Contents

Initialize

```
clear; clc;
```

Define variables and constants

```
global mu
mu = 398600;        % km^3/s^2
```

Initial conditions

```
r1 = [5644 -2830 -4170];        % km
r2 = [-2240 7320 -4980];        % km
dt = 20*60;                     % s
string = "pro";
```

use lambert function from book to get v at each position

```
[v1, v2] = lambert(r1, r2, dt, string);
```

get orbital params from coe from sv script from book

```
coe = coe_from_sv(r1, v1, mu);

% outputs
% coe = [h e RA incl w TA a]
fprintf("e=%g", coe(2));
fprintf("\nh=%g km^2/s", coe(1));
fprintf("\ni=%g deg", rad2deg(coe(4)));
fprintf("\nOmega=%g deg", rad2deg(coe(3)));
fprintf("\nw=%g deg", rad2deg(coe(5)));
fprintf("\ntheta=%g deg", rad2deg(coe(6)));
```

```
e=1.20053
h=76096.4 km^2/s
i=59.0184 deg
Omega=130.007 deg
w=259.98 deg
theta=320.023 deg
```

calculate perigee

```
rp = coe(1)^2/mu*1/(1+coe(2));       % radius of perigee (km)
zp = rp - 6378;                      % alt of perigee (km)
fprintf("\nz perigee=%g km", zp);
```

```
z perigee=223.823 km
```

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