$$S(N,V,E) = k \ln \Gamma = kN \left[\frac{V}{h^3} \left(\frac{4\pi m E}{3N} \right)^{3/2} \right] + \frac{3}{2} Nk$$

$$E(S,V,N) = \frac{3h^2 N}{4\pi m V^{2/3}} \exp\left(\frac{2S}{3Nk} - 1 \right)$$

$$E = N\left(\frac{3}{2}kT\right) = n\left(\frac{3}{2}RT\right)$$

$$C_V = \left(\frac{\partial E}{\partial T} \right)_{N,V} = \frac{3}{2}Nk = \frac{3}{2}nR$$

$$P = -\left(\frac{\partial E}{\partial V} \right)_{N,S} = \frac{2}{3}\frac{E}{V}$$

$$P = \frac{NkT}{V} \qquad \text{edo} \qquad PV = nRT$$

$$C_P = \left(\frac{\partial (E + PV)}{\partial T} \right)_{N,P} = \frac{5}{2}nR$$

$$\gamma = \frac{C_P}{C_V} = \frac{5}{3}$$

$$S_f - S_i = Nk \ln\left(\frac{V_f}{V_i} \right)$$

$PV^\gamma = \text{konstante}$ eta $TV^{\gamma-1} = \text{konstante}$

$$(dE)_{\text{adiabatiko}} = -PdV = -\frac{2}{3}\frac{E}{V}dV$$