Biki Ram Assignment-2 AA 403/603

In [2]:
```
import matplotlib.pyplot as plt
#import pandas as pd
import numpy as np
```

In [3]:
```
f = np.genfromtxt('2.txt')
f[f==9999.99]=np.nan
print(f)
np.shape(f)
```

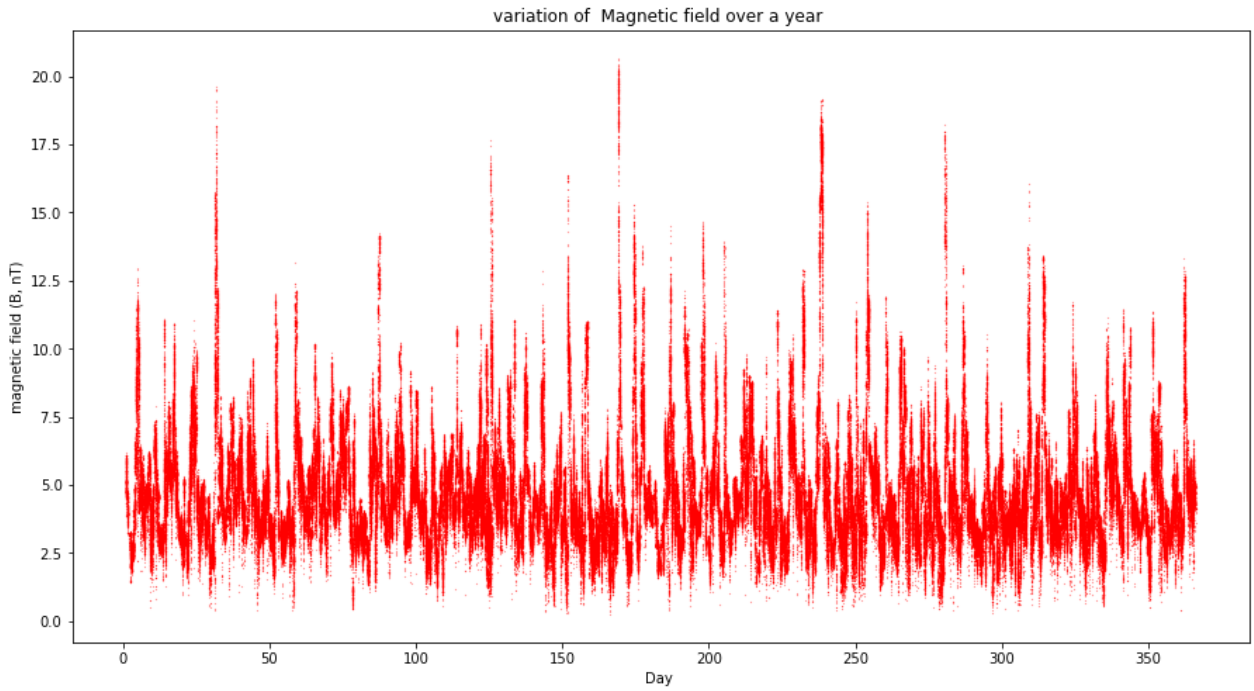
```
[[ 2.0180e+03  1.2100e+02  0.0000e+00 ...  2.0990e+02 -9.3320e+01
   3.3600e+00]
 [ 2.0180e+03  1.2100e+02  0.0000e+00 ...  2.0990e+02 -9.3320e+01
   3.3600e+00]
 [ 2.0180e+03  1.2100e+02  0.0000e+00 ...  2.0990e+02 -9.3320e+01
   3.3600e+00]
 ...
 [ 2.0190e+03  1.2500e+02  2.3000e+01 ...  2.0346e+02 -6.0720e+01
  -4.9000e-01]
 [ 2.0190e+03  1.2500e+02  2.3000e+01 ...  2.0346e+02 -6.0730e+01
  -4.9000e-01]
 [ 2.0190e+03  1.2500e+02  2.3000e+01 ...  2.0346e+02 -6.0760e+01
  -4.9000e-01]]
```

Out[3]: (532800, 8)

In [4]:
```
D=f[:,1]
Hr=f[:,2]
Min=f[:,3]
B=f[:,4]
Day=D+(Hr/24)+(Min/(24*60))
x=f[:,5]
y=f[:,6]
z=f[:,7]
```

In [5]:
```
f=plt.figure()
f.set_figwidth(15)
f.set_figheight(8)

plt.plot(Day,B,".",markersize=0.3,color='r')
plt.title("variation of  Magnetic field over a year ")
plt.xlabel("Day ")
plt.ylabel(" magnetic field (B, nT) " )
#plt.grid(axis = 'x')
plt.savefig('magetic_field.jpg',dpi=500)
plt.show()
```



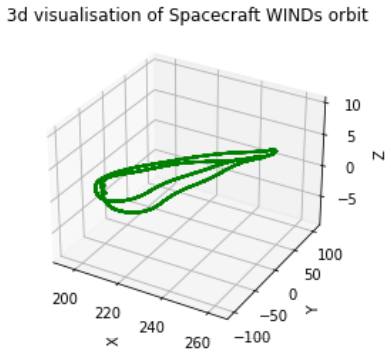
In [ ]:
```
fig, (ax0,ax1, ax2,ax3,ax4,ax5) = plt.subplots(6,figsize=(10,25))
ax0.plot(Day,x)
ax0.set_xlabel( 'Day',fontsize=12)
ax0.set_ylabel( 'x',fontsize=20)

ax1.plot(Day,y)
ax1.set_xlabel( 'Day',fontsize=12)
ax1.set_ylabel( 'y',fontsize=20)
ax2.plot(Day,z)
ax2.set_xlabel( 'Day',fontsize=12)
ax2.set_ylabel( 'z',fontsize=20)
ax3.plot(x,y)
ax3.set_xlabel( 'x',fontsize=12)
ax3.set_ylabel( 'y',fontsize=20)
ax4.plot(y,z)
ax4.set_xlabel( 'y',fontsize=12)
ax4.set_ylabel( 'z',fontsize=20)
ax5.plot(x,z)
ax5.set_xlabel( 'x',fontsize=12)
ax5.set_ylabel( 'z',fontsize=20)
plt.savefig('evolution.jpg',dpi=500)
#ax0.set_title('Evolution of Nthcomp Model parameters ')
```

In [70]:
```
a=plt.figure()
ax = plt.axes(projection ='3d')

ax.plot3D(x, y, z, 'green')
ax.set_title(' 3d visualisation of Spacecraft WINDs orbit')
ax.set_xlabel('X', rotation=90)
ax.set_ylabel('Y', rotation=90)
ax.set_zlabel('Z', rotation=90)

plt.savefig('3dimage.jpg',dpi=500)
plt.show()
```



In [9]:
```
R=np.sqrt(np.square(x-240) + np.square(y) + np.square(z))
len(R)
np.shape(R)
R = R[~np.isnan(R)]
print(np.shape(R))
rp=min(R)
ra=max(R)
print(rp,ra)
a=0.5*(rp+ra)
b=np.sqrt(rp*ra)
print(a,b)
e=(ra-rp)/(ra+rp)
print(e)
#t=(np.pi(6371*a*1000)**1.5)/np.sqrt(4*10**14)
#t/(24*3600)
```

```
(409119,)
19.99987499960935 104.46881304963698
62.23434402462316 45.70955263782722
0.678636043923009
```