

Потенциалы:

$$\begin{aligned}
 F &= U - TS \\
 W &= U + pV \\
 \Phi &= U + pV - TS \\
 \Omega &= U - TS - \mu N
 \end{aligned}$$

Дифференциалы

$$\begin{aligned}
 dU &= TdS - pdV + \mu dN \\
 dF &= -SdT - pdV + \mu dN \\
 dW &= TdS + Vdp + \mu dN \\
 d\Phi &= -SdT + Vdp + \mu dN \\
 d\Omega &= -SdT - pdV - Nd\mu
 \end{aligned}$$

Якобиан $\frac{\partial(U, V)}{\partial(x, y)} \equiv \begin{vmatrix} \left(\frac{\partial U}{\partial x}\right)_y & \left(\frac{\partial U}{\partial y}\right)_x \\ \left(\frac{\partial V}{\partial x}\right)_y & \left(\frac{\partial V}{\partial y}\right)_x \end{vmatrix}, \quad \left(\frac{\partial U}{\partial x}\right)_y = \frac{\partial(U, y)}{\partial(x, y)} = \frac{\partial(y, U)}{\partial(y, x)}$

Свойство: $\frac{\partial(U, V)}{\partial(x, y)} = \frac{\partial(U, V)}{\partial(t, s)} \frac{\partial(t, s)}{\partial(x, y)}$

Теорема вириала $n\langle U \rangle = \left\langle \sum_{k=1} \frac{\partial H}{\partial q_k} q_k \right\rangle = \left\langle \sum_{k=1} \frac{\partial H}{\partial p_k} p_k \right\rangle = 2\langle K \rangle.$

Эквипарциальная теорема $\left\langle \frac{\partial H}{\partial q_k} q_k \right\rangle = \left\langle \frac{\partial H}{\partial p_k} p_k \right\rangle = kT$

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