
Problem #1)

This starter has 3 variables

```
In[94]:= Clear["Global`*"]
```

```
In[95]:= (* Put your eigenvectors here  
THESE ARE ALL FAKE NUMBERS  
*)
```

```
ev1 = {1, 2, -3};
```

```
ev2 = {1, 2, -3};
```

```
ev3 = {1, 2, -3};
```

```
(* and the three eigenvalues here
```

```
NOTE: w2 is w2 in my notation *)
```

```
sol = {{w2 -> 1}, {w2 -> 2}, {w2 -> 3}}
```

```
Out[98]= {{w2 -> 1}, {w2 -> 2}, {w2 -> 3}}
```

Part B Look at motion

```
In[99]:= values = {k -> 1, m -> 1};
```

```
In[100]:= mode1 = ev1 Exp[I w t] /. {w -> Sqrt[w2]} /. sol[[1]]
```

```
Out[100]= {ei t, 2 ei t, -3 ei t}
```

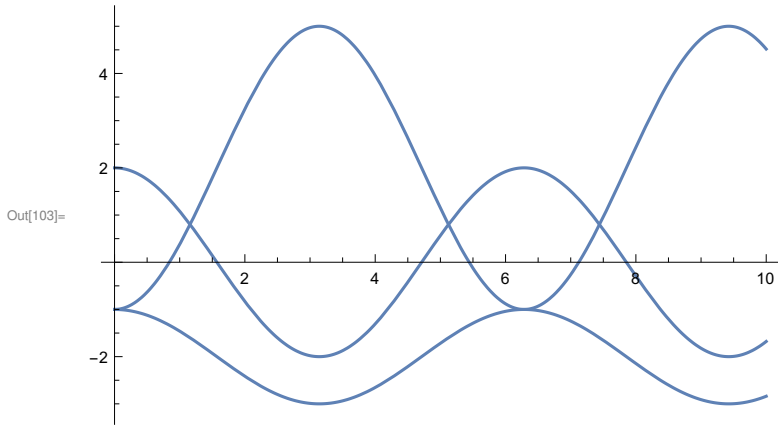
```
In[101]:= mode2 = ev2 Exp[I w t] /. {w -> Sqrt[w2]} /. sol[[2]]
```

```
Out[101]= {ei √2 t, 2 ei √2 t, -3 ei √2 t}
```

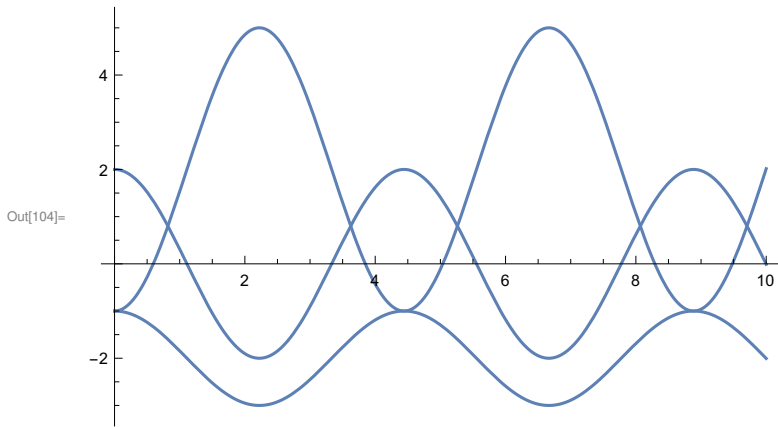
```
In[102]:= mode3 = ev3 Exp[I w t] /. {w -> Sqrt[w2]} /. sol[[3]]
```

```
Out[102]= {ei √3 t, 2 ei √3 t, -3 ei √3 t}
```

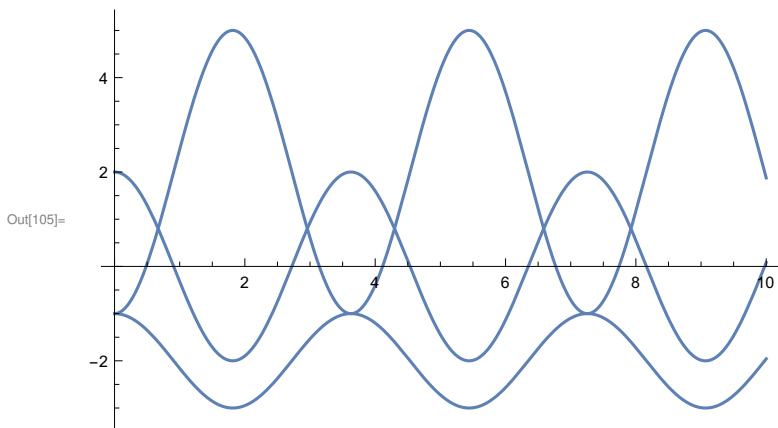
In[103]:= Plot[mode1 +{-2, 0, 2} /. values // Re, {t, 0, 10}]



