

- DATOS
- 1) $\frac{L_D}{D} = 4$
 - 2) Alimentación \Rightarrow líquido saturado (a 4^{ta} burbuja)
 - 3) Equilibrio L-V ~~agua~~
 $x = -0.18905y^3 + 0.83856y^2 + 0.35164y - 0.00313$

Determinar : a) no pisos teóricos
b) posición

MÉTODO DE LEWIS

1º) Balance en la columna : $A = D + R$ (1)
 $Az_A = Dz_D + Rx_R$ (2)

B.C = $100 \frac{\text{kmol}}{\text{h}}$ A

(1) $\rightarrow 100 = D + R$
 (2) $\rightarrow 100 \cdot 0.7 = D \cdot 0.86 + R \cdot 0.285$

$$\begin{cases} D = 100 - R \\ 70 = 86 - 0.86R + 0.285R \end{cases}$$

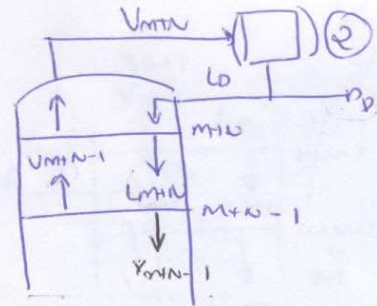
$D = 72.174 \frac{\text{kmol}}{\text{h}}$ $R = 27.826 \frac{\text{kmol}}{\text{h}}$

2º) $\frac{L_D}{D} = 4 = \frac{L_D}{72.174} \Rightarrow L_D = 288.696 \frac{\text{kmol}}{\text{h}}$

3º) Condensador total

$y_{m+n} = x_D = 0.86$
 $V_{m+n} = L_D + D = 360.87 \frac{\text{kmol}}{\text{h}}$
 $T_D = T_{BURBUBA}$

4º) SECTOR DE ENRIQUECIMIENTO



Piso. m+1 (6)

$$y_{m+1} = x_D = 0.86$$

$$V_{m+1} = L_0 + D = 360.87 \frac{\text{kmol}}{\text{h}}$$

$$x_{m+1} = 0.80$$

↑
Curva equilibrio

Piso m+1-1 (5)

a) Recta operativa $\Rightarrow y_{m+1-1} = \frac{L_{m+1}}{V_{m+1-1}} x_{m+1} + \frac{D x_D}{V_{m+1-1}}$

$$\Rightarrow y_{m+1-1} = 0.8 x_{m+1} + 0.172$$

$$y_{m+1-1} = 0.8 (0.8) + 0.172 = 0.812$$

b) Equilibrio x-y

$$x_{m+1-1} = 0.734$$

$\Rightarrow x_1^A = 0.7 < x_{m+1-1} < x_{m+1} \Rightarrow$ No es el piso de alimentación.

Piso m+1-2

a) Recta operativa $\Rightarrow y_{m+1-2} = 0.8 \cdot x_{m+1-1} + 0.172 = 0.8(0.734) + 0.172$

$$y_{m+1-2} = 0.759$$

b) Datos de equilibrio

$$x_{m+1-2} = 0.664$$

$$x_{m+1-2} < x_1^A < x_{m+1-1}$$

$$(0.664) \quad (0.7) \quad (0.734)$$

$\Rightarrow m+1-2 \Rightarrow$ Piso de alimentación

5-) Piso de alimentación.

Balance de entrada de alimento

$$L_m = qA + L_n$$

$$V_{n-1} = V_m + (1-q)A$$

$q = 1$ porque es líquido saturado.

$$L_m = (1)(100) + 288696 = 388696 \frac{\text{kmol}}{\text{h}}$$

$$V_m = 36087 - 0 = 36087 \frac{\text{kmol}}{\text{h}}$$

$$V_m y_m + (1-q)A y_a = D z_0 + L_n x_{a+1}$$

$$\Rightarrow y_m = 0.759$$

6-) SECTOR DE DEBODMIENTO

$$\text{Recta operativa} \Rightarrow y_{m-1} = \left(\frac{L_m}{V_m} \right) x_m - \left(\frac{R}{V_m} \right) x_R$$

Piso M (4)
 $M = M+N-2$

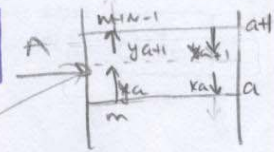
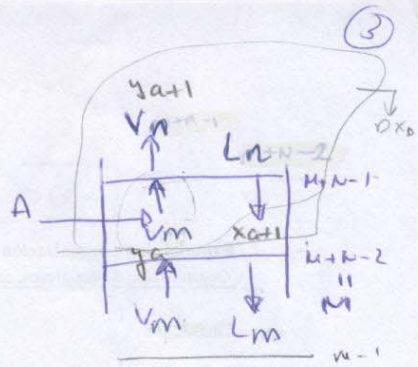
$$\left. \begin{array}{l} y_{m+n-2} = y_m = 0.759 \\ x_{m+n-2} = x_m = 0.664 \end{array} \right\}$$

Piso M-1

a) Recta operativa (3) $\Rightarrow y_{m-1} = \left(\frac{388696}{36087} \right) \cdot 0.664 - \left(\frac{27826}{36087} \right) \cdot 0.285$

$$y_{m-1} = 0.693$$

b) Dato de equilibrio $\Rightarrow x_{m-1} = 0.580$



(4)

Piso m-2 (2)

$$R.O \Rightarrow [y_{m-2} = (1.077) \cdot (0.580) - 0.02198 = 0.603]$$

$$\text{Datos equilibrio} \Rightarrow [x_{m-2} = 0.472]$$

Piso m-3 (1)

$$a) \text{ Recta operativa} \Rightarrow [y_{m-3} = (1.077) \cdot (0.472) - 0.02198 = 0.486]$$

$$b) \text{ Datos equilibrio} \Rightarrow [x_{m-3} = 0.344]$$

Piso m-4

$$a) \text{ Recta operativa} \Rightarrow [y_{m-4} = (1.077) \cdot (0.344) - 0.02198 = 0.349]$$

$$b) \text{ Datos de equilibrio} \Rightarrow [x_{m-4} = 0.214]$$

$$x_R = 0.285 \Rightarrow x_{m-3} > x_R > x_{m-4}$$

Caldera

Nº etapas \Rightarrow Caldera + 6 pisos + condensador

