Contents

Initialize

```
clear; clc;
```

Define variables and constants

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

Initial conditions

```
r1 = [5887 -3520 -1204];        % km
r2 = [5572 -3457 -2376];        % km
r3 = [5088 -3289 -3480];        % km
```

Use gibbs script from textbook to find v2

```
[v2, ierr] = gibbs(r1, r2, r3);
```

get orbital params from coe from sv script from book

```
coe = coe_from_sv(r2, v2, 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=0.0127385
h=52948.9 km^2/s
i=95.0071 deg
Omega=150.003 deg
w=151.691 deg
theta=48.3059 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=567.108 km
```

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