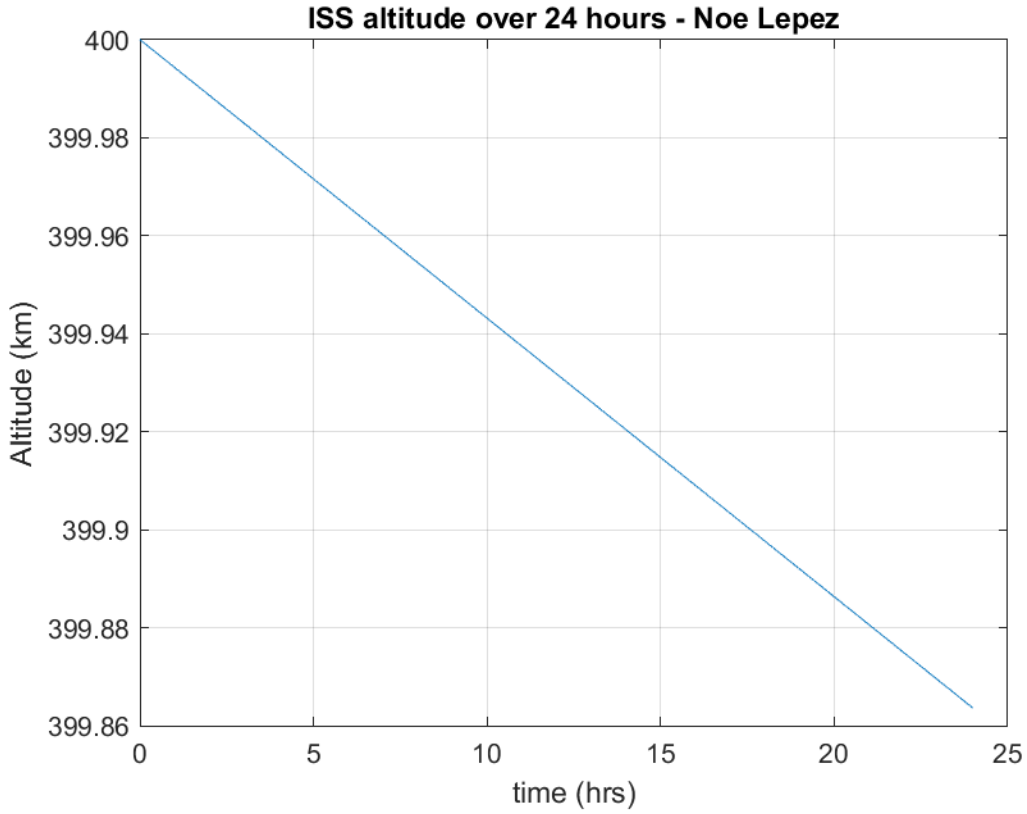
Noe Lepez Da Silva Duarte

AE 4361 – Assignment 5

1) a)



b) The delta v required after 24 hours is **0.0773 m/s**.

c) $m_{prop} = m_0\left[1 - exp\left(\frac{-f_D \Delta t}{g_0 I_{sp}}\right)\right] = (2.5 \times 10^5 + 7150)\left[1 - exp\left(\frac{-(0.0773)\times 86400}{9.81 \times 302}\right)\right]$

=**6.7104kg**

Workspace outputs for Q1 matlab code:

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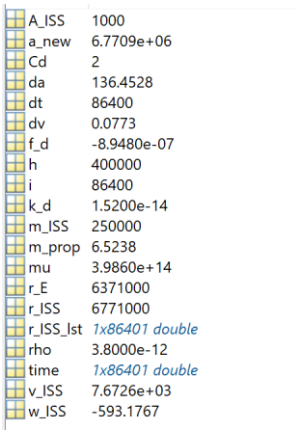

A_ISS	1000
a_new	6.7709e+06
Cd	2
da	136.4528
dt	86400
dv	0.0773
f_d	-8.9480e-07
h	400000
i	86400
k_d	1.5200e-14
m_ISS	250000
m_prop	6.5238
mu	3.9860e+14
r_E	6371000
r_ISS	6771000
r_ISS_lst	*1x86401 double*
rho	3.8000e-12
time	*1x86401 double*
v_ISS	7.6726e+03
w_ISS	-593.1767

2) a)

```
QZS1_ECEF =

   1.0e+04 *

  -2.437105577135947
   3.202635666415417
  -0.802707665754315


QZS2_ECEF =

   1.0e+04 *

  -2.490531814134237
   2.285352646336224
   3.009510505458528


QZS3_ECEF =

   1.0e+04 *

  -2.538505211931146
   3.366264749116892
   0.003679267915283


QZS4_ECEF =

   1.0e+04 *

  -3.450087256214880
   2.061564641309682
  -0.789972760420482
```

Satellite name	**Position (km)**
QZS-1	x= -24,371.056
	y= 32,026.357
	z= 8,027.077
QZS-2	x= -24,905.318
	y= 22,853.526
	z= 30,095.105
QZS-3	x= -25,383.052
	y= 33,662.647
	z= 36.793
QZS-4	x= -34,500.873
	y= 20,615.646
	z= -7,899.728

b)

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```
rho_1 =

     4.103742000000000e+04

rho_2 =

     4.525786000000000e+04

rho_3 =

     4.216131000000000e+04

rho_4 =

     4.095999000000000e+04
```

Pseudorange number	Pseudorange (km)
ρ_1	41,037.420
ρ_2	45,257.786
ρ_3	42,161.310
ρ_4	40,959.990

3) a)

```
ans =

   1.0e+03 *

  -3.602893701106829
   4.151190841193351
   3.221245960849440
   0.000000001240849
```

x_u = -3,602.8937 km

y_u = 4,151.1908 km

z_u = 3,221.2460 km

$t_u = 1.2408491*10^{-06}$ s

latitude of 30.3719

longitude of 130.9553

This is the JAXA Tanegashima space center!