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Josh O

----- HW2 - Josh Oates -----

4.15

-----P4.15-----

My calculations have the following results:

Velocity in Perifocal Frame [km/s]:

0 12.2156 0

Position in Perifocal Frame [km]:

6678 0 0

Velocity in ECI Frame [km/s]:

-10.3559 -5.7627 2.9611

Velocity in Perifocal Frame [km]:

*1.0e+03 **

-1.9838 5.3488 3.4715

H/C: norms of r and v in either frame should be equal:

Norm veci: 12.2156 Norm vp: 12.2156

Norm reci: 6678 Norm rp: 6678

5.6

*Warning: joshfLambert: This function may be useful but it is not well tested
and*

complete argument validation has not been implimented.

-----P5.6-----

My calculations have the following results:

V1 in km/s:

-4.8864 6.0226 3.0479

V2 in km/s:

-6.9168 1.2549 -1.3988

H/C: We should be using the short side and $\theta_1 < \theta_2$ so this makes sense

6.8

-----P6.8-----

My calculations have the following results:

dv [km/s]: 1.1977

transit time [s]: 59.6542

H/C: transfer time is half of the transfer period. This period makes sense for something LEO MEOish.

6.23

-----P6.23-----

My calculations have the following results:

dv [km/s]: 3.4054

H/C: The orbital period used in the calculation makes sense for a MEO orbit.

6.25

Warning: joshCOE will assume that R and V are normal if the inputs are scalar ie: the craft is in a circular orbit or is at periapse or apoapse

-----P6.25-----

My calculations have the following results:

Delta gamma [degrees]: -8.1813

Delta v [km/s]: 0.91545

H/C: We would imagine a moderate delta v for a maneuver like this. This seems to make sense for a small apseline rotation.

6.31

on paper

6.44

-----P6.44-----

My calculations have the following results:

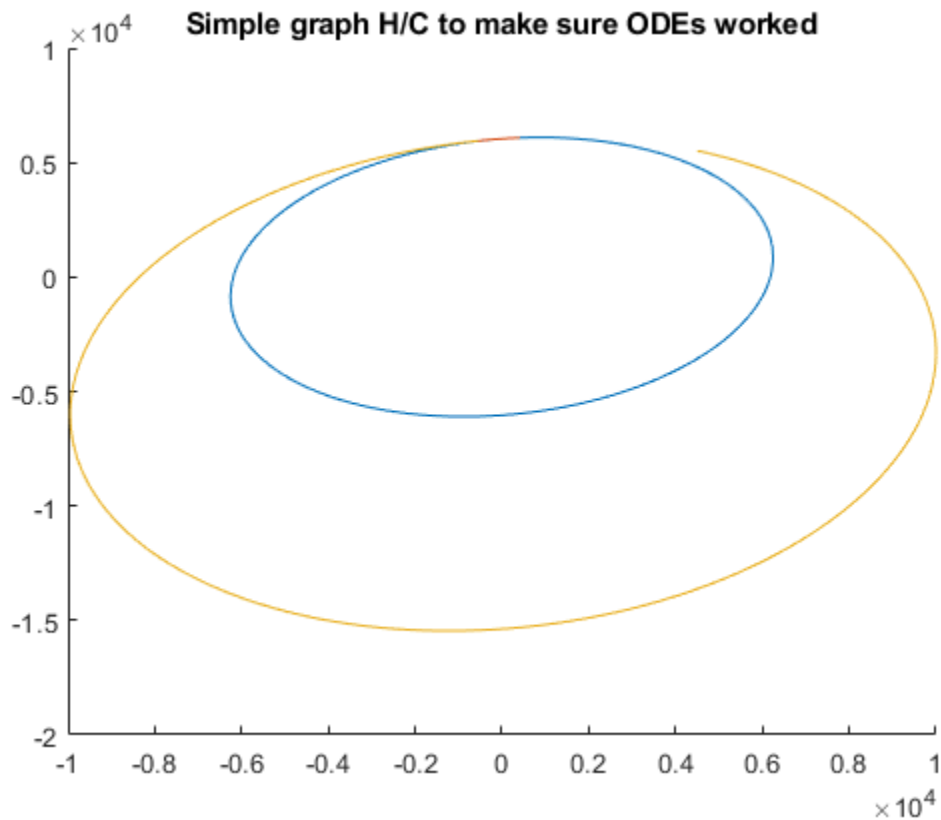
A) dv [km/s]: 2.7927

B) dv [km/s]: 2.6951

C) dv [km/s]: 2.7835

H/C: We would expect the lowest delta v to be a combined maneuver at a greater altitude, this way there is less velocity to change so to speak and a small dv will create a larger inc change.

6.47



dependancies

-----Dependancies-----

My code uses the following functions:

```
{ 'C:\AERO351\A351HW3\HW3.m' }
{ 'C:\joshFunctionsMatlab\joshAnomalyCalculator.m' }
{ 'C:\joshFunctionsMatlab\joshAxisRotation.m' }
{ 'C:\joshFunctionsMatlab\joshCOE.m' }
{ 'C:\joshFunctionsMatlab\joshHomann.m' }
{ 'C:\joshFunctionsMatlab\joshIsOnes.m' }
{ 'C:\joshFunctionsMatlab\joshLawCos.m' }
{ 'C:\joshFunctionsMatlab\joshStumpffCoeffs.m' }
{ 'C:\joshFunctionsMatlab\joshStumpffZ.m' }
{ 'C:\joshFunctionsMatlab\joshVazVr.m' }
{ 'C:\joshFunctionsMatlab\joshfLambert.m' }
```

functions

-----P6.44-----

My calculations have the following results:

Max altitude [km]: 10433.3136

Max altitude time since t_0 [min]: 194.9897

*H/C: the time to get to apogee seems to be within range for 2ish orbits in LEO
which is what the included graph seems to predict.*

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