1) File read and averages

The average values are calculated by

```
#read time t and ~mfreelayer from data file oscillator.dat
t, mfree_x, mfree_y, mfree_z, mfixed_x, mfixed_y, mifxed_z = np.loadtxt("oscillator.dat", unpack=True)
#averages
avgs = list(map(lambda x: integrate.simpson(x,t)/(t[-1]-t[0]), [mfree_x, mfree_y, mfree_z]))
avgs.append(np.sum(t)/len(t))
betrag = list(map(lambda x,y,z: math.sqrt(x**2+y**2+z**2), mfree_x, mfree_y, mfree_z))
avgs.append(np.average(betrag))
print(avgs)
```

and are

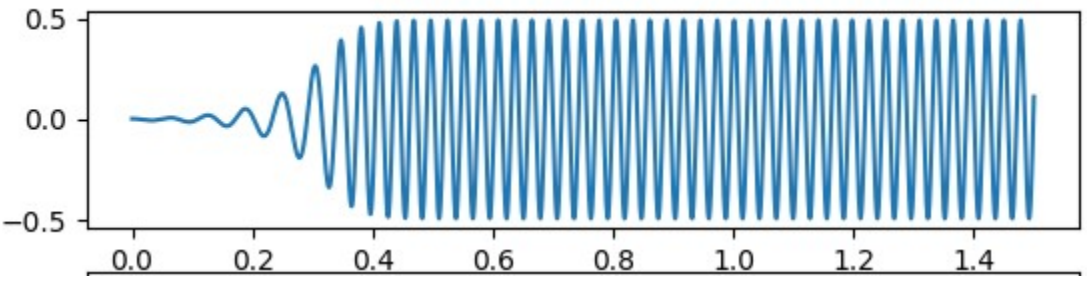
t =7.50046538015108e-09
m_x =-0.0014513581342045037
m_y = -0.0004139060305847991
m_z = 0.8607622383441947
m_betrag = 0.9653470844899261

2) Interpolation, FFT and plotting

Range declaration and interpolation:

```
ran = np.arange(0,t[-1], t[1])
interp = np.interp(ran, t, mfree_x)
```

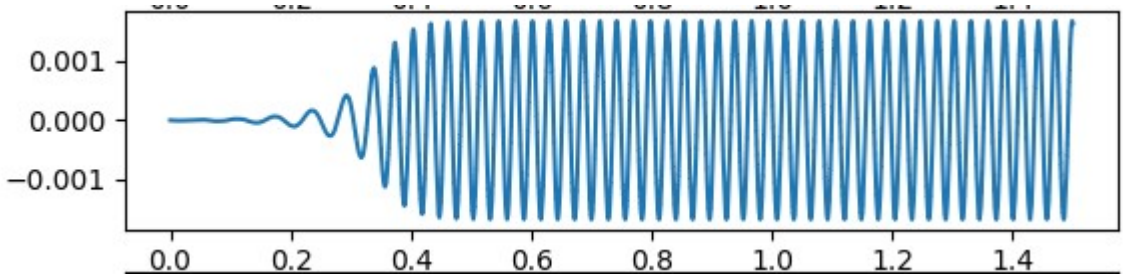
looks like this



the derivative, dm_x/dt, was generated using

```
dfdt = np.diff(interp)
```

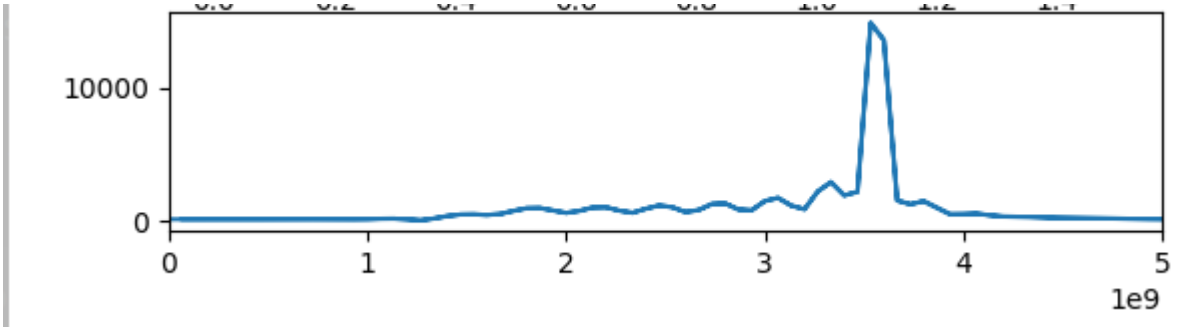
and looks like this



The fft is created by

```
f = np.fft.fft(interp)
xf = np.fft.fftfreq(len(interp), t[1])
```

and looks like this



One can see that the frequency is around ~3.5 Ghz.