Project 3 (12/4/2020)
Maximum points 15

1. Solve problem 5-7 of book. Use the angle between the Earth's orbital velocity and the position vector of the launch site, $\theta = 74^0$, $V_\infty = 10290$ m/s and is to be parallel to the Earth's velocity. This problem is to be solved by iteration. You will get a quadratic equation involving eccentricity ε and the position angle ν_L at launch. Also you will get a second equation involving ν_L , ε , and θ .
    a. Begin with $\nu_L = 0$. Solve the quadratic for ε by using the "roots" function in MATLAB. Using the "find" function in MATLAB, choose the positive solution for ε , and save that solution in an array; obtain the new value of ν_L from the second equation. Save the new value of ν_L in an array and also store new minus old values of ν_L in an array. Use a "while loop" in MATLAB, as long as this difference is greater than 0.4.
    b. Display the converged values of ε , ν_L , and the number of iterations it takes to converge out of the while loop.
    c. Plot ε , ν_L as a function of the iteration.
    d. Using the converged value of ε , find the perigee of the orbit.
    e. Also find the launch velocity and corresponding elevation angle.

The submission should be typed and include analysis, diagrams, MATLAB code as necessary.