

Problems:

4- Use the variational principle to find the lowest bound on the ground state of the hydrogen you can get using the following wave function

$$\psi(r) = A.e^{-br^2} ,$$

Where b is a variational parameter and A is determine by normalization.

5- Find the best bound on the ground state energy for the one-dimensional harmonic oscillator using a trial wave function of the form

$$\psi(x) = \frac{A}{x^2 + b^2} ,$$

Where A is determine by normalization and b is a variational parameter.