

Eigen - Basis - class

1) After doing HW 2, I realized that I actually still do not understand routines and how to actually connect the files.

* After finishing Act 7, I understand it better actually*

2) "Gsl Potential.h"

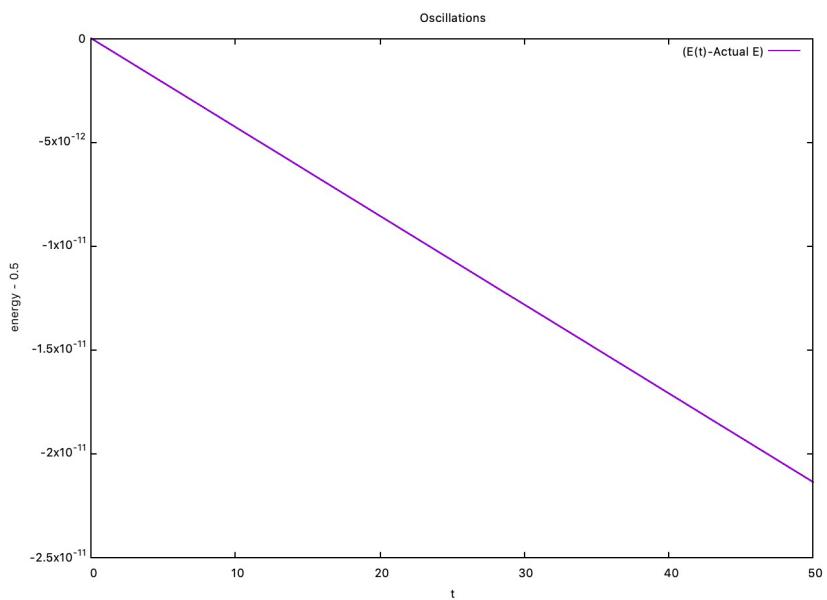
↳ also needs $\langle \text{gsl/gsl-eigen} \rangle$

3) Solving for the H_{ij} -integrand

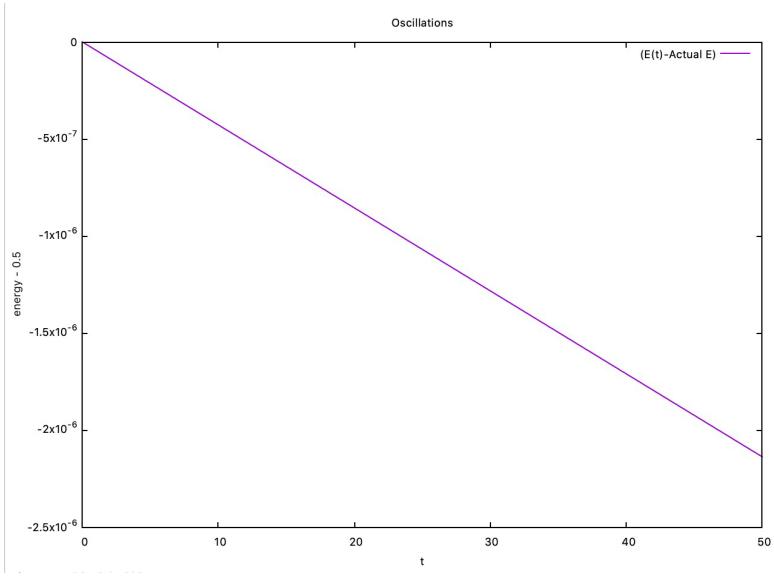
Driven Nonlinear Oscillations

- 1) plot 1 : position vs time
- plot 2 : Velocity vs position
- plot 3 : Potential vs position
- plot 4 : KE and PE vs time

