$$\mathbf{g = -(co + b * To) * T * Log\left[\frac{T}{To}\right] + (co + b * To) * (T - To) + \frac{1}{2} * b * (T - To)^2 + \nu o * \left(P - \frac{1}{2} * ko * P^2\right) + \lambda * \nu o * P * \left((T - To)^2 + a * P * (T - To) + \frac{1}{3} * a^2 * P^2\right)}$$

$$\frac{1}{2} b (T - To)^2 + (T - To) (co + b\, To) + \left(P - \frac{ko\, P^2}{2}\right) \nu o + P \left(\frac{a^2 P^2}{3} + a P (T - To) + (T - To)^2\right) \lambda\, \nu o + T (-co - b\, To) \, Log\left[\frac{T}{To}\right]$$

$$\mathbf{\nu = FullSimplify[D[g, P]]}$$

$$(1 - ko\, P + (a P + T - To)^2 \lambda)\, \nu o$$

$$\mathbf{u = FullSimplify[g - T * D[g, T] - P * D[g, P]]}$$

$$co (T - To) - \frac{1}{2} b (T - To)^2 + P (a P (-2 T + To) + 2 T (-T + To))\, \lambda\, \nu o + \frac{1}{6} P^2 (3 ko - 4 a^2 P \lambda)\, \nu o$$

$$\mathbf{c\nu = FullSimplify[D[u, T]]}$$

$$co + b (-T + To) + 2 P (-a P - 2 T + To)\, \lambda\, \nu o$$

$$\mathbf{h = FullSimplify[g - T * D[g, T]]}$$

$$\frac{1}{6} (3 (T - To) (2 co + b (-T + To)) + P (6 - 3 ko\, P + 2 (a^2 P^2 - 3 T^2 - 3 a P\, To + 3 To^2) \lambda)\, \nu o)$$

$$\mathbf{cp = FullSimplify[D[h, T]]}$$

$$co + b (-T + To) - 2 P T \lambda\, \nu o$$

$$\mathbf{\gamma = FullSimplify\left[\frac{cp}{c\nu}\right]}$$

$$\frac{co + b (-T + To) - 2 P T \lambda\, \nu o}{co + b (-T + To) + 2 P (-a P - 2 T + To)\, \lambda\, \nu o}$$

$$\mathbf{FullSimplify\left[Solve\left[\rho == \frac{1}{\nu}, \rho\right]\right]}$$

$$\left\{\left\{\rho \to \frac{1}{(1 - ko\, P + (a P + T - To)^2 \lambda)\, \nu o}\right\}\right\}$$

$$\mathbf{FullSimplify\left[Solve\left[\rho == \frac{1}{\nu}, T\right]\right]}$$

$$\left\{\left\{T \to -a P + To - \frac{\sqrt{\lambda\, \nu o\, \rho\, (1 + (-1 + ko\, P)\, \nu o\, \rho)}}{\lambda\, \nu o\, \rho}\right\}, \left\{T \to -a P + To + \frac{\sqrt{\lambda\, \nu o\, \rho\, (1 + (-1 + ko\, P)\, \nu o\, \rho)}}{\lambda\, \nu o\, \rho}\right\}\right\}$$

$$\mathbf{FullSimplify\left[Solve\left[\rho == \frac{1}{\nu}, P\right]\right]}$$

$$\left\{\left\{P \to \frac{1}{2 a^2 \lambda\, \nu o\, \rho} \left((ko + 2 a (-T + To) \lambda)\, \nu o\, \rho - \sqrt{\nu o\, \rho\, (ko^2\, \nu o\, \rho + 4 a \lambda (a - (a + ko (T - To))\, \nu o\, \rho))}\right)\right\}, \left\{P \to \frac{1}{2 a^2 \lambda\, \nu o\, \rho} \left((ko + 2 a (-T + To) \lambda)\, \nu o\, \rho + \sqrt{\nu o\, \rho\, (ko^2\, \nu o\, \rho + 4 a \lambda (a - (a + ko (T - To))\, \nu o\, \rho))}\right)\right\}\right\}$$

$$\text{dP\_d}\rho = \text{FullSimplify}\left[\frac{1}{D\left[\frac{1}{\nu}, P\right]}\right]$$

$$\frac{\left(1 - \text{ko}\, P + (a\, P + T - \text{To})^2\, \lambda\right)^2\, \nu\text{o}}{\text{ko} - 2\, a\, (a\, P + T - \text{To})\, \lambda}$$

$$\text{dP\_de} = \text{FullSimplify}\left[-\frac{1}{c\nu} * \frac{D[\nu, T]}{D[\nu, P]}\right]$$

$(2\, (a\, P + T - \text{To})\, \lambda) / ((\text{ko} - 2\, a\, (a\, P + T - \text{To})\, \lambda)\, (\text{co} + b\, (-T + \text{To}) + 2\, P\, (-a\, P - 2\, T + \text{To})\, \lambda\, \nu\text{o}))$

$$\beta = \frac{1}{\nu} * D[\nu, T]$$

$$\frac{2\, (a\, P + T - \text{To})\, \lambda}{1 - \text{ko}\, P + (a\, P + T - \text{To})^2\, \lambda}$$