$F(V, T)$ について

$$dF = \left(\frac{\partial F}{\partial V}\right)_T dV + \left(\frac{\partial F}{\partial T}\right)_V dT$$

これを $dF = -PdV - SdT$ と比べると

$$\left(\frac{\partial F}{\partial V}\right)_T = -P$$

$$\left(\frac{\partial F}{\partial T}\right)_V = -S$$

$G(P, T)$ について

$$dG = \left(\frac{\partial G}{\partial P}\right)_T dP + \left(\frac{\partial G}{\partial T}\right)_P dT$$

$dG = VdP - SdT$ と比べて

$$\left(\frac{\partial G}{\partial P}\right)_T = V$$

$$\left(\frac{\partial G}{\partial T}\right)_P = -S$$

$H(S, T)$ について

$$dH = \left(\frac{\partial H}{\partial S}\right)_P dS + \left(\frac{\partial H}{\partial P}\right)_S dP$$

$dH = TdS + VdP$ と比べて

$$\left(\frac{\partial H}{\partial S}\right)_P = T$$

$$\left(\frac{\partial H}{\partial P}\right)_S = V$$

$$\therefore \quad \left(\frac{\partial H}{\partial S}\right)_P = \left(\frac{\partial U}{\partial S}\right)_V = T \Rightarrow \left(\frac{\partial S}{\partial H}\right)_P = \left(\frac{\partial S}{\partial U}\right)_V = \frac{1}{T}$$

$$\left(\frac{\partial G}{\partial T}\right)_P = \left(\frac{\partial F}{\partial T}\right)_V = -S \Rightarrow \left(\frac{\partial T}{\partial G}\right)_P = \left(\frac{\partial T}{\partial F}\right)_V = -\frac{1}{S}$$

$$\left(\frac{\partial U}{\partial V}\right)_S = \left(\frac{\partial F}{\partial V}\right)_T = -P \Rightarrow \left(\frac{\partial V}{\partial U}\right)_S = \left(\frac{\partial P}{\partial G}\right)_T = -\frac{1}{P}$$

$$\left(\frac{\partial H}{\partial P}\right)_S = \left(\frac{\partial G}{\partial P}\right)_T = V \Rightarrow \left(\frac{\partial P}{\partial H}\right)_S = \left(\frac{\partial P}{\partial G}\right)_T = \frac{1}{V}$$