Load_Data

October 27, 2024

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

[3]:
```
traj = pd.read_csv("../data/fy25-adc-high-school-data.csv")
```

[4]:
```
traj
```

[4]:

	MISSION ELAPSED TIME (mins)	Rx(km)[J2000-EARTH]	Ry(km)[J2000-EARTH]	\
0	0.000000	3690.0	4220.0	
1	8.236481	2320.0	4870.0	
2	9.236481	1870.0	4980.0	
3	10.236481	1400.0	5070.0	
4	11.236481	932.0	5140.0	
…	…	…	…	
12976	12979.169980	6250.0	283.0	
12977	12980.169980	6310.0	533.0	
12978	12981.169980	6350.0	780.0	
12979	12982.169980	6360.0	1020.0	
12980	12983.169980	6330.0	1260.0	

	Rz(km)[J2000-EARTH]	Vx(km/s)[J2000-EARTH]	Vy(km/s)[J2000-EARTH]	\
0	3030.0	-0.308	0.269	
1	3700.0	-7.470	2.140	
2	3860.0	-7.650	1.720	
3	4010.0	-7.790	1.310	
4	4130.0	-7.880	0.888	
…	…	…	…	
12976	-3170.0	1.300	4.180	
12977	-2580.0	0.844	4.150	
12978	-1990.0	0.355	4.100	
12979	-1380.0	-0.165	4.030	
12980	-771.0	-0.709	3.930	

	Vz(km/s)[J2000-EARTH]	MASS (kg)	WPSA	WPSA Range	DS54	\
0	0.0007	60129.73972	1	1139.486313	0	
1	2.8900	60129.73972	0	NaN	0	
2	2.5700	60129.73972	0	NaN	1	

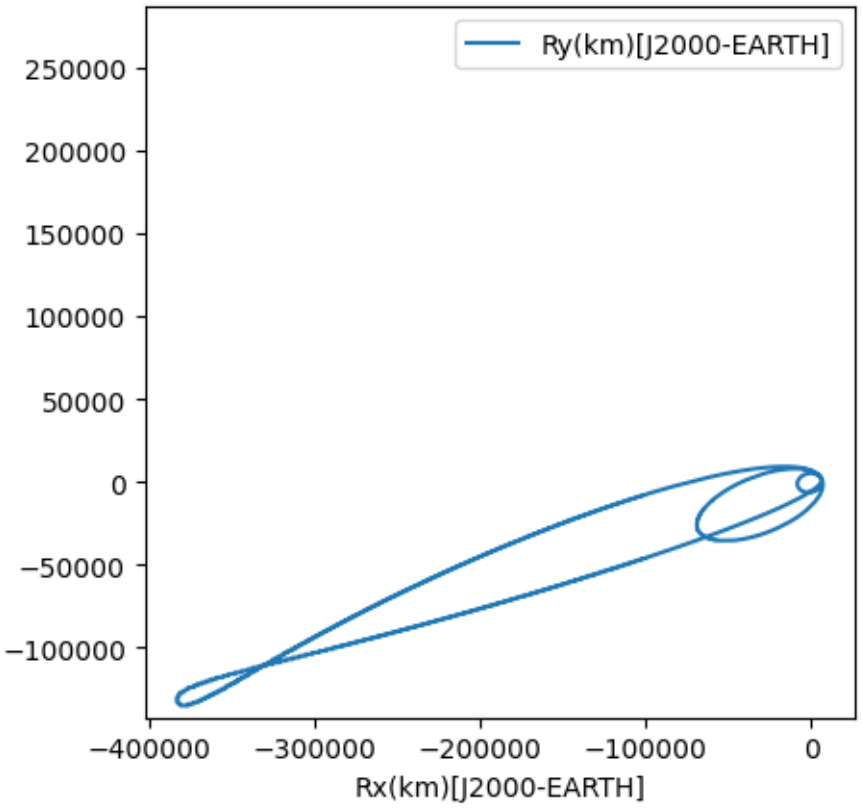
```
3                    2.2400  60129.73972     0          NaN     1
4                    1.9100  60129.73972     0          NaN     1
…                       …           …   …          …   …
12976                9.6300  22666.29909     0          NaN     0
12977                9.8400  22666.29909     0          NaN     0
12978               10.0000  22666.29909     0          NaN     0
12979               10.2000  22666.29909     0          NaN     0
12980               10.2000  22666.29909     0          NaN     0

        DS54 Range  DS24  Range DS24  DS34  Range DS34
0              NaN     0         NaN     0         NaN
1              NaN     0         NaN     0         NaN
2      3804.920572     0         NaN     0         NaN
3      3804.920572     0         NaN     0         NaN
4      3804.920572     0         NaN     0         NaN
…              …   …           …   …         …
12976          NaN     0         NaN     0         NaN
12977          NaN     0         NaN     0         NaN
12978          NaN     0         NaN     0         NaN
12979          NaN     0         NaN     0         NaN
12980          NaN     0         NaN     0         NaN

[12981 rows x 16 columns]
```

