$$E(\psi_0 + \delta\psi) \approx E(\psi_0) + \underbrace{\delta E}_{=0} + \underline{\mathcal{O}(\delta\psi^2)}$$

ψ_0 opt.

δ(dipol moment) $\sim \underline{\delta\psi}$

Eckart inequality

$$|\psi\rangle = \sum c_i |\psi_i\rangle \qquad \langle\psi|\psi\rangle = 1 \quad \underline{\sum_{i=0}^{\infty} |c_i|^2 = 1}$$

$$S = \langle\psi_0|\psi\rangle$$

$$E = \langle\psi|\hat{H}|\psi\rangle = \ldots = \sum_{i=0}^{\infty} |c_i|^2 \cdot E_i = |S|^2 E_0 + \sum_{i=1}^{\infty} |c_i|^2 \cdot E_i \geq$$

($E_i \geq E_1$)

$$\geq |S|^2 E_0 + \sum_{i=1}^{\infty} |c_i|^2 \cdot E_1 = |S|^2 \cdot E_0 + E_1 \cdot \underbrace{\sum_{i=1}^{\infty} |c_i|^2}_{1 - |S|^2} =$$

$$= |S|^2 \cdot E_0 + E_1 \left(1 - |S|^2\right)$$

$$(E_1 - E_0) \cdot |S|^2 \geq E_1 - E$$

$$1 \geq \underline{|S|^2} \geq \frac{E_1 - E}{E_1 - E_0}$$

$$\rightarrow 1$$