**MECE 441 Lab. Exercises**

1. In Figure 1, let G(s) = 5 and P(s) = **7/(s+2).**
   1. Calculate the steady-state error due to a command input R(s) = **3/s** with D(s) = **0**.
   2. Verify the result of Part **a** using Simulink.
   3. Calculate the steady-state error due to a disturbance input D(s) = **-1/s** with R(s) = **0**.
   4. Verify the result of Part **c** using Simulink.
   5. Calculate the total steady-state error due to command input R(s) = **3/s** and a disturbance D(s) = **-1/s** applied simultaneously.
   6. Verify the result of Part **e** using Simulink.

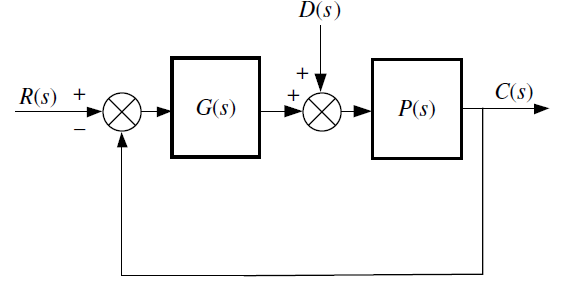
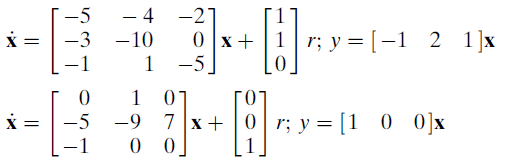


Figure : Question-1

1. For each of the following closed-loop systems, find the steady-state error for unit step and unit ramp inputs.



1. Given the system shown in Figure 2, find the sensitivity of the steady-state error to parameter a. Assume a step input. Plot the sensitivity as a function of parameter a.

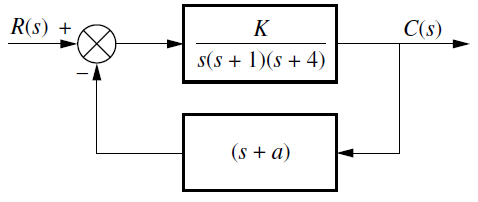


Figure : Question 3