EXAMPLE 3.1

$T := 350 \qquad P := 10 \qquad R := 83.14$

$T_c := 282.5 \qquad P_c := 50.6 \qquad \omega := 0.089$

$$T_r := \frac{T}{T_c} \qquad P_r := \frac{P}{P_c}$$

$$B0 := 0.083 - \frac{0.422}{T_r^{1.6}} \qquad B1 := 0.139 - \frac{0.172}{T_r^{4.2}}$$

$$B := \frac{R \cdot T_c}{P_c}(B0 + \omega \cdot B1)$$

$$Z := 1 + \frac{B \cdot P}{R \cdot T}$$

$$V := \frac{Z \cdot R \cdot T}{P} = 2.812 \times 10^3$$

Alternative Approach

$T_c := 282.5 \qquad P_c := 50.6 \qquad \omega := 0.089 \qquad R := 83.14$

$$V(T, P) := \begin{array}{l} T_r \leftarrow \frac{T}{T_c} \\ P_r \leftarrow \frac{P}{P_c} \\ B0 \leftarrow \frac{R \cdot T_c}{P_c}(B0 + \omega \cdot B1) \\ B1 \leftarrow 0.139 - \frac{0.172}{T_r^{4.2}} \\ Z \leftarrow 1 + \frac{B \cdot P}{R \cdot T} \\ V \leftarrow \frac{Z \cdot R \cdot T}{P} \\ V \end{array}$$

$$V(350, 10) = 2.812 \times 10^3$$