

ORIGIN := 1

$T := 397.7$        $P := 652.9$        $R := 8314$        $y_1 := 0.305$        $x_1 := 0.342$

$V := \begin{pmatrix} 67.4 \\ 88.3 \end{pmatrix}$        $B := \begin{pmatrix} -562.3 & -519.6 \\ -519.6 & -692.9 \end{pmatrix}$        $P_{vap} := \begin{pmatrix} 487.1 \\ 665.3 \end{pmatrix}$

$i := 1..2$

$$\phi_{vap_i} := \exp\left(\frac{B_{i,i} \cdot P_{vap_i}}{R \cdot T}\right)$$

$x_2 := 1 - x_1$        $y_2 := 1 - y_1$

$$\phi_i := \exp\left[\frac{P}{R \cdot T} \cdot \left[B_{i,i} + (1 - y_i)^2 \cdot (2 B_{1,2} - B_{1,1} - B_{2,2})\right]\right]$$

$$\gamma_i := \frac{\phi_i \cdot y_i \cdot P}{P_{vap_i} \cdot \phi_{vap_i} \cdot x_i \cdot \exp\left[V_i \cdot \left(\frac{P - P_{vap_i}}{R \cdot T}\right)\right]}$$

$$\gamma = \begin{pmatrix} 1.182 \\ 1.044 \end{pmatrix}$$

**This is Eq. (8.4-11)**

$$A := \frac{\ln(\gamma_2)}{(x_1)^2} \cdot \left(2 x_1 - \frac{1}{2}\right) + \frac{\ln(\gamma_1)}{(x_2)^2} \cdot \left(\frac{3}{2} - 2 x_1\right) = 0.383$$

$$B := \frac{1}{2} \cdot \left[\frac{\ln(\gamma_1)}{(x_2)^2} - \frac{\ln(\gamma_2)}{(x_1)^2}\right] = 0.01$$