EAS 596, Fall 2019, Final Exam, Part II
Due 11:59 PM Sunday Dec. 15, 2019, submitted to UBLearns
Total Possible Points: 50

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SECTION: David Salac **SCORE:** /50

By submitting this work I affirm that I have not given or receive any unauthorized help and that all work is my own. I understand the consequence of not following this policy will result in a score of zero for the entire exam.

Problem 1b:

The solution to the initial value problem using ODE45 inbuilt matlab function is 0.36789.

The error on using ODE45 matlab function for the ODE is 1.11952e-05

Problem 1d:

The minimum number of time steps needed by improved euler to obtain the error at t = 1 no larger than that provided by ode45 is 373

Problem 2a:

The root problem is
L1sin(theta1) + L2sin (theta2) - h = 0

Problem 2g:

The original theta1 values had noise and outliers which dominated the plots and resulted in spikes in velocity and acceleration plots. Particularly we see the acceleration plot has gone extreme negative(-7912) for one outlier value and extreme positive for another(225.36).

When we computed the theta1 values using the non linear relationship between theta1 and time, the resulting values of theta2 and X, the new theta1 values are more accurate than the original data and this can be seen when we plot velocity v/s time. This time velocity v/s time is a smooth curve increasing as time increases upto a time t and then maintaining it. Accleration plot shows increase in acceleration initially and then later settling for a constant acceleration with few spikes.