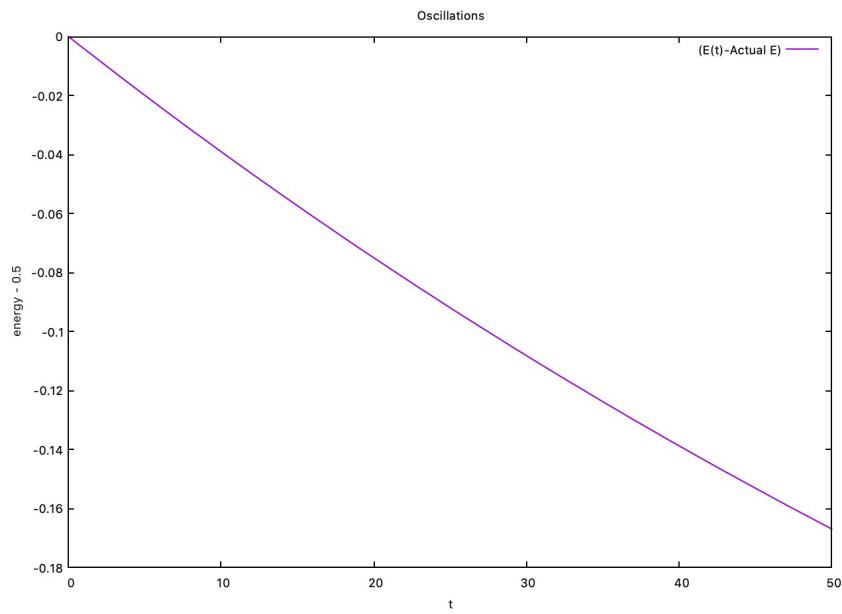
3) $\hbar = .001$: use this! smallest error!



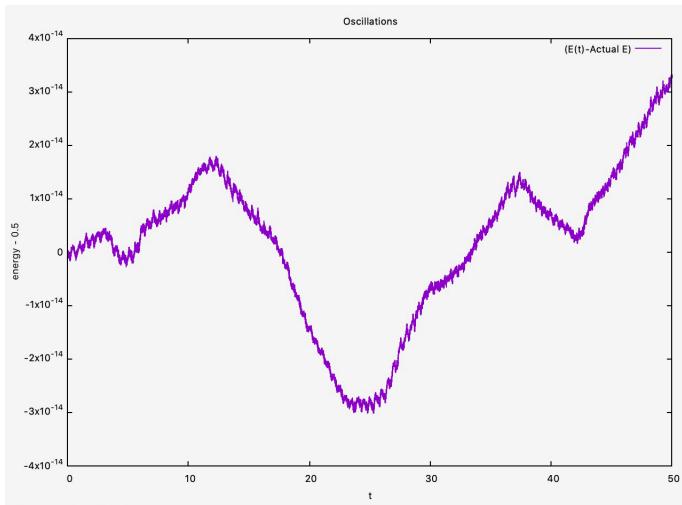
$\hbar = .01$



$\hbar = .1$



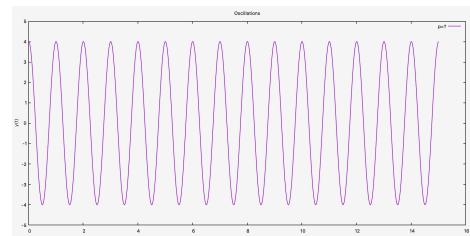
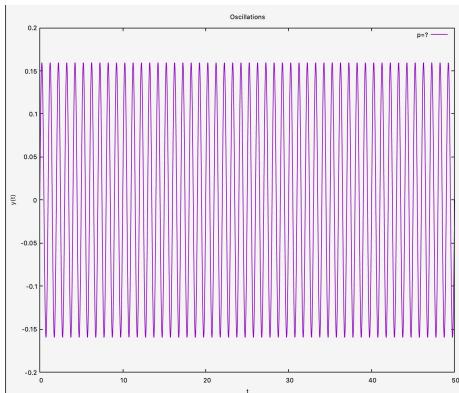
$\hbar = .0001$



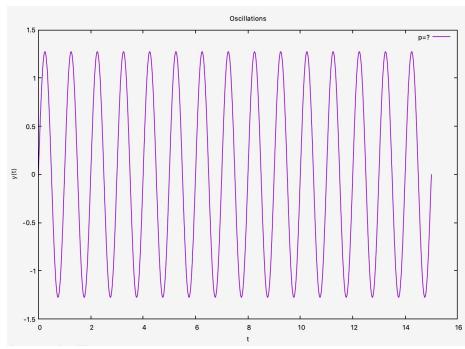
4)

