

PHYS 452: Quantum Mechanics II – Fall 2016
Quiz #2

Apply the variational method to estimate the ground state energy of a system with the Hamiltonian \hat{H} using the trial wave function

$$\psi(x) = c_1 f_1(x) + c_2 f_2(x),$$

where c_i 's are variational parameters and f_i 's are some given functions. Assume that is some appropriate units

$$\langle f_1 | f_1 \rangle = 1, \quad \langle f_2 | f_2 \rangle = 1, \quad \langle f_1 | f_2 \rangle = 1/2$$

and

$$\langle f_1 | \hat{H} | f_1 \rangle = 2, \quad \langle f_2 | \hat{H} | f_2 \rangle = 4, \quad \langle f_1 | \hat{H} | f_2 \rangle = 1.$$