$\int$ meint man Entropie (n fest)

ideales Gas: U = kin. Energie im Volumen V mit Temperatur T

$$pV = nRT$$

$$U = nL\left(\tfrac{3}{2} + \tfrac{n_f}{2}\right)kT \quad \rightarrow \boxed{\frac{\partial U}{\partial V} = 0}$$

(*) $\quad 0 = \frac{\partial}{\partial T}\left(+\frac{p}{T}\right)$ o.k.

$\underbrace{\qquad}_{-nR/V}$

für $T = T^S$

Entropie $S(T,V)$ mit $\left.\frac{\partial S}{\partial T}\right|_V = \frac{1}{T}\left.\frac{\partial U}{\partial T}\right|_V = C_V$

$$\left.\frac{\partial S}{\partial V}\right|_T = \left(\frac{1}{T}\left.\frac{\partial U}{\partial V}\right|_T + \frac{p}{T}\right)$$

für ideales Gas: $U = nRT\left(\tfrac{3}{2} + \tfrac{n_f}{2}\right)$

$$\left.\frac{\partial S}{\partial T}\right|_V = \frac{1}{T} nR\left(\tfrac{3}{2} + \tfrac{n_f}{2}\right)$$

$$\left.\frac{\partial S}{\partial V}\right|_T = +\frac{p}{T} = +\frac{nRT}{VT}$$

$$S = nR \int_{(T_0,V_0)}^{(T,V)} \left(dT \, \frac{\left(\tfrac{3}{2} + \tfrac{n_f}{2}\right)}{T} + \frac{dV}{V} \right) \quad \text{(2!)}$$

$$= nR\left(\left(\tfrac{3}{2} + \tfrac{n_f}{2}\right) \ln \frac{T}{T_0} + \ln \frac{V}{V_0}\right)$$