\infty^2}{T_{base} \cdot T_B - T_B \cdot T_\infty - T_{base} \cdot T_\infty + T_\infty^2}\right)\right) \cdot \frac{\sqrt{A_{tr}}}{\sqrt{h \cdot P} \cdot x} + \frac{1}{\sqrt{k_a}} = \frac{1}{\sqrt{k_b}}$$

$$\left(\left(\ln\left(\frac{T_A \cdot T_{base} - T_\infty \cdot T_{base} - T_\infty \cdot T_A + T_\infty^2}{T_{base} \cdot T_B - T_B \cdot T_\infty - T_{base} \cdot T_\infty + T_\infty^2}\right)\right) \cdot \frac{\sqrt{A_{tr}}}{\sqrt{h \cdot P} \cdot x} + \frac{1}{\sqrt{k_a}}\right)^{-1} = \sqrt{k_b}$$

$$\left(\left(\ln\left(\frac{T_A \cdot T_{base} - T_\infty \cdot T_{base} - T_\infty \cdot T_A + T_\infty^2}{T_{base} \cdot T_B - T_B \cdot T_\infty - T_{base} \cdot T_\infty + T_\infty^2}\right)\right) \cdot \left(\frac{\sqrt{h \cdot P} \cdot x}{\sqrt{A_{tr}}}\right)^{-1} + \frac{1}{\sqrt{k_a}}\right)^{-2} = k_b$$

ENCONTRANDO OS PARÂMETROS

$$\frac{T_a - T_\infty}{T_{base} - T_\infty} = e^{-\sqrt{\frac{h \cdot P}{k_a \cdot A_{tr}}} \cdot x}$$

$$\ln\left(\frac{T_a - T_\infty}{T_{base} - T_\infty}\right) = -\frac{1}{\sqrt{k_a}} \cdot \frac{x \cdot \sqrt{h \cdot P}}{\sqrt{A_{tr}}}$$

$$\frac{x \cdot \sqrt{h \cdot P}}{\sqrt{A_{tr}}} = \ln\left(\frac{T_a - T_\infty}{T_{base} - T_\infty}\right) \cdot (-k_a)$$