[6]:
```
traj.columns
```

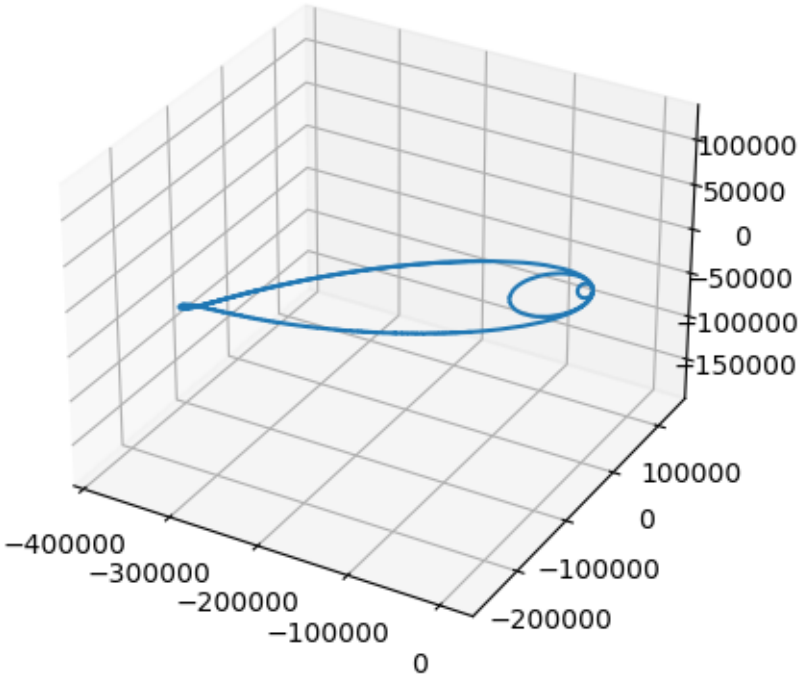
[6]:
```
Index(['MISSION ELAPSED TIME (mins)', 'Rx(km)[J2000-EARTH]',
       'Ry(km)[J2000-EARTH]', 'Rz(km)[J2000-EARTH]', 'Vx(km/s)[J2000-EARTH]',
       'Vy(km/s)[J2000-EARTH]', 'Vz(km/s)[J2000-EARTH]', 'MASS (kg)', 'WPSA',
       'WPSA Range', 'DS54', 'DS54 Range', 'DS24', 'Range DS24', 'DS34',
       'Range DS34'],
      dtype='object')
```

[41]:
```
tplot = traj.plot(x=traj.columns[1],y=traj.columns[2])
tplot.axis([-4e5,1.0e5,-2e5,3e5])
tplot.axis('square')
#tplot.axis.set_box_aspect(1)
#ax.set_aspect('equal', adjustable='box')
```

