EE 475 F HW #6

1. Modify the Matlab script file that you have been working on. Now it should do the following:
    a. The first block of code is for you to enter information about the design problem. For each problem you will re-edit this part. This includes plant model either in TF, or SS, or another form; The desired specifications are also entered here. You can have place-holders for all types plant models and all specs (transient and steady state), but with most commented out. Only uncomment the ones you need, and edit according to a given problem.
    b. Compute the desired zeta, desired sigma, desired omega_n, etc. from the specs. These will correspond to the desired region for the dominant poles. Draw the root locus, overlay the RL plot with zeta-wn grid lines, hold the plot, draw the boundaries of the desired region for the dominant poles.
    c. Use a user dialog to prompt the user to select a dominant pole location pd with a mouse click inside the desired region.
    d. Determine if the selected pd is on the root locus by checking if angle(G(pd)) is very close to pi. If yes, go to f, else continue with e.
    e. Design a PD controller, or a lead controller, as needed. You can have 3 place holders for PD design, and for two ways of lead design.
    f. Compute Controller gain, compute controller TF, and compute Go(s) = C(s)*G(s).
    g. Determine the system type, compute the finite non-zero error constant (either Kp, or Kv, or Ka, depending on the type), and check to see if steady-state error satisfies specifications. If it does, go to i, else, continue with h.
    h. Desire either a PI controller or a lag controller. You should have 3 place holders for the lag design and two ways of PI design. Modify the Go(s) by multiplying the lag or PI to the Go(s) in step f. Keep the same controller gain.
    i. Compute the closed-loop TF Gc(s), obtain closed-loop step response, plot the step response with achieved specs annotated on it, return the achieved specs in a vector, check to see if all specifications are met.
    j. If all specs are good enough, done, else, either re-do the design or perform some simple tuning of controller parameters based on the RL moving direction.

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3. B-6-15
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