

$$\langle U \rangle = \psi_{i0}(|a_i + u_i|) = \psi_{i0}(|a_i|) + \frac{1}{2} \left(\frac{\delta^2 \psi_{i0}}{\delta u_i^2} \right) \langle u_i^2 \rangle + \frac{1}{24} \left(\frac{\delta^4 \psi_{i0}}{\delta u_i^4} \right) \langle u_i^4 \rangle$$