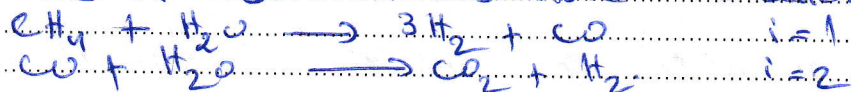


Solution Série N° 3:

Exercice 1: Soit l'ensemble de réactions:



on pose: $A_1 = \text{CH}_4$; $A_2 = \text{H}_2\text{O}$; $A_3 = \text{H}_2$; $A_4 = \text{CO}$; $A_5 = \text{CO}_2$

1/ Les bilans de matière des divers constituants en fonction de Z_1 et Z_2 et ξ

$$F_j = F_{j0} (1 - X_1)$$

$$F_j = F_{j0} + F_0 \sum_i \alpha_{ij} Z_i$$

$$F_j = F_{j0} + \sum_i \alpha_{ij} \xi_i$$

F_0 = débit molaire de référence

$$\begin{aligned} F_0 &= F_{10} + F_{20} \\ &= 1 + \frac{1}{0,75} \\ &= 2,33 \text{ mol/s} \end{aligned}$$

$J=1$

$$\begin{cases} F_1 = F_{10} (1 - X_1) \\ F_1 = F_{10} - F_0 Z_1 \end{cases}$$

$$F_{30} = F_{40} = F_{50} = 0$$

$$F_1 = F_{10} - \xi_1$$

$J=2$

$$F_2 = F_{20} + F_0 (-Z_1 - Z_2)$$

$$F_2 = F_{20} + (-\xi_1 - \xi_2)$$

$J=3$

$$\begin{aligned} F_3 &= F_{30} + F_0 (3Z_1 + Z_2) \\ &= F_{30} + (3\xi_1 + \xi_2) \end{aligned}$$

$J=4$

$$F_4 = F_{40} + F_0 (Z_1 - Z_2)$$

$$F_4 = F_{40} + (\xi_1 - \xi_2)$$

$J=5$

$$F_5 = F_{50} + F_0 (Z_2)$$

$$F_5 = F_{50} + \xi_2$$

2/ calcul de X_1 et Z_1, Z_2, ξ_1 et ξ_2 .

$$F_1 = F_{10} (1 - X_1) \Rightarrow X_1 = 1 - \frac{F_1}{F_{10}} = 1 - \frac{0,367}{1} = 0,633 \text{ mol/s}$$

$$F_1 = F_{10} - F_0 Z_1 \Rightarrow Z_1 = \frac{F_{10} - F_1}{F_0} = \frac{1 - 0,367}{2,33} = 0,27$$