[41]:
```
(-402505.0, 26605.0, -142212.5, 286897.5)
```

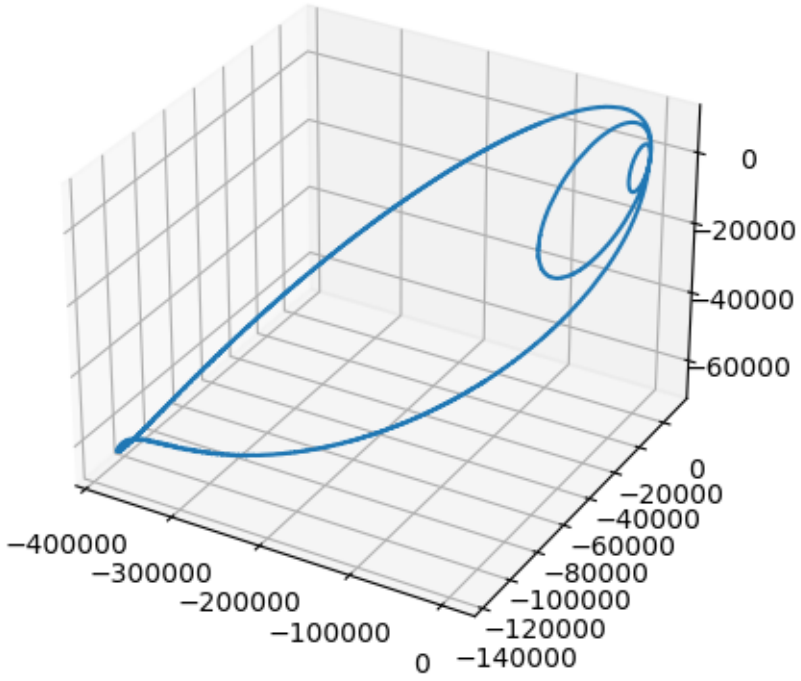


[44]:
```
ax = plt.figure().add_subplot(projection='3d')
ax.
 ↪plot(traj['Rx(km)[J2000-EARTH]'],traj['Ry(km)[J2000-EARTH]'],traj['Rz(km)[J2000-EARTH]'])
#ax.set_xlim(-4e5,1e5)
#ax.set_ylim(-2e5,3e5)
#ax.set_zlim(-4e5,1e5)
ax.set_aspect('equal', adjustable='box')
```



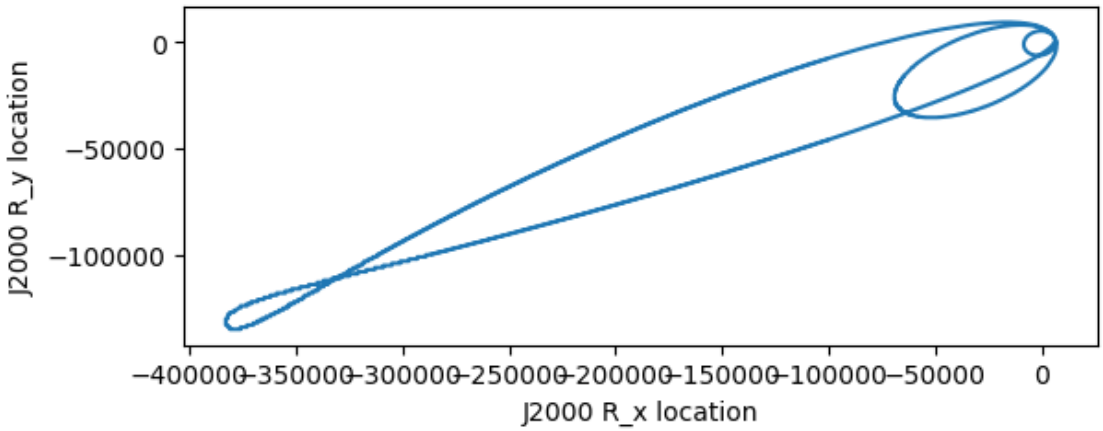
[43]:
```
ax = plt.figure().add_subplot(projection='3d')
ax.
 ↪plot(traj['Rx(km)[J2000-EARTH]'],traj['Ry(km)[J2000-EARTH]'],traj['Rz(km)[J2000-EARTH]'])
```

[43]: [<mpl_toolkits.mplot3d.art3d.Line3D at 0x7f86693e8210>]



[51]:
```
plt.plot(traj['Rx(km)[J2000-EARTH]'],traj['Ry(km)[J2000-EARTH]'])
#ax.set_xlim(-4e5,1e5)
#ax.set_ylim(-2e5,3e5)
#ax.set_zlim(-4e5,1e5)
ax = plt.gca()
ax.set_aspect('equal', adjustable='box')
ax.set_xlabel('J2000 R_x location')
ax.set_ylabel('J2000 R_y location')
```

[51]:
```
Text(0, 0.5, 'J2000 R_y location')
```


0
−50000
−100000
J2000 R_y location
−400000
−350000
−300000
−250000
−200000
−150000
−100000
−50000
0
J2000 R_x location

[ ]: