Contents

Problem 1

```
coe_1= coe_from_sv( [6837.432552  1868.795099  1455.480629 ],[-2.294079 6.758849  2.049468 ],
398600);
fprintf('\n Angular momentum = %s km^3/s \n', coe_1(1))
fprintf('\n Eccentricity = %s \n', coe_1(2))
fprintf('\n Right ascesion = %s degrees\n', coe_1(3)*180/pi)
fprintf('\n Inclination = %s degrees\n', coe_1(4)*180/pi)
fprintf('\n Argument of Perigee = %s degrees \n', coe_1(5)*180/pi)
fprintf('\n True Anomaly = %s degrees\n', coe_1(6)*180/pi)
fprintf('\n Semi major axis = %s km\n', coe_1(7))
```

```
Angular momentum = 5.373516e+04 km^3/s

Eccentricity = 1.726783e-03

Right ascesion = 3.409040e+02 degrees

Inclination = 1.998189e+01 degrees

Argument of Perigee = 8.677805e+01 degrees

True Anomaly = 3.092803e+02 degrees

Semi major axis = 7.244044e+03 km
```

Problem 2

```
lst_1 = LST(2016, 12, 17, 5.5, 80.1599639);  % Sriharikota
lst_2 = LST(2007, 12, 21, 10, 144+58/60);    % Melbourne
lst_3 = LST(2006, 02, 15, 3, -43-6/60);       % Rio de Janeiro
fprintf('\n Sidereal time at Sriharikota = %s degrees \n', lst_1)
fprintf('\n Sidereal time at Melbourne = %s degrees \n', lst_2)
fprintf('\n Sidereal time at Rio de Janeiro = %s degrees \n', lst_3)
```

```
Sidereal time at Sriharikota = 2.489391e+02 degrees

Sidereal time at Melbourne = 2.456463e+01 degrees

Sidereal time at Rio de Janeiro = 1.468842e+02 degrees
```

Problem 3

```
[r,v] = rv_from_observe(988, 4.86, 36, 0.59, 36.6,-0.263, 40,35, 0)
```

```
r =

   1.0e+03 *

    3.7948    3.7928    4.5014


v =

   -7.7248    7.7213    0.0187
```

Problem 4

```
r1=[5662.1 6538.0 3269 ];
v1=[-3.8856 5.1214 -2.2433 ];
X=-r1/norm(r1);
Z=-cross(r1,v1);Z=Z/norm(Z);
Y=cross(Z,X);Y=Y/norm(Y);
fprintf('\n Transformation matrix\n')
T=[X; Y; Z]
```

```
 Transformation matrix

T =

   -0.6124   -0.7071   -0.3536
   -0.6124    0.7071   -0.3535
    0.5000    0.0000   -0.8660
```

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