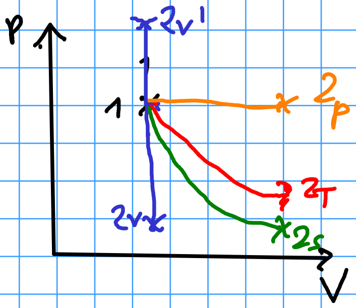
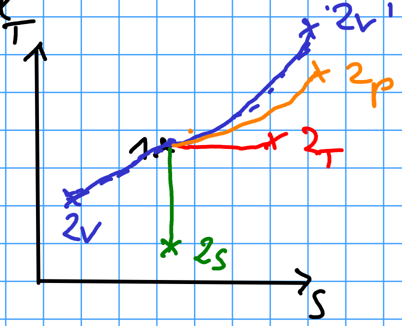
1. Hauptsatz: $dU = -p\,dV + T\,dS$

$$\int_1^2 T\,dS = \int_1^2 (dQ + dW_{diss}) = Q_{12} + W_{diss12}$$

$$-\int_1^2 p\,dV = W_{V12}$$

zunächst reversibel





Isochore: $S_2 - S_1 = m c_v \ln \frac{T_2}{T_1}$

$$T_2 = T_1 e^{\frac{S_2 - S_1}{m c_v}}$$

Isobare: $S_2 - S_1 = m c_p \ln \frac{T_2}{T_1}$

$$T_2 = T_1 e^{\frac{S_2 - S_1}{m c_p}}$$

$c_p > c_v$

$$S_2 - S_1 = m c_v \ln \frac{T_2}{T_1} + m R_i \ln \frac{V_2}{V_1}$$

Polytrope : $\frac{V_2}{V_1} = \left(\frac{T_1}{T_2}\right)^{\frac{1}{n-1}}$

$$\rightarrow S_2 - S_1 = \left(m c_v + \frac{m R_i}{n-1}\right) \ln \frac{T_2}{T_1}$$

$$c_v = \frac{R_i}{\varkappa - 1} \Rightarrow R_i = (\varkappa - 1) c_v$$

$$S_2 - S_1 = m c_v \left(1 + \frac{\varkappa - 1}{n-1}\right) \ln \frac{T_2}{T_1}$$

$$= m c_v \frac{n - \varkappa}{n-1} \ln\left(\frac{T_2}{T_1}\right)$$

Spezialfall : $1 < n < \varkappa$ $\rightarrow$ fallende e-Funktion