Ideale Flüssigkeiten

Näherungen:

$v = \text{const}$ (also auch $\frac{1}{v} = \varrho$) $\rightarrow$ thermische Zustandsgl.

$c_p = \text{const}$

$$du = c_v\,dT + \left(\frac{\partial u}{\partial v}\right)_T \underbrace{dv}_{\to 0}$$

$$dh = du + v\,dp + \underbrace{p\,dv}_{\to 0} \qquad dh = c_p\,dT + \left(\frac{\partial h}{\partial p}\right)_T dp$$

$$= c_v\,dT + v\,dp \quad \Rightarrow \quad c_v = c_p \quad , \quad \left(\frac{\partial h}{\partial p}\right)_T = v$$

$$h(T,p) = c_p T + \underbrace{f(p)}_{v \cdot p + h_0}$$

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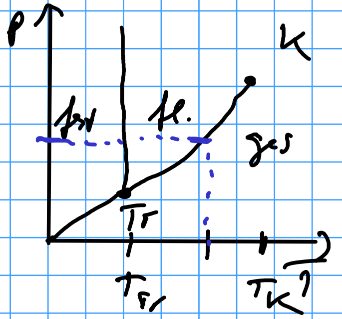
$$ds = \frac{dq}{T} = \frac{dh}{T} - \frac{v\,dp}{T} = c_p \frac{dT}{T} \Rightarrow s_2 - s_1 = c_p \ln\frac{T_2}{T_1}$$

Bilineare Interpolation

$h(p, T)$

	T_1	T	T_2
p_1	h_1		h_2
p	h_a	h	h_b
p_2	h_3		h_4



Dampfdruckkurve

$$p = p(T)$$

Zustandsgleichung im Nassdampfgebiet

geg. T (damit $p(T)$) und x

$$V = V_g + V_f \quad \Big| \, \frac{1}{m_g + m_f}$$

$$v = \frac{V}{m_g + m_f} = \frac{V_g}{m_g}\frac{m_g}{m_g + m_f} + \frac{V_f}{m_f}\frac{m_f}{m_g + m_f} = \underset{v''}{\overset{x=1}{v_g}}\, x + \underset{v'}{\overset{x=0}{v_f}}\,(1 - x)$$