

Homework 8

1. (50 points) Give the general derivation of the expression for the energy shift $\Delta = E_n - E_n^0$ and wave function ψ_n for the Hamiltonian H , using the known results of the eigenstate, ψ_n^0 and eigenvalues, E_n^0 of Hamiltonian H_0 .

2. (100 points) Derive Δ and ψ_n within the first and second order of perturbation theory.

3 (50 points) Calculate the energy of Harmonic Oscillator, perturbed by $\frac{1}{2} \lambda x^2$ interaction.