Adibideak 2: solido ideala, partikula bereizgarriak

$$Q_N(V,T) = [Q_1(V,T)]^N$$

$$Q_1(V,T) = \phi(T)$$

$$\mathscr{Q}(z,V,T) = \sum_{N_r=0}^{\infty} [z\phi(T)]^{N_r} = [1 - z\phi(T)]^{-1}$$

$$P \equiv \frac{k_{\mathrm{B}}T}{V} q(z,T) = -\frac{k_{\mathrm{B}}T}{V} \ln\{1 - z\phi(T)\}$$

$$N = \frac{z\phi(T)}{1 - z\phi(T)}$$

$$U = \frac{zk_{\mathrm{B}}T^2\phi'(T)}{1 - z\phi(T)} \qquad \frac{\phi(T)}{\phi(T)} \to \frac{U}{N} = \frac{k_B T^2 \phi'(T)}{\phi(T)}$$

$$A = Nk_{\mathrm{B}}T \ln z + k_{\mathrm{B}}T \ln\{1 - z\phi(T)\}$$

$$S = -Nk \ln z - k \ln\{1 - z\phi(T)\} + \frac{zk_{\mathrm{B}}T\phi'(T)}{1 - z\phi(T)}$$