AE 313/AE 613 Space Flight Mechanics

Assignment 1

Start Date: 22-09-22

Submission Date: 16-10-2022

At a given instant, a space object has the following position and velocity vectors relative to an earth centered inertial frame of reference (i, j, k):

ro= 20,000i- 105000j- 19,000 k (km)

vo= 0.9000i-3.4000j-1.5000k (km/s)

Refer Exercise Problem 3.20 in Curtis

(i) Use Algorithm 3.4 (Curtis 3rd edition) to find r and v, 2 hours later. Show the detailed steps involved and the matlab code used to arrive at the answer

(ii) Use a different initial condition (ro, vo) of your choice and find the 'r' and 'v' at a later time t (could be 1 hr , 2hr or 3hr, you may choose).

Note 1: For problem (ii) each one of your initial conditions (values of ro, vo) must be different from the respective conditions of your other batch mates.

Note2: You must employ the concept of Universal Variable approach (section 3.7, Curtis) that is suitable for any orbit/trajectory. The current assignment is a learning experience for all of you. You are encouraged to discuss among each other to understand the formulation but in no case must copy from someone else's assignment