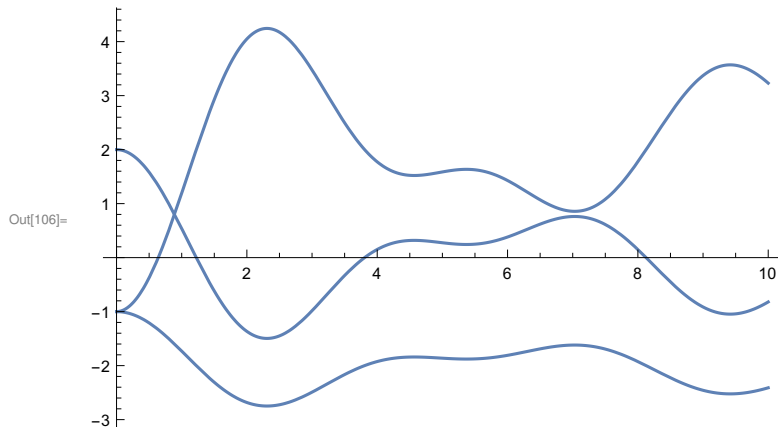
In[104]:= Plot[mode2 +{-2, 0, 2} /. values // Re, {t, 0, 10}]



In[105]:= Plot[mode3 +{-2, 0, 2} /. values // Re, {t, 0, 10}]



```
In[106]:= Plot[ $\frac{1}{2}$  mode1 +  $\frac{1}{4}$  mode2 +  $\frac{1}{4}$  mode3 + {-2, 0, 2} /. values // Re, {t, 0, 10}]
```



Problem #2,3,4,5,6)

This starter has 2 variables

```
In[107]:= Clear["Global`*"]
```

```
In[108]:= (* Put your eigenvectors here
```

```
THESE ARE ALL FAKE NUMBERS
```

```
*)
```

```
ev1 = {1, 2};
```

```
ev2 = {1, -2};
```

```
(* and the three eigenvalues here
```

```
NOTE: w2 is w2 in my notation *)
```

```
sol = {{w2 -> 1}, {w2 -> 2}}
```

```
Out[110]= {{w2 -> 1}, {w2 -> 2}}
```

Part B Look at motion

```
In[111]:= values = {k -> 1, m -> 1};
```

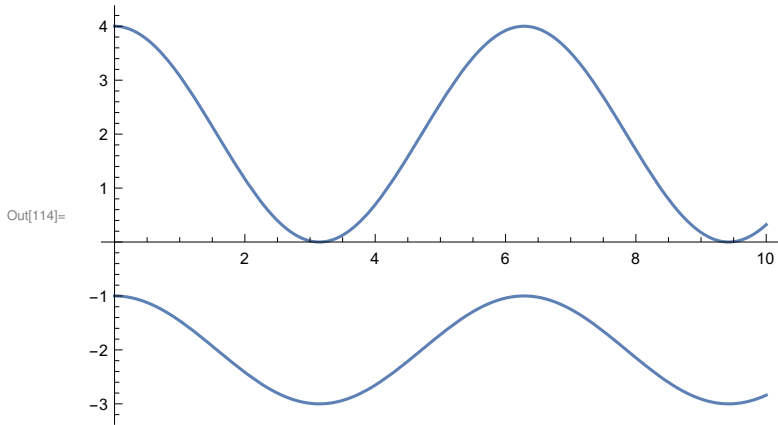
```
In[112]:= mode1 = ev1 Exp[I w t] /. {w -> Sqrt[w2]} /. sol[[1]]
```

```
Out[112]= {ei t, 2 ei t}
```

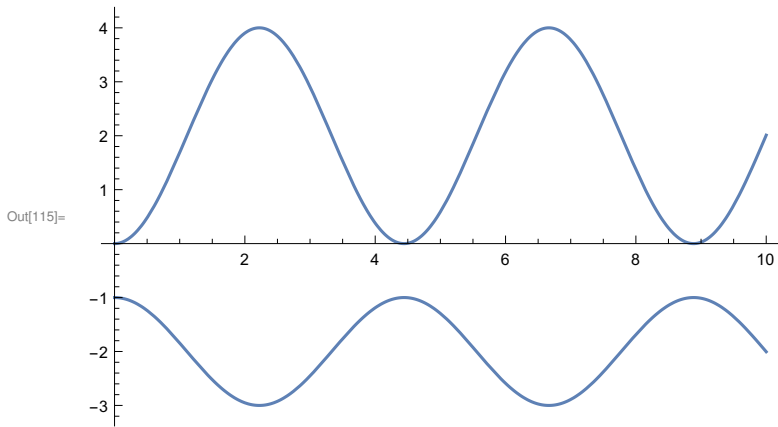
```
In[113]:= mode2 = ev2 Exp[I w t] /. {w -> Sqrt[w2]} /. sol[[2]]
```

```
Out[113]= {ei √2 t, -2 ei √2 t}
```

In[114]:= Plot[mode1 + {-2, 2} /. values // Re, {t, 0, 10}]



In[115]:= Plot[mode2 + {-2, 2} /. values // Re, {t, 0, 10}]



In[116]:= Plot[$\frac{2}{3}$ mode1 + $\frac{1}{3}$ mode2 + {-2, 2} /. values // Re, {t, 0, 10}]

