$$Q = \Delta U' - W \qquad \Delta U' \equiv U_B - U_A$$

$$Q + W - \Delta U' = 0 \qquad \Delta U \equiv -\Delta U'$$

$$Q + W + \Delta U = 0$$

$$\boxed{Q_{bfi} + W_{fi} + \Delta U_s = 0} \qquad \boxed{Q_{bfi} + W_{fi} + (U_A - U_B) = 0}$$

W_{fi} maximizatu $\Rightarrow$ Q_{bfi} minimizatu $\Rightarrow$ ΔS_{bfi} minimizatu $\Rightarrow$ ΔS_{sos} minimizatu $\Rightarrow$

ΔS_{sos} minimizatu $\Rightarrow$ "Minimorik baxuena"
"Minimoa, absolutua"

$$\boxed{\Delta S_{sos} = 0 \quad \text{PROZESU ITZULGARRIA}}$$

$$\boxed{\begin{aligned} &dU + \delta Q_{bfi} + \delta W_{fi} = 0 && \text{EKP} \\ &dS_{sos} = dS + \frac{\delta Q_{bfi}}{T_{bfi}} \; (\geq 0) \begin{cases} > 0 & \text{IE} \\ = 0 & \text{IG} \end{cases} && \text{EEM} \end{aligned}}$$

$$\delta W_{fi} = -dU - \delta Q_{bfi}$$

$$dS + \frac{\delta Q_{bfi}}{T_{bfi}} \geq 0 \Rightarrow \frac{\delta Q_{bfi}}{T_{bfi}} \geq -dS \Rightarrow -\delta Q_{bfi} \leq T_{bfi}\, dS$$

$$\Rightarrow \boxed{\delta W_{fi} \leq -dU + T_{bfi}\, dS}$$

$$\delta Q = dU - \delta W \Rightarrow -dU = -\delta Q - \delta W$$

$$\delta W_{fi} \leq -\delta Q - \delta W + T_{bfi}\, dS$$

$$\boxed{[\delta W_{fi}]_M = -\delta Q - \delta W + T_{bfi}\, dS}$$

maximoa berdintza bete dezaken berdintza bada $\Rightarrow$ prozesua itzulgarria

$$\delta Q = T\,dS$$

$$[\delta W_{fi}]_M = -T\,dS - \delta W + T_{bfi}\, dS$$

$$= -T\,dS\left(1 - \frac{T_{bfi}}{T}\right) - \delta W$$

$$\boxed{[\delta W_{fi}]_M = \left(1 - \frac{T_{bfi}}{T}\right)(-\delta Q) + (-\delta W)}$$

$(-\delta W)$ barneaan ateratako lana

$(-\delta Q)$ barneaan ateratako bero-trukea