Gas ideala

$$Q_N(V,T) = \frac{1}{N!h^{3N}} \int e^{-\beta H(q,p)} \mathrm{d}\omega$$

- $H(q,p) = \sum_{i=1}^{N} h_i(q_i, p_i)$ partikulak independenteak dira $\rightarrow$ integralak haien aldetik

  $h_i = h_j \; \forall \, i, j$ partikulak identikoak dira $\rightarrow$ integralak berdinak dira

  $N \, h_1(q_1, p_1)$
- $H(q,p) = \sum_{i=1}^{N} \left(\frac{p_i^2}{2m} \right)$

$$Q_N(V,T) = \frac{1}{N!h^{3N}} \int e^{-\beta/2m \sum_i p_i^2} \prod_{i=1}^{N} (d^3 q_i d^3 p_i)$$

$$Q_N(V,T) = \frac{V^N}{N!h^{3N}} \left[\int_0^{\infty} e^{-p^2/2mk_BT} (4\pi p^2 dp) \right]^N$$

$$Q_1$$

$$Q_N(V,T) = \frac{1}{N!} \left[\frac{V}{h^3} (2\pi m k_B T)^{3/2} \right]^N$$

- iruzkinak: gas ideala beste zenbait modutan