Phy482 Hw6 Prob2.3 Wood

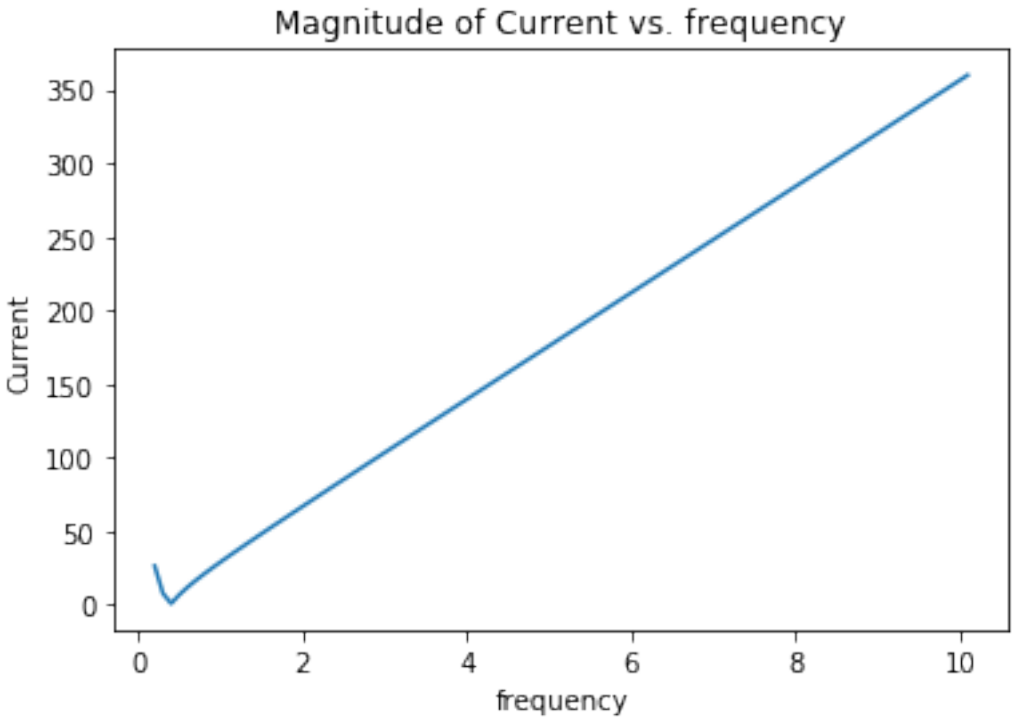
February 22, 2018

In [1]:
```
import matplotlib.pyplot as plt
from math import *
from math import pi
from scipy.optimize import fmin
```

In [2]:
```
w = 0.1
dw = 0.1
wf = 10.0

V = 1.0
R = 2.0
L = 3.0
C = 4.0

frequency = []
I = []

while w < wf:
    i = V*sqrt(1/R**2+(((w**2)*C*L-1)/w*L)**2)
    w = w + dw
    frequency.append(w)
    I.append(i)

def f(w):
    return V*sqrt(1/R**2+(((w**2)*C*L-1)/w*L)**2)

fmin(f,0.5)

plt.plot(frequency, I)
plt.xlabel('frequency')
plt.ylabel('Current')
plt.title('Magnitude of Current vs. frequency')
plt.show()
```

```
Optimization terminated successfully.
         Current function value: 0.500000
         Iterations: 14
```

```
Function evaluations: 28
```



It seems that the current is at an extremum (minimum) for frequency equal to 1/2.

In [3]:
```
w = 0.1
dw = 0.1
wf = 100.0

R = 2.0
L = 3.0
C = 4.0
V = 1.0
t = 1.0

frequency = []
I = []

while w < wf:
    i = V*sqrt(1/R**2+(((w**2)*C*L-1)/w*L)**2)*cos(w*t+atan(((w**2)*C*L-1)/R*w*L))
    w = w + dw
    frequency.append(w)
    I.append(i)

plt.plot(frequency, I)
```

```
plt.xlabel('frequency')
plt.ylabel('Current')
plt.title('Current vs. frequency at t = 1')
plt.show()
```