John Clouse IMD HW5 problem 2

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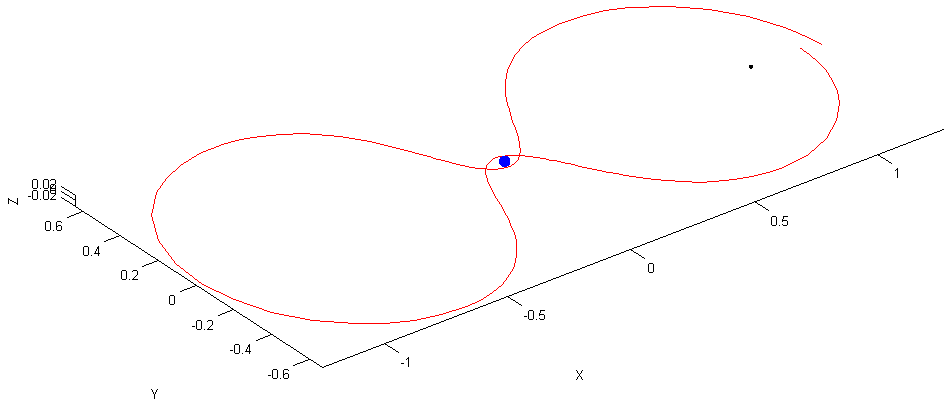
Initialize

```
clearvars -except hw_pub function_list
close all

x0 = 1.2;
x_dot0 = 0;
y0 = 0;
y_dot0 = -1.049657509830343;
X = [x0; y0; 0; x_dot0; y_dot0; 0];

mu = 0.012150585609624;
dunit = 384747.962856037;

T = 6.192169331319632;
```

Integrate and plot

```
[~,X_out] = ode45(@CRTBP, [0,T], X, odeset(),mu);

figure('Position', hw_pub.figPosn)
plot3(X_out(:,1), X_out(:,2), X_out(:,3), 'r')
hold on
axis equal
rad_vec = [0:0.1:2*pi, 2*pi];
my_circ = [cos(rad_vec); zeros(1, length(rad_vec)); sin(rad_vec)]';
for ang = rad_vec
    for blah = 1:length(my_circ)
        new_circ(blah,:) = (Euler2DCM('3', ang)*my_circ(blah,:)')';
    end
    earth =  new_circ * 6378.1/dunit;
    moon =  (new_circ * 1737/dunit);
    plot3(earth(:,1), earth(:,2), earth(:,3))
    plot3(moon(:,1) + 1, moon(:,2), moon(:,3), 'k')
end
xlabel('X'); ylabel('Y'); zlabel('Z');
```



Conclusion

This is not a periodic orbit, since the final position on the XZ plane is not the same as the initial position on the plane. It ends up further from the Moon than it started.

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