

Thermodynamische Potentiale (Umwandlung mit Legendre-Trafo)

Name	Funktion	differentielle Form
innere Energie	$U(S, V) = U$	$dU = TdS - pdV$
freie Energie	$F(T, V) = U - TS$	$dF = -SdT - pdV$
Enthalpie	$H(S, p) = U + PV$	$dH = TdS + VdP$
freie Enthalpie	$G(T, p) = U - TS + pV$	$dG = -SdT + Vdp$

Maxwellrelationen unter Berücksichtigung: $\frac{\partial}{\partial y} \frac{\partial f}{\partial x} = \frac{\partial}{\partial x} \frac{\partial f}{\partial y}$

$$\begin{aligned}
 - \left(\frac{\partial T}{\partial V} \right)_S &= \left(\frac{\partial p}{\partial S} \right)_V \text{ aus } dU & \left(\frac{\partial S}{\partial V} \right)_T &= \left(\frac{\partial p}{\partial T} \right)_V \text{ aus } dF \\
 \left(\frac{\partial T}{\partial p} \right)_S &= \left(\frac{\partial V}{\partial S} \right)_p \text{ aus } dH & - \left(\frac{\partial S}{\partial p} \right)_T &= \left(\frac{\partial V}{\partial T} \right)_p \text{ aus } dG
 \end{aligned}$$