Initial Conditions

$$\chi(0) = 4$$



$$v(0) = 8$$



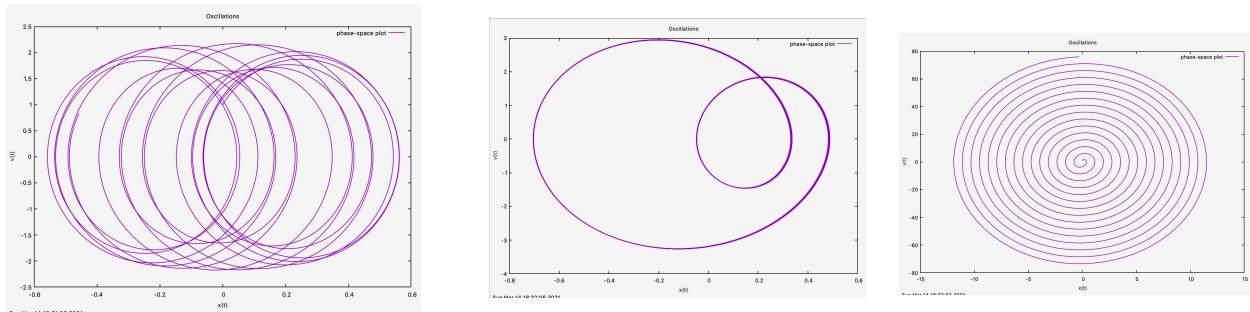
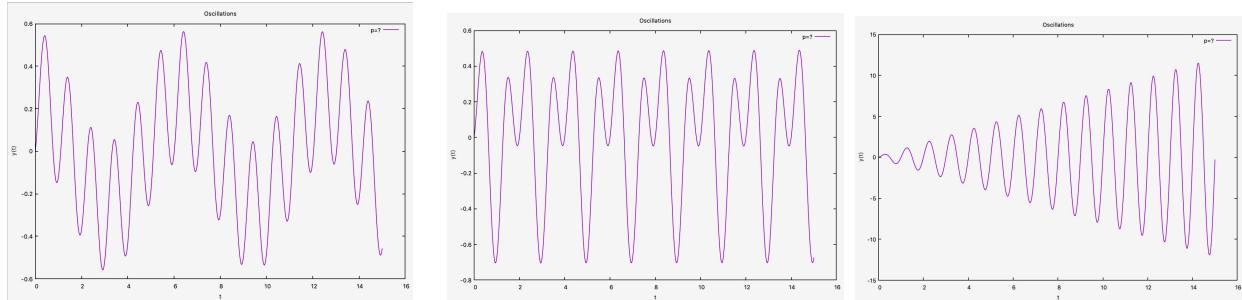
No, a larger amplitude does not mean shorter or longer period. It's possible to have a high amplitude with low speed \Rightarrow long period. And the same high amplitude with a faster $V(0)$ will have a shorter period.

$$5) \quad P=2 \quad f_{\text{ext}} = 10$$

$$\omega_{\text{ext}} = 1$$

$$3.14$$

$$6.28$$

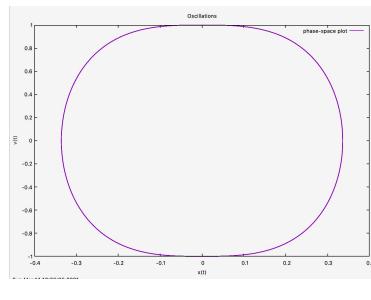
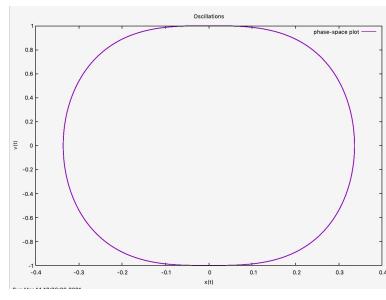
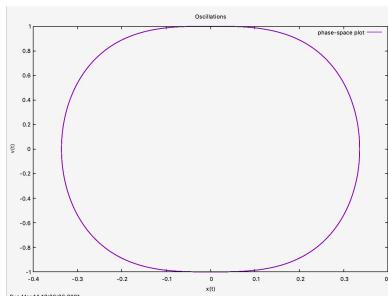
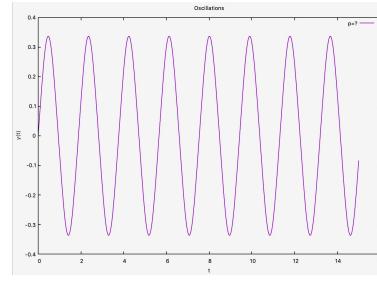
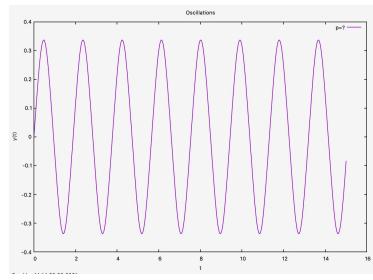
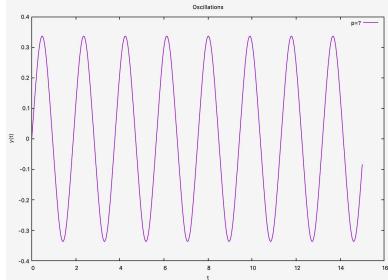


