

ORIGIN := 1

T := 313

T_c := 304.2

P_c := 73.8

ω := 0.239

R := 83.14

P := $\begin{pmatrix} 5.1 \\ 16 \\ 19.8 \\ 22.2 \\ 43.3 \\ 58.6 \\ 74.6 \\ 90.9 \\ 86.9 \end{pmatrix}$

x₂ := $\begin{pmatrix} 0.0304 \\ 0.0831 \\ 0.1001 \\ 0.1099 \\ 0.1796 \\ 0.2101 \\ 0.2428 \\ 0.2437 \\ 0.2468 \end{pmatrix}$

root(p, q, r) := $\begin{array}{l} v \leftarrow \begin{pmatrix} r \\ q \\ p \\ 1 \end{pmatrix} \\ x \leftarrow \text{polyroots}(v) \\ \text{for } i \in 1 \dots 3 \\ \quad x_i \leftarrow 0 \text{ if } \text{Im}(x_i) \neq 0 \\ x1 \leftarrow \max(x) \\ y \leftarrow \min(x) \\ x2 \leftarrow \begin{cases} \max(x) & \text{if } y = 0 \\ y & \text{otherwise} \end{cases} \\ \begin{pmatrix} x1 \\ x2 \end{pmatrix} \end{array}$

$$f_2(p) := \begin{array}{l} T_r \leftarrow \frac{T}{T_c} \\ P_r \leftarrow \frac{P}{P_c} \\ \alpha \leftarrow \left[1 + (0.480 + 1.574\omega - 0.176\omega^2) \cdot (1 - \sqrt{T_r}) \right]^2 \\ A \leftarrow 0.42748 \cdot \frac{P_r \cdot \alpha}{T_r^2} \\ B \leftarrow 0.08664 \cdot \frac{P_r}{T_r} \\ p \leftarrow -1 \\ q \leftarrow A - B - B^2 \\ r \leftarrow -A \cdot B \\ Z \leftarrow \text{root}(p, q, r)_1 \\ \Theta \leftarrow \frac{A}{B} \cdot \ln\left(1 + \frac{B}{Z}\right) \\ \phi \leftarrow \exp(Z - 1 - \ln(Z - B) - \Theta) \\ f \leftarrow \phi \cdot P \\ f \end{array}$$

i := 1 .. 9

$f_2(P_i) =$

4.991
14.94
18.181
20.168
35.68
44.742
52.18
57.199
56.243

$$d_i := \ln\left(\frac{f_2(P_i)}{x_{2_i}}\right)$$

$$\text{line}(P, d) = \begin{pmatrix} 5.12 \\ 3.678 \times 10^{-3} \end{pmatrix} \quad \text{corr}(P, d) = 0.986$$

$$z_i := \text{line}(P, d)_1 + \text{line}(P, d)_2 \cdot P_i$$

