# Partition Function

19 January 2012
23:06

Function

$$\boxed{< x_i \frac{\delta H}{\delta x_j} >= \delta_{ij} kT}$$

Eg

$$H = \frac{1}{2m} p^2$$

1. $< p \frac{\delta H}{\delta p} > \; = p * \frac{2p}{2m} = \frac{2p^2}{2m} = 2H \Rightarrow \boxed{< p \frac{\delta H}{\delta p} >= 2H}$
2. $U = E =< H >$

$$= \frac{1}{2} < p \frac{\delta H}{\delta p} >$$

$$= \frac{1}{2} kT \sum_{i=0}^{d} \delta_{ij}$$

$$U \Rightarrow \boxed{\frac{D}{2} kT}$$

$$C_v = \frac{\delta U}{\delta T} = \frac{D}{2} k$$

In short:

1) $< x \frac{\delta H}{\delta x} >$
2) Find your result from 1) as a function of H
3) Then $\boxed{U =< H >= \alpha < x \frac{\delta H}{\delta x} >}$

Where $\alpha$ is a constant

$$\boxed{C_v = \frac{\delta U}{\delta T}}$$