PARTE II

EXERCÍCIO 1

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

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

IGUALANDO AS EQUAÇÕES

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

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

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

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

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

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

IGUALANDO

$$\ln\left(\frac{T_B - T_\infty}{T_{base} - T_\infty}\right) \cdot (-k_b) = \ln\left(\frac{T_a - T_\infty}{T_{base} - T_\infty}\right) \cdot (-k_a)$$

$$\sqrt{k_b} = -\frac{\ln\left(\frac{T_a - T_\infty}{T_{base} - T_\infty}\right) \cdot (-\sqrt{k_a})}{\ln\left(\frac{T_B - T_\infty}{T_{base} - T_\infty}\right)}$$

MODELO MATEMÁTICO

$$k_b = \left(-\frac{\ln\left(\frac{T_a - T_\infty}{T_{base} - T_\infty}\right) \cdot \left(-\sqrt{k_a}\right)}{\ln\left(\frac{T_B - T_\infty}{T_{base} - T_\infty}\right)} \right)^2$$