$P=3$ $f_{ext}=0$

$w_{ext}=1$

3.14

6.28

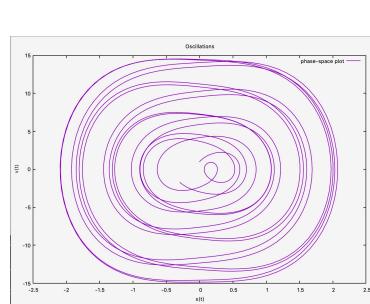
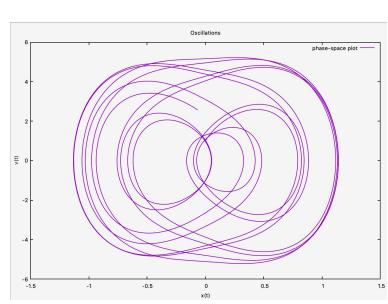
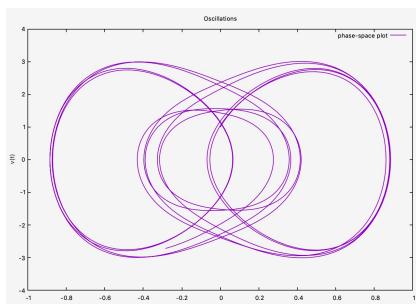
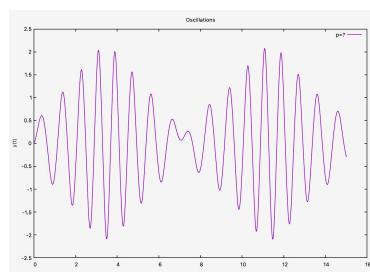
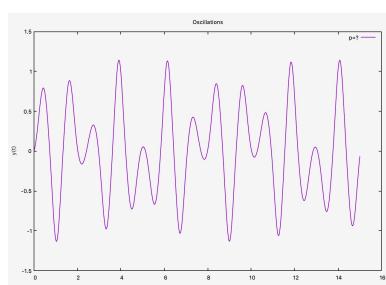
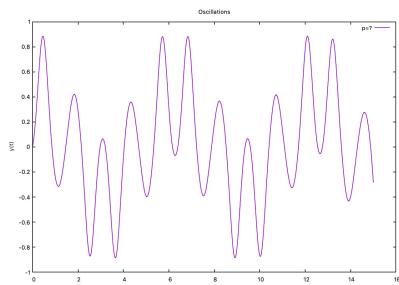


$P=3$ $f_{ext}=10$

$w_{ext}=1$

3.14

6.28



11/3. theory. is resonant behavior, but not for

$$P=2 \quad f=10 \quad \omega=6.28$$

Adding Damping

1) ✓

2) added

-double b

-double v_0

-double $F_{\text{ext}} = (-b \cdot v_0) + t \cdot 0$

t was causing
problems when compiling
so I left it

4) underdamped

$$\omega_0 > \frac{b}{2M} \quad 1 > \frac{b}{2} \quad 2 > b$$

critically damped

$$\omega_0 = \frac{b}{2M} \quad 2 = b$$

overdamped

$$\omega_0 < \frac{b}{2M} \quad 2 < b$$