

Irrev, Øving 1

1a) Irrev. gir transportlikninger solid
Foranbrukt: teori

Entropiproduksjonen gir innsikt i hvordan
minimere tap arbeid

$$1b) \quad q = -k \frac{\partial T}{\partial x}, \quad J_i = -D_i \frac{\partial c_i}{\partial x}, \quad i = -R \frac{\partial \phi}{\partial x}$$

$$2a) \quad \Delta_{\text{mix}} G = 2\mu_s - (\mu_v + \mu_s) = \mu_s - \mu_v$$

$$\mu_s = \mu_v + RT \ln \frac{c_s}{c_v}$$

$$\Delta_{\text{mix}} G = RT \ln \frac{c_s}{c_v} = \underline{\underline{-31,4 \text{ J}}}$$

$$3a) \quad \eta_I = \frac{w}{q_H} \approx \frac{1}{3} \quad (0,8?) \leftarrow$$

$$3b) \quad \eta_{II} = \frac{w}{w_{id}}, \quad w_{id} = q_H \left(\frac{T_H - T_C}{T_H} \right) = \underline{\underline{59 \text{ MW}}}$$

$$\eta_{II} = \underline{\underline{0,42}}$$

$$3c) \quad w_{\text{top}} = w_{id} - w = 14 \text{ MW}$$

$$3d) \quad \max(\eta_I, \eta_{II}) = (1, 1)$$

3e) Exergy analysis: Balance over systemet
Irrev. ? Integreere entropiproduksjonsfunksjonen

$$3f) \quad w = w_{id} - T_0 \left(\frac{\partial S_{\text{irr}}}{\partial t} \right) dt$$

$$\eta_{II} = \frac{w}{w_{id}} = 1 - \frac{T_0}{w_{id}} \left(\frac{\partial S_{\text{irr}}}{\partial t} \right) dt < 1$$
