

Homework 4: Linear and nonlinear equations (**Due Friday October 26** **Total points= 120**)

October 18, 2018

1 QUANTUM MECHANICS IN A BOX **(60 POINTS)**

Do Exercise 6.9.

Now consider the following initial wave function:

$$\Psi(x, t = 0) = \begin{cases} \sqrt{\frac{12}{L^3}}x, & 0 < x < \frac{L}{2} \\ \sqrt{\frac{12}{L^3}}(L - x), & \frac{L}{2} < x < L \end{cases} \quad (1.1)$$

The evolution of $\Psi(x, t)$ take the form

$$\Psi(x, t) = \sum_{n=1} A_n e^{-iE_n t/\hbar} \psi_n(x), \quad (1.2)$$

where $A_n = \int_0^L dx \psi_n(x) \Psi(x, 0)$. **Write** a code to generate a video of the behavior of $\Psi(x, t)$.

2 THE LAGRANGE POINT **(20 POINTS)**

Do Exercise 6.16

3 NONLINEAR CIRCUITS **(40 POINTS)**

Do Exercise 6.17