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: Prof. Dargush **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:

Value of y(1) computed through ODE45 is 0.36789
Error in ODE45 (rounded to 5 decimal points): 1.0000e-05
Raw Error: 1.1195e-05

Problem 1e:

Improved Euler took 372 steps to achieve to same accuracy as ODE45
ODE45 took 57 steps

Problem 2a:

Root problem:
(L1 * sin (theta1)) + (L2 * sin (theta2))-h=0

substitute values of theta1, theta2, L1, L2 to find x
x = (L1 * cos (theta1) + L2 * cos (theta2))

Problem 2g:

After fitting a non-linear regression to explain theta1, in terms of t, the relationship has been generalized
The noise introduced in theta1 measured has been smoothened due to the curve fitting
This is evident especially while plotting velocity and acceleration, the noise has resulted in spikes in the first order - velocity and second order - acceleration terms, which is smoothed after fitting non-linear relationship. The acceleration being zero in the last step is due to backward finite difference method and forward finite difference method returning same value for velocity for the last two steps.