HW07

# Given

A close up of black text

Description automatically generated

# e= 0.5; Target eccentricity

# a= 3850 Target semi-major axis [km]

# nu0= 170 Initial true anomaly at t=0, [rad]

# x= 5 km

# y= 8 km

# z= 5 km

xdot = 0.002

ydot = -0.0002

zdot = 0

# Plots

A graph with a blue line

Description automatically generatedA graph of a function

Description automatically generatedA graph of a function

Description automatically generated with medium confidence

# Find and Answers

A white text with black text

Description automatically generated

Chase

ydot= (-nudot0 \* x - e \* sin(nu0) \* (xdot - nudot0 \* y)) / ( k ) - nudot0 \* x; %[km/s]

* Variables explained in MATLAB

ydot = -0.0655

# Graphs

A graph of a moving motion

Description automatically generated

A graph of a plane

Description automatically generatedA graph of a function

Description automatically generated with medium confidence

# Assumptions

* R2BEOM, no perturbations
* TH
  + R2BEOM, no perturbations
  + Target may be in an elliptical orbit

# Units

All units are explained with the answers.

# Analysis

It seems that there is a velocity in the x or the y direction can make an orbit periodic with this model. This probably becomes more unrealistic as the relative distances and velocities between the chase and the target increase. Despite my different inputs the graphs seem to always map 2 periods. The position will always match up with how it started and the x and y positions will be in different locations unless we use the ydot equation which matches the period of x and y with the z period. This is most likely because x and y affect each other and leave z unaffected. This requires that the periodic motion be based off of the period it takes to return to the original z position.