

116-4

$P = \text{atm}$

$M_F = 100 \text{ kg}$

$X_{AF} = 0,4 \text{ kmol Benzol}$

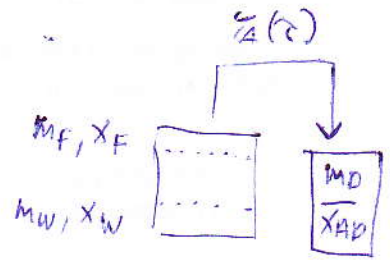
$X_{BF} = 0,6 \text{ kmol Toluol}$

$X_A = 0,2 \text{ kmol Benzol (km)}$

$\bar{Y}_{AD} = ?$

$m_D = ?$

$\alpha = 2,5$



$$\ln \frac{M_F}{m_W} = \frac{1}{\alpha_{AB} - 1} \ln \frac{X_{AF} (1 - X_{AW})}{X_{AW} (1 - X_{AF})} + \ln \frac{1 - X_{AW}}{1 - X_{AF}}$$

Balance

$X_{AF} = 0,4$

$X_{AW} = 0,2$

$$\ln \frac{100}{m_W} = \frac{1}{2,5 - 1} \ln \frac{0,4 \cdot (1 - 0,2)}{0,2 \cdot (1 - 0,4)} + \ln \frac{1 - 0,2}{1 - 0,4}$$

$$\ln \frac{100}{m_W} = \frac{1}{1,5} \ln \frac{0,4 \cdot 0,8}{0,2 \cdot 0,6} + \ln \frac{0,8}{0,6}$$

$$\ln \frac{100}{m_W} = 0,94157$$

$$\ln 100 - \ln m_W = 0,94157$$

$$\ln m_W = \ln 100 - 0,94157 = 3,6636$$

$$m_W = 39 \text{ kg}$$

$$m_D = m_F - m_W = 100 - 39 = 61 \text{ kg}$$

$$\bar{X}_{AD} = \frac{1}{m_D} \cdot (z_{AF} \cdot m_F - X_A \cdot m_W)$$

$$= \frac{1}{61} \cdot (0,4 \cdot 100 - 0,2 \cdot 39)$$

$$= 0,5279 \text{ kmol\%}$$