ENGR232 Week 7 Lab Summer 2017

Solve the following initial value problem:

$$y''+y'\text{-}6y = \exp(\text{-}t)\cos(t), \quad y(0)= 1, y'(0)= 1$$

a) Write down the expression for the Laplace Transform Y(s) of the solution (as a comment in your script)

b) Obtain the solution y(t) using inverse Laplace transform in Symbolic Toolbox.

c) Numerically solve the IVP using ode45. Plot y(t) and y'(t) in the time interval [0, 4] in the left two panes and the phase plot y(t) vs. y'(t) in the right 2 panes. Annotate all plots. Use legend to annotate the initial conations. Call these solutions the ODE-y(t) and ODE-y'(t).

d) Use the solution obtained in part (a) and matlabFunction() to create a function for y and y'.

e) Overlay the component plots y(t) and y'(t) for analytic solutions from part (d) on the same plot as the numeric solutions of part (c). You do not have to overlay the phase plot.

Upload your published file at the end of the class.