Physics 402
Spring 2019
Prof. Belloni
Discussion Worksheet for February 13, 2019

1. Consider the one-dimensional *anharmonic* oscillator with Hamiltonian

$$H = H_0 + K' x^4$$

and the unperturbed Hamiltonian $H_0 = (p_x^2 / 2m) + k\, x^2 / 2$.

a) Write down the unperturbed eigen-energies for this problem.

b) Write down a general expression for the first order correction to the eigene-nergies.

c) Evaluate the expression for the first order correction to the eigen-energy of the n^{th} harmonic oscillator state. Hint: Look back at Eqs. [2.69] and [2.66] in